NORTH Dakota

Be Legendary.

Priority Climate Action Plan

February 28, 2024

PREPARED FOR

North Dakota Department of Environmental Quality

PREPARED BY

Environmental Resources Management, Inc.

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

ACRONYMS	DESCRIPTION
CCAP	Comprehensive Climate Action Plan
CEJST	Climate and Economic Justice Screening Tool
CH_4	Methane
CO_2	Carbon dioxide
CO_2EC	Carbon dioxide from electricity consumption
CO_2FFC	Carbon dioxide from fossil fuel combustion
CO_2e	Carbon dioxide equivalent
EERC	Energy & Environmental Research Center
EIA	Energy Information Administration
EJScreen	Environmental Justice Screening and Mapping Tool
EPA	U.S. Environmental Protection Agency
ERM	Environmental Resources Management, Inc.
GHG	Greenhouse gas
GHG Inventory	Greenhouse gas inventory
HVAC	Heating, venting, and air conditioning
HFC	Hydrofluorocarbons
LIDAC	Low-income and disadvantaged communities
LULUCF	Land use, land-use change and forestry
$MMtCO_2e$	Million metric tons of carbon dioxide equivalent
MSA	Metropolitan statistical areas
MT	Metric tons
MSW	Municipal solid waste
N_2O	Nitrous oxide
NDASCD	North Dakota Association of Soil Conservation Districts
N.D.C.C.	North Dakota Century Code
NDDEQ	North Dakota Department of Environmental Quality
NDDES	North Dakota Department of Emergency Services
NDHHS	North Dakota Department of Health and Human Services

NDFU	North Dakota Farmers Union
NDPA	North Dakota Pipeline Authority
NF_3	Nitrogen trifluoride
NRCS	National Resources Conservation Service
PCAP	Priority Climate Action Plan
PFC	Perfluorocarbons
PHMSA	Pipeline Hazardous Materials Safety Administration
SCD	Soil Conservation Districts
SF_6	Sulfur hexafluoride
SIT	State Inventory Tool
USDA	U.S. Department of Agriculture
ZCTA	ZIP code tabulation areas

1. INTRODUCTION

The North Dakota Department of Environmental Quality (NDDEQ) was awarded a Climate Pollution Reduction Grant (CPRG) from the U.S. Environmental Protection Agency (EPA)[1] to develop North Dakota's first climate action plan, including a comprehensive greenhouse gas (GHG) inventory, and incorporating public input on proposed GHG reduction measures. This Priority Climate Action Plan (PCAP) focuses on creating vibrant economies and bringing innovative approaches to climate planning. NDDEQ produced this PCAP to support investments that create high-quality jobs, spur economic growth, and enhance quality of life for all North Dakotans. NDDEQ sought the recommendations of North Dakotans over multiple rounds of engagement through in-person dialogue and listening forums.

[1] U.S. Environmental Protection Agency. 2024. "Climate Pollution Reduction Grants." Accessed February 2024. Retrieved from: https://www.epa.gov/inflation-reduction-act/climate-pollution-reduction-grants

This PCAP is reflective of communities' needs and was designed to ensure a sustainable, high-quality environment for current and future generations.

CLIMATE POLLUTION REDUCTION GRANT AND PRIORITY CLIMATE ACTION PLAN OVERVIEW

EPA's CPRG program provides $5 billion in grants to states, local governments, tribes, and territories to develop and implement ambitious plans for reducing GHG emissions and other harmful air pollution. EPA's key objectives for the CPRG program are to tackle damaging climate pollution while supporting the creation of good jobs and lowering energy costs for families; accelerate work to address environmental injustice and empower community-driven solutions in overburdened neighborhoods; and deliver cleaner air by reducing harmful air pollution in places where people live, work, play and go to school. The program is authorized under Section 60114 of the Inflation Reduction Act[2] and consists of two phases.

Phase 1 provides $250 million for noncompetitive planning grants to support states, local governments, tribes and territories with climate planning. Planning grant recipients must design two climate action plans that incorporate various measures to reduce GHG emissions in the following sectors: electricity generation, industry, transportation, buildings, agriculture, natural and working lands, and waste management. All planning grantees must submit the following deliverables to EPA:

Priority Climate Action Plan – A PCAP is a narrative report that includes a focused list of near-term, high-priority and implementation-ready measures to reduce GHG pollution and an analysis of GHG emissions reductions. State PCAPs are due to EPA on March 1, 2024.

Comprehensive Climate Action Plan (CCAP) – A CCAP is a narrative report that provides an overview of the grantees' significant GHG sources and sinks, establishes near-term and long-term GHG emission reduction goals, and provides strategies and identifies measures that address the highest priority sectors to help the grantees meet those goals. State CCAPs are due to EPA two years after the planning grant award.

Status Report – A Status Report includes the implementation status of the quantified GHG reduction measures from the CCAP; any relevant updated analyses or projections supporting CCAP implementation; and next steps and future budget/staffing needs to continue CCAP implementation. For state grantees, the Status Report is due at the end of the four-year grant period.

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[2] H.R.5376 – 117th Congress (2021-2022): Inflation Reduction Act of 2022. 2021. https://www.congress.gov/bill/117th-congress/house-bill/5376/text.

Phase 2 provides $4.6 billion for competitive implementation grants to support the GHG reduction measures identified in the PCAP developed with Phase 1 planning grant funding. Applications for Phase 2 implementation grants are due to EPA on April 1, 2024. This funding is open to entities that received planning grants, as well as eligible government entities that did not directly receive a planning grant that are applying for funds to implement measures included in an applicable PCAP. The GHG reduction measures identified within this PCAP are broadly available to any entity in the state eligible to receive funding under the EPA's CPRG program and other funding streams, as applicable.

NORTH DAKOTA CONTEXT

North Dakota's PCAP advances the state's goal of carbon neutrality by 2030[3] by building on a variety of strategies that have been successful and are supported by communities across the state. North Dakotans have voiced broad support for finding innovative strategies to reduce emissions across sectors, recognizing the need to maintain thriving and sustainable communities and create quality, well-paying jobs. This plan is aligned with the primary drivers of North Dakota's economy and focuses on identifying opportunities for investment in the energy and agriculture sectors.

The State of North Dakota plans to foster economic growth through energy exploration and manufacturing expansion, while targeting an all-of-the-above energy approach. In 2022, coal-fired power plants accounted for 55% of North Dakota's electricity generation and wind energy accounted for 37%.[4] North Dakota also ranks third in the nation in crude oil reserves and production and is a top-10 fuel ethanol-producing state.[5] The state's unique geology[6] positions it to lead the nation in deploying innovative carbon sequestration technologies, which will help reduce GHG emissions from the oil and gas, coal and manufacturing sectors. Additionally, North Dakota is part of the Heartland Hydrogen Hub, which will leverage energy resources to decarbonize fertilizer production, energy generation and cold climate space heating.[7] North Dakota also continues to support wind and solar

[3] North Dakota Office of the Governor. May 12, 2021. "Burgum addresses Williston Basin Petroleum Conference, issues carbon neutral challenge." Accessed February 2024. Retrieved from: https://www.governor.nd.gov/news/updated-waudio-burgum-addresses-williston-basin-petroleum-conference-issues-carbon-neutral

[4] U.S. Energy Information Administration. N.D. "North Dakota State Profile and Energy Estimates." Accessed February 2024. Retrieved from: https://www.eia.gov/state/?sid=ND

[5] Ibid.

[6] North Dakota Department of Commerce. N.D. "North Dakota Carbon Neutrality Opportunity." Accessed February 2024. Retrieved from: https://www.medialibrary.nd.gov/assetbank-nd/assetfile/117050.pdf

[7] North Dakota Office of the Governor. October 13, 2023. "Burgum applauds DOE selecting Heartland Hydrogen Hub formed by governors of ND, MN, MT and WI." Accessed February 2024. Retrieved from: https://www.governor.nd.gov/news/burgum-applauds-doe-selecting-heartland-hydrogen-hub-formed-governors-nd-mn-mt-and-wi

energy resources to provide more clean energy across the state and the country. The Heartland Hydrogen Hub and energy sector expansion are expected to create many new clean energy jobs and reduce GHG emissions in the energy and manufacturing sectors.

North Dakotans share a commitment to be good stewards of the land. Farmers and ranchers across North Dakota have long understood the importance of maintaining soil health for the prosperity of their businesses and the environment. This plan leverages approaches developed by North Dakota's producers to build upon climate-smart agriculture practices that protect soil health through regenerative farming practices. Increasing educational opportunities for these practices and expanding existing programs will help to limit the financial burden to implementing sustainable agriculture practices. These efforts will remove existing barriers and encourage additional producers to adopt sustainable agriculture practices, reducing GHG emissions across the state.

NDDEQ prioritized collaborating with North Dakotans to ensure the state's PCAP reflects communities' needs and was supportive of local planning efforts. Integrating the vision of the state with the wants and needs of North Dakotans, this PCAP outlines a pathway to continue supporting the growth of local economies while transitioning towards a carbon-neutral future. Actions taken as a result of this plan will lead to meaningful impacts that help to ensure North Dakotans prosper for years to come.

SCOPE OF THE PCAP

North Dakota consists of 53 counties that are home to a population of 783,926.[8] With a population density of 11 people per square mile, North Dakota ranks 49 out of 52 states and territories in population density.[9] Even as North Dakota experienced a 15% population growth from 2010 to 2020, 36 of the state's 53 counties remain classified as "frontier" due to a population density of less than six persons per square mile.[10] Communities in North Dakota self-identify as "tight-knit," even though they are geographically distributed across vast distances. Residents must often travel long distances for activities such as jobs, school, healthcare, grocery stores or entertainment.

The state's population is also becoming more diverse; North Dakota's diversity index increased from 20.6% to 32.6% from 2010-2020, with counties in the western part of the state seeing the greatest

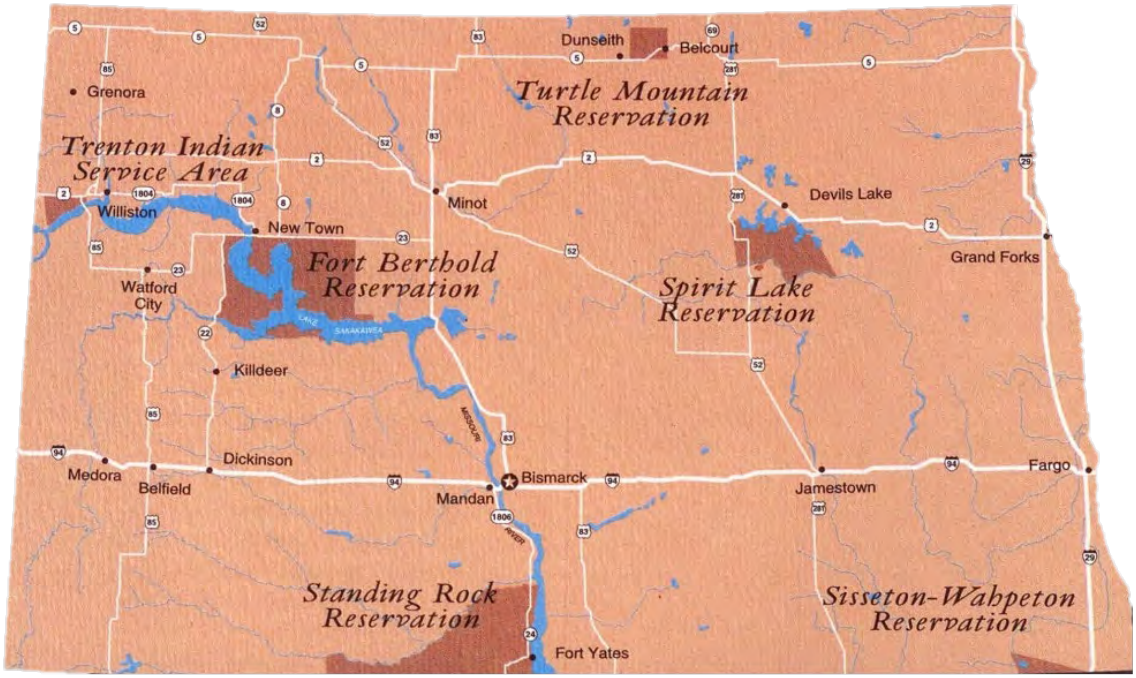
[8] U.S. Census Bureau. 2023. "Quick Facts - North Dakota." Accessed February 2024. Retrieved from: https://www.census.gov/quickfacts/fact/table/ND#

[9] U.S. Census Bureau. April 26, 2021. "Historical Population Density Data (1910-2020)." Accessed February 2024. Retrieved from: https://www.census.gov/data/tables/time-series/dec/density-data-text.html

[10] Ibid.

increase in diversity.[11] North Dakotans identify as 86.6% White, 5.3% Native American (alone), 4.6% Hispanic (alone), 3.6% Black (alone), 1.7% Asian (alone), 0.1% Native Hawaiian and Pacific Islander (alone), and 2.6% two or more race groups.[12] There are five federally recognized Native American tribes and one Indian community that share geography with North Dakota, including the Mandan, Hidatsa, & Arikara Nation (Three Affiliated Tribes), the Spirit Lake Nation, the Standing Rock Sioux Tribe, the Turtle Mountain Band of Chippewa Indians, the Sisseton-Wahpeton Oyate Nation, and the Trenton Indian Service Area, as shown in Figure 1.[13]

Figure 1. State of North Dakota and Tribal Nations



Source: North Dakota Department of Indian Affairs. N.D. "Tribal Nations." Accessed February 2024. Retrieved from: https://www.indianaffairs.nd.gov/tribal-nations

North Dakota is a center for energy innovation, advanced manufacturing, and agricultural expertise. Over the last 50 years, North Dakota has grown from a mainly agricultural economy to become a

[11] U.S Census Bureau. August 12, 2021. "Racial and Ethnic Diversity in the United States: 2010 Census and 2020 Census." Accessed February 2024. Retrieved from: https://www.census.gov/library/visualizations/interactive/racial-and-ethnic-diversity-in-the-united-states-2010-and-2020-census.html

[12] U.S. Census Bureau. 2023. "Quick Facts - North Dakota." Accessed February 2024. Retrieved from: https://www.census.gov/quickfacts/fact/table/ND#

[13] North Dakota Department of Indian Affairs. N.D. "Tribal Nations." Accessed February 2024. Retrieved from: https://www.indianaffairs.nd.gov/tribal-nations

leading state in energy production and manufacturing.[14] Of North Dakota's $71.5 billion gross domestic product, $10.2 billion comes from mining, quarrying and oil and gas extraction; $5.5 billion from manufacturing; and $4.9 billion from agriculture, forestry, fishing and hunting.[15] These sectors also represent some of the highest sources of GHG emissions in the state and offer an opportunity to develop innovative approaches to reduce emissions. This plan seeks to generate high-quality and high-wage job opportunities across sectors to increase the capacity of the state's workforce, support a resilient agricultural sector that protects the health of North Dakota's soil and improve energy affordability and efficiency across the state. By aligning with the priorities of public, private and nonprofit stakeholders, this plan leverages opportunities for GHG reductions across some of the largest sectors of the state's economy.

NDDEQ led a planning process to build from the ideas, experiences and perspectives of North Dakotans through extensive stakeholder engagement. The engagement efforts were designed to gather input from the various sectors and communities across the state, including tribal communities and residents from low-income and disadvantaged communities (LIDAC). This PCAP includes five implementation-ready opportunities from the agriculture, energy and natural lands sectors to fuel local economies, strengthen energy independence and reduce pollution throughout North Dakota:

1. Energy Conservation Grant Program – Expand the program to provide a greater amount of funding to support public and tribal building energy efficiency improvements across the state.
2. Alliance to Advance Climate-Smart Agriculture Program – Extend the program and expand its reach to support farmers and ranchers in up to eight additional Soil Conservation Districts (SCDs) with financial incentives for climate-smart agriculture practices on working lands.
3. Soil Health Cover Crop Program – Expand the program eligibility and incentives to support producers in 54 SCDs by implementing cover crops to promote soil health and increasing access to no-till drill equipment.
4. City of Fargo LED Streetlight Upgrades – Upgrade all remaining streetlight replacements throughout the City of Fargo to more energy-efficient and longer-lasting LEDs that use approximately 50% less energy and provide benefits to surrounding communities.
5. N.D. Statewide Tree Planting Initiative – Expand the program to support additional producers in 54 SCDs with tree and shrub plantings to improve soil health and energy efficiency upgrades for tree seedling storage coolers.

[14] U.S.A. Facts. 2023. "Economy of North Dakota." Accessed February 2024. Retrieved from: https://usafacts.org/topics/economy/state/north-dakota/
[15] Ibid.

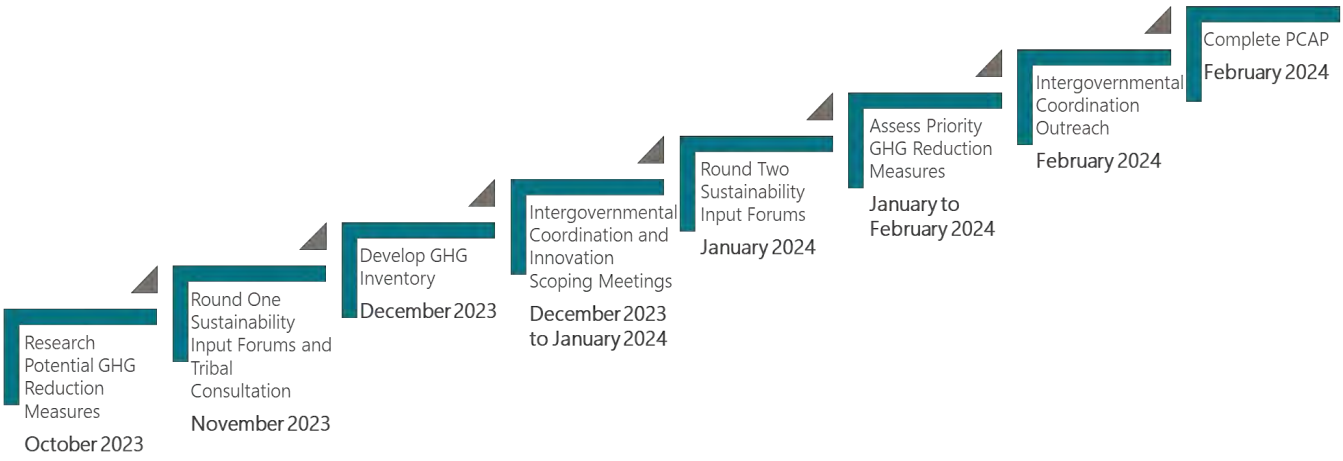
2. APPROACH

Utilizing a two-pronged approach, NDDEQ focused on targeting implementation-ready strategies in the electric energy generation and agriculture industries through developing a GHG inventory, researching innovative approaches and quantifying GHG reductions; and prioritized identifying North Dakotans' needs through a series of community-focused, sector-specific and intergovernmental outreach efforts throughout the state.

NDDEQ, partnering with Environmental Resources Management, Inc. (ERM), comprised the planning team. ERM was hired to facilitate, organize and coordinate stakeholder meetings and support development of the state's PCAP. Researchers with the University of North Dakota's Energy & Environmental Research Center (EERC) led the development of the North Dakota GHG Inventory, identifying statewide GHG emissions sources and sinks.

Figure 2 provides an overview of the approach to developing the PCAP, along with a timeline of key milestones reached throughout the planning process.

Figure 2. PCAP Approach Timeline



ENGAGING NORTH DAKOTANS

NDDEQ held meetings and informational events to gather input from North Dakotans across the state, inclusive of urban and rural areas, LIDAC residents, tribal communities, cross-sector private and nonprofit interests and state and local government representatives. The planning team designed the stakeholder engagement efforts to focus on collecting North Dakotans' ideas and experiences to inform the development of the PCAP throughout each stage of the planning process. In addition, the planning team captured ideas for long-term planning to inform NDDEQ's future CCAP planning process.

ROUND ONE SUSTAINABILITY INPUT FORUMS

The planning team launched the first round of public outreach at the start of the planning process by holding input forums in eight different communities between October 30 and November 8, 2023. At each meeting site, the planning team held three input forums, for a total of 24 sessions. While the forums were designed to recognize and accommodate interests from the various sectors within the state, the planning team encouraged flexibility for individuals to participate in whatever session best fit their schedule. The forums were scheduled during the morning, afternoon and evening to maximize accessibility for participants. Each forum was held in person and offered live via ZOOM at the following sites:

- **Bismarck, October 30** – NDDEQ meeting room (day-time forums) and Bismarck Veterans Memorial Library (evening forum)
- **Devils Lake, November 8** – Agricultural Center at Lake Region State College
- **Dickinson, November 1** – Veterans Pavilion
- **Fargo, November 2** – West Acres Mall Community Room
- **Grand Forks, November 6** – Choice Health & Fitness Community Room

- **Jamestown, November 1** – Knights of Columbus
- **Minot, November 6** – Carnegie Center
- **Williston, November 2** – James Memorial Art Center

The forums were structured as a group conversation, representing a new format for NDDEQ public meetings. Forum feedback suggested that participants appreciated this type of engagement and the opportunity to create impact and meet fellow stakeholders.

An online survey was also made available to the public from October 30 to December 1, 2023. The survey paralleled questions asked during the in-person forums, focusing on the benefits and downsides of reducing GHG emissions in the state, sharing perspectives on what actions North Dakotans are already taking to reduce GHG emissions, offering ideas for how the state could support or incentivize GHG reductions and providing input on a set of example GHG reduction measures. The survey was completed by 121 participants. Participants in live forums totaled 65 in-person and 125 via the ZOOM online platform. The planning team focused on outreach to LIDAC residents to encourage participation in the forums and online survey. Of the online ZOOM forum participants and online survey respondents, 9% were from ZIP codes considered LIDAC areas. Among those attending in person, there were at least two people participating in each location who were from geographic areas qualifying as LIDAC. Section 5 provides an overview of engagement and results specific to LIDAC participants.

Detailed reports from each of the eight meeting sites and a state summary report were developed and posted to NDDEQ's Sustainability website.[16] The state summary report, available in Appendix A, focuses on themes common across North Dakota, including all round one meeting sites and online survey responses, while highlighting perspectives that showed meaningful differences between regions. The eight site-specific reports are included in Appendix B.

ROUND TWO SUSTAINABILITY INPUT FORUMS

The second round of input forums was held online between January 9 and January 11, 2024, with an accompanying online survey available to the public from January 9 to January 19, 2024. The set of three forums each focused on sharing the feedback aggregated from the first round of input and gave North Dakotans an opportunity to provide more detailed feedback on an updated set of implementation-ready GHG reduction measures. The planning team conducted outreach to try and gather insights from a diverse group of North Dakotans. Forty-four people participated in the Round Two Sustainability Input Forums, and there were three responses to the corresponding online survey. There were 9% of

[16] North Dakota Department of Environmental Quality. 2023. "North Dakota Sustainability." Accessed February 2024. Retrieved from: http://www.deq.nd.gov/sustainability

participants from LIDAC areas, while 19 participants said they had previously participated in a Round One Sustainability Input Forum held in fall 2023.

The forums were structured to ensure feedback could be incorporated into the PCAP development process. Across all forum sessions, three overarching needs were identified related to implementing GHG reduction strategies across each sector: more education on GHG reduction opportunities, expanded funding opportunities and increased access to existing programs. The summary report, available in Appendix C, summarizes additional themes common across all three round two forums and online survey responses and highlights opportunities related to specific GHG reduction measures.

INTERGOVERNMENTAL COORDINATION MEETINGS

NDDEQ consulted and engaged with the state's five tribal nations through the North Dakota Indian Affairs Council meeting in November 2023. Three of North Dakota's tribes hold independent CPRG planning grants from EPA, and all were invited to provide input and comments as part of the state's planning process. Tribal government representatives were invited to share feedback on the state's planning process via one-on-one discussions and through the input forums.

NDDEQ held a CPRG kick-off meeting with North Dakota State Cabinet agencies on August 16, 2023, introducing state leadership to the CPRG grant and NDDEQ's intended approach to developing the PCAP. The planning team also conducted outreach to state and local government representatives to coordinate and ensure the state's plan was supportive of local planning efforts. Invitations were sent to representatives from all state cabinet agencies, all mayoral offices, the North Dakota League of Cities and the North Dakota Association of Counties. A virtual coordination meeting was held in December 2023 to inform state and local partners about the CPRG opportunity, initiate coordination, gather input on the updated list of GHG reduction measures and request outreach support to promote the second round of input forums. Participants were encouraged to share additional feedback related to specific GHG reduction measures to inform the PCAP development.

INNOVATION SCOPING MEETINGS

Over the course of December 2023 through January 2024, the planning team held a series of one-on-one discussions with a set of state, local and nonprofit stakeholders to delve deeper into specific ideas for innovative GHG reduction measures for the PCAP. Conversations centered on implementation-ready opportunities for the energy, agriculture and natural lands sectors. The specific set of stakeholders was informed by a prioritization of GHG reduction strategies that occurred as a result of round one of public feedback and a thorough assessment of existing state and local GHG reduction efforts that could be built upon for the PCAP.

PRIORITIZING GREENHOUSE GAS REDUCTION MEASURES

The planning team developed the priority GHG reduction measures list through several rounds of research and stakeholder engagement to identify priorities, challenges and benefits. Beginning with a review of existing state and local energy and sustainability plans and considering best practice strategies

to reduce GHG emissions from other states, the planning team compiled a list of potential GHG reduction measures organized by sector. This list was shared during each of the sector-specific Round One Sustainability Input Forums to gather feedback from stakeholders throughout North Dakota about the strength of support or opposition to the list of example GHG reduction measures. Figure 3 represents the responses from all round one forum participants across the 24 meetings. Phrases displayed in blue show levels of support; phrases displayed in orange show opposition. The size of the phrase represents strength of support or opposition; the more often an example measure was supported or opposed by participants, the larger the size of the word.

Figure 3. North Dakotans' Support and Opposition to Example GHG Reduction Measures

Overall, every example GHG reduction measure displayed to forum participants received at least some support, with conservation practices and energy efficiency strategies receiving a high degree of support statewide. The strength of reactions to various GHG reduction strategies did differ by region, which can best be seen in the detailed site-specific reports, available in Appendix B. For example, electric vehicles

and related charging stations overall drew both moderate support and opposition and, at some meeting sites, especially strong support or strong opposition.[17]

After round one, the planning team then reassessed the list of potential GHG reduction measures and categorized the list according to the degree of public support received and consideration for short-term or long-term planning efforts. Appendix D includes the categorized list of potential GHG reduction measures, organized according to:

- Implementation-ready GHG strategies with **high** public support
- Implementation-ready GHG strategies with **moderate** public support
- Long-term GHG strategies to consider with **location-specific** public support
- Long-term GHG strategies to consider with **varying** public support

The categorization was informed by feedback from North Dakotans via the Round One Sustainability Input Forums and online survey comments. In addition, the planning team considered the research of existing North Dakota state and local plans, best practices from other states and EPA's grant criteria required for PCAP.

Next, the planning team focused on gathering stakeholder feedback related specifically to the implementation-ready measures listed in Appendix D to support the PCAP development. The long-term strategies listed in Appendix D, along with any additional strategies received through public feedback, remain under consideration for the state's long-term CCAP planning and stakeholder engagement process that will begin later in 2024. From December 2023 to January 2024, the planning team conducted outreach to state and local government representatives, organized the Round Two Sustainability Input Forums, and held a series of one-on-one innovation scoping discussions with a set of state, local and nonprofit stakeholders to delve deeper into specific ideas for innovative GHG reduction measures for the PCAP. After considering all the stakeholder input, the planning team narrowed in on a short list of existing efforts from the energy and agriculture sectors that received the highest degree of support from public outreach. These existing efforts reflected the priorities and needs of North Dakotans identified through Round Two Sustainability Input Forums; that feedback included broad support for offering expanded funding opportunities and increased access to programs to reduce GHG emissions and benefit communities. A summary of feedback received across all Round Two Sustainability Input Forums is included in Appendix C. The planning team then conducted additional outreach to the implementing entities for the GHG reduction measures to assess how the existing

[17] The planning team considered this type of feedback as "varying" public support, given the existence of both support and opposition, and the differences by geographic location or sector-specific participants.

programs could be expanded to provide more opportunities for GHG reductions, financial incentives and increase access for more North Dakotans.

Once the planning team identified the short list of GHG reduction measures, a thorough analysis was conducted to assess the extent to which each measure could meet EPA's PCAP criteria, including estimating GHG reduction potential, understanding the potential LIDAC benefits, reviewing whether the authority to implement exists, and researching additional available funding opportunities for each measure. The results of the analysis for each priority GHG reduction measure are included throughout Sections 4-6.

GREENHOUSE GAS INVENTORY

EERC compiled a high-level GHG inventory for the state of North Dakota. The statewide inventory includes six sectors that were identified according to their importance to the state and emissions impacts:

- Agriculture, natural and working lands
- Oil and natural gas
- Electric power generation
- Industry
- Commercial and residential buildings and waste
- Transportation

The inventory was developed using EPA's State Inventory Tool (SIT),[18] designed to help states develop GHG inventories that are straightforward to calculate and maintain in the future. The tool consists of 11 emissions modules that identify sources and sinks within the state using a top-down approach for calculating GHG emissions. Emissions sources captured by the SIT modules include fossil fuel combustion, electricity consumption, mobile combustion, coal mining, natural gas and oil systems, industrial processes, agricultural, natural and working lands, municipal solid waste (MSW) and wastewater. There is also a synthesizer module to combine the emissions across all modules. The tool provides default data for each state based on information provided by federal agencies and other sources. When default data is not readily available, alternative data can be sourced and entered into the modules. Alternative data sources are described in more detail in Section 3. Once each module was completed, EERC used summary files to compile the inventory according to the six sectors identified.

[18] U.S. Environmental Protection Agency. February 5, 2024. "State Inventory and Projection Tool." Accessed November 2023. Retrieved from: https://www.epa.gov/statelocalenergy/state-inventory-and-projection-tool

The results of the statewide inventory were then compared to the EPA-estimated North Dakota GHG inventory.[19] Differences between EPA state estimates and the SIT estimates can be attributed to varied methodologies. EPA state estimates must sum to the national total and often use top-down methodologies, while the SIT estimates relied on state data. According to EPA, "there will be differences between the EPA's state-level estimates and some inventory estimates developed independently by individual state governments. Inventories compiled by states may differ for several reasons and differences do not necessarily mean that one set of estimates is more accurate, or 'correct.'"[20] Further discussion on the difference between the EPA Inventory by State and the North Dakota SIT estimated inventory for each sector can be found in Section 3, along with more detailed information on the methodology and results of the GHG inventory. Appendix E includes the process for developing the GHG inventory as described in the Quality Assurance Project Plan.

QUANTIFYING EMISSION REDUCTIONS

This state plan identifies five priority GHG reduction measures that are implementation-ready. The following subsections briefly describe the quantification behind the GHG emissions estimates for each of these measures, which capture a variety of specific projects, actions and initiatives to reduce GHG emissions. Refer to Section 4 for specific GHG reduction estimates.

GHG REDUCTION MEASURE #1: ENERGY CONSERVATION GRANT PROGRAM

The Energy Conservation Grant Program is administered by the North Dakota Department of Commerce. This program assists North Dakota political subdivisions (including tribal governments) in making energy efficiency improvements to public buildings. Commerce will expand this program to provide increased funding to support a variety of energy efficiency upgrades. The planning team used the eligible energy efficiency upgrades to quantify the program's GHG emissions reductions. Data from previous grant awardees including project type, size and cost were leveraged as assumptions for additional projects that new program funds could support. Upgrades to Heating, venting and air conditioning (HVAC) systems and boilers, window replacements and insulation each reduce natural gas and fuel oil consumption at a given facility, reducing GHG emissions. Installing LED lighting reduces electricity consumption which avoids GHG emissions from power plants.

[19] U.S. Environmental Protection Agency. August 18, 2023. "Greenhouse Gas Inventory Data Explorer." Accessed November 2023. Retrieved from: https://cfpub.epa.gov/ghgdata/inventoryexplorer/#allsectors/allsectors/allgas/econsect/all

[20] U.S. Environmental Protection Agency. October 9, 2023. "State GHG Emissions and Removal." Accessed November 2023. Retrieved from: https://www.epa.gov/ghgemissions/state-ghg-emissions-and-removals

GHG REDUCTION MEASURE #2: ALLIANCE TO ADVANCE CLIMATE-SMART AGRICULTURE PROGRAM

The North Dakota Farmers Union (NDFU) is implementing the Alliance to Advance Climate-Smart Agriculture Program from 2024 to 2026 across seven SCDs in North Dakota. With additional funds, NDFU plans to expand the program's reach to support farmers and ranchers in up to eight additional SCDs and extend the program through growing seasons 2026 to 2029. To quantify the GHG benefits of this expansion, it is assumed that additional funds will provide financial incentives for even greater adoption of high-value conservation practices approved by the National Resources Conservation Service (NRCS).

Practices such as cover cropping, reduced and no-till, crop rotation, prescribed grazing, silvopasture, riparian tree buffers and herb covers, pasture and hay planting and tree and shrub establishment, each result in greater carbon storage in lands and soils as well as reductions in nitrous oxide (N_2O) emissions. Additionally, some of these practices such as reduced and no-till, require the use of different equipment that consumes less diesel compared to conventional tillage, resulting in GHG emissions reductions from avoided fuel consumption. Furthermore, soil conservation practices for nutrient management also reduce GHG emissions and can improve local water quality.

The expanded program will support changes to irrigation water use management, which would reduce energy consumption related to water resource use, resulting in GHG emissions reductions. Expansion and extension of this program will also further support the availability of funds for animal feed management practices that reduce the amount of enteric methane (CH_4) produced by beef and dairy cattle. Additionally, this could also support greater adoption of improved manure storage practices that reduce GHGs, especially CH_4, through roofs and covers as part of other enhanced agricultural waste management practices.

An analysis for each of the above practices was conducted to quantify the GHG emissions reductions, assuming these conservation measures would not occur without the financial incentives provided by the additional funding administered through this expanded program.

GHG REDUCTION MEASURE #3: SOIL HEALTH COVER CROP PROGRAM

The North Dakota Association of Soil Conservation Districts (NDASCD) implements the Soil Health Cover Crop program, providing producers with per-acre funds reimbursements for planting eligible cover crops to address sodic/saline soils across the state. NDASCD provides soil and water conservation

support for the 54 SCDs across the state.[21] With additional funding, expanding this program could support an additional 202,500 acres of planted cover crops across the three growing seasons from 2025 to 2027, resulting in improved soil health and stored carbon across the state, further reducing GHG emissions from the agricultural sector. SCDs not currently eligible in the Alliance to Advance Climate-Smart Agriculture Program would be eligible for cover crop reimbursements through this program.

Program expansion would also support the purchase of 10 no-till drills that would allow more producers to implement no-till practices using this shared equipment at lower costs. SCDs selected to receive this equipment would be prioritized based on LIDAC status. This equipment will help reduce erosion as well as encourage more farmers to adopt this new technology. Implementing no-till practices with this new equipment results in improved carbon storage in the soil, avoiding GHG emissions from conventional tillage practices. Additionally, no-till farming practices are more fuel efficient and consume less diesel compared to conventional tillage management, resulting in GHG emissions reductions from decreased fuel consumption.

GHG REDUCTION MEASURE #4: CITY OF FARGO LED STREETLIGHT UPGRADES

The City of Fargo is North Dakota's largest and most diverse city with a population of about 126,000. The city has set aside a portion of budget each year for high-pressure sodium streetlight replacements to more energy-efficient and longer-lasting LEDs. The city plans to complete upgrades across all their remaining streetlights, enabling upgrades for 7,000 streetlights in just three years. The planning team quantified GHG emissions reductions for a faster-paced phase-in of more efficient streetlights, resulting in reduced electricity consumption, and avoiding emissions from North Dakota's electric grid.

GHG REDUCTION MEASURE #5: N.D. STATEWIDE TREE PLANTING INITIATIVE

NDASCD has been implementing the N.D. Statewide Tree Planting Initiative since 2017, assisting producers with planting trees and shrubs to reduce erosion and improve soil health, water quality, livestock protection, highway and road safety and wildlife habitat protection. With additional funding, NDASCD plans to expand this program from 2025 through 2028, planting additional trees and shrubs across nearly 2,500 acres, and reducing GHG emissions through stored carbon from additional planting for years to come.

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[21] North Dakota State University. 2023. "Soil Conservation Districts." Accessed February 2024. Retrieved from: https://www.ndsu.edu/ndssc/districts/#:~:text=Soil%20Conservation%20Districts,-Soil%20Conservation%20Districts&text=In%20North%20Dakota%2C%20there%20are,county%2C%20organized%20into%20five%20areas

Expanding the program will also result in increased funding available to support energy efficiency upgrades to tree seedling storage coolers across North Dakota's 53 counties. Energy efficiency upgrades for cold storage facilities will include improved insulation, LED lighting and more efficient compressors. Each of these actions would reduce electricity consumption and avoid emissions from North Dakota's grid. However, without knowing the specifics of the facilities that may apply for this funding or the types of energy efficiency improvement actions they may seek to take, it is difficult to quantify the GHG emissions reduction benefits with certainty at this time.

IMPLEMENTATION AUTHORITY

The implementation authority analysis pertains to those priority GHG reduction measures positioned and zoned on public grounds, excluding measures located on private lands and property and implemented by nonprofit or private entities. The methodology for conducting the implementation authority varied depending on the available information. Several priority GHG reduction measures are bound by the existing current North Dakota statues, North Dakota Century Code (N.D.C.C.) and Federal Charters, whereas others required a review of existing municipal ordinances pertaining to the scope of the measure.

All five entities implementing the priority GHG reduction measures hold the authority to implement those measures as described, without any additional milestones. Refer to Section 6 for a detailed review of the implementation authority for each GHG reduction measure and the relevant statutory references.

3. GREENHOUSE GAS INVENTORY

SCOPE

EERC compiled a high-level GHG inventory of emissions for the state of North Dakota. A baseline year of 2019 was selected for the GHG inventory because it was the most recent year with widely available published data that was not significantly affected by the global COVID-19 pandemic. A substantial decrease in emissions was observed in the data between 2019 and 2020, and the years 2022–2023 were not assessed due to the inherent lag between years' end and the publishing of large aggregate datasets.

EERC identified the following six sectors for the GHG inventory based on their importance to the state and emissions impacts according to 2018 data from EPA.[22]:

- **Agriculture, natural and working lands** – Agriculture accounted for 22% of the state's 2018 GHG emissions and a large portion of North Dakota's land statewide is used for ranching and farming. North Dakota land used both agriculturally and left in its natural state acts as sinks for carbon, removing carbon dioxide (CO_2) from the atmosphere.
- **Oil and natural gas** – The state's oil and gas production accounted for 11.5% of all U.S. production in 2018. Given the potency of CH_4 as a GHG, oil and gas production has been put it under scrutiny nationwide.
- **Electric power generation** – The electric power sector generated 32% of North Dakota's 2018 GHG emissions and is responsible for the state's status as a net energy exporter.
- **Industry** – Industrial sources, including fertilizer production, food processing and manufacturing, were the largest sources of GHG emissions for the state in 2018 at 34%.
- **Commercial and residential buildings and waste** – While the magnitude of emissions in these sectors are relatively small, commercial and residential buildings represent some end-use of power generation, landfills have a large impact on CH_4 emissions, and wastewater treatment is a major source of N_2O emissions. EPA's national GHG data listed emissions associated with residential and commercial buildings at less than 3% of the total emissions, while percentages for waste were not independently provided in the summary.
- **Transportation** – Transportation activities accounted for 8.6% of North Dakota's 2018 GHG emissions.

The inventory accounted for emissions from CO_2, CH_4 and N_2O, calculated as CO_2 equivalents (CO_2e). Fluorinated gases, including hydrofluorocarbons (HFC), perfluorocarbons (PFC), sulfur hexafluoride (SF_6) and nitrogen trifluoride (NF_3) were included as a relatively small (3%), though a potent portion of GHGs in the industrial sector.

INVENTORY METHODOLOGY AND DATA REVIEW

EPA's SIT[23] includes 11 modules that identify sources and sinks within the state, along with one module used to synthesize estimates across all modules. Below is a list of all 11 modules:

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[22] U.S. Environmental Protection Agency. February 14, 2024. "Inventory of U.S. Greenhouse Gas Emissions and Sinks." Accessed November 2023. Retrieved from: https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks

[23] U.S. Environmental Protection Agency. February 5, 2024. "State Inventory and Projection Tool." Accessed November 2023. Retrieved from: https://www.epa.gov/statelocalenergy/state-inventory-and-projection-tool

1. CO_2 from fossil fuel combustion (CO_2FFC)
2. CO_2 from electricity consumption (CO_2EC)
3. Stationary combustion
4. Mobile combustion
5. Coal mining
6. Natural gas and oil systems
7. Industrial processes
8. Agriculture
9. Land use, land-use change and forestry (LULUCF)
10. MSW
11. Wastewater

Each module included various levels of default data. For the purposes of this inventory, default data include datasets contained within the SIT modules used to populate inputs for the state. Data that were not included within modules, but were suggested by a module, were also considered to be default data. Default data were given priority and EERC utilized them whenever possible to complete the SIT modules, upon checking for accuracy against external sources. If default data were not available, data from other federal, state or industry sources were used, or it was confirmed that data were unavailable. Completed modules provided summary files that EERC used to compile the inventory based upon the six sectors identified.

When default data were not available for the entirety of each module, alternative data sources were used in the following instances for each of the applicable modules:

- **CO_2 from fossil fuel combustion (CO_2FFC) –** All data required to complete this module were taken from the SIT's default data.
- **CO_2 from electricity consumption (CO_2EC) –** All data required to complete this module were taken from the SIT default data. Data from the U.S. Department of Transportation Federal Transit Administration[24] were used to confirm that North Dakota did not consume electricity for transportation.
- **Stationary combustion –** All data required to complete this module were taken from the SIT default data.
- **Mobile combustion –** All data required to complete this module were taken from the SIT default data.

[24] U.S. Department of Transportation, Federal Transit Administration. 2019. "Fuel and Energy." Accessed November 2023. Retrieved from: https://www.transit.dot.gov/ntd/data-product/2019-fuel-and-energy

- **Coal mining –** The majority of data used to complete this module were taken from the SIT default data. Data from the U.S. Department of Labor Mine Safety and Health Administration's Mine Data Retrieval System[25] were used to populate the additional abandoned coal mines list.
- **Natural gas and oil systems –** For natural gas transmission data, transmission and pipeline mileage was pulled from the U.S. Department of Transportation Pipeline Hazardous Materials Safety Administration (PHMSA) annual reports[26] as suggested by the SIT module. This dataset consists of PHMSA-regulated lines that are only a small fraction of the total mileage in the state. In addition, the mileage reported is often for multiple states with no clear indication which portion belongs to each state. For this inventory, the mileage was divided evenly among each state. Data for the number of gas-processing plants were obtained from the North Dakota Pipeline Authority (NDPA)[27]. For oil transportation values, the full export capacity across all options provided by NDPA was assumed. Refining values on the same tab were obtained from Energy Information Administration (EIA)[28] data and assumed to be the maximum daily capacity reported in barrels per calendar day. All other data used in this module were data taken from the SIT default data.
- **Industrial processes –** All data required to complete this module were taken from the SIT default data.
- **Agriculture –** All data required to complete this module were taken from the SIT default data.
- **LULUCF –** The majority of data used to complete this module were taken from the SIT default data. Data from the National Interagency Fire Center's InFORM Fire Occurrence Data Records[29] were used to determine a real extent of wildfire burns.
- **MSW –** All data required to complete this module were taken from the SIT default data.
- **Wastewater –** All data required to complete this module were taken from the SIT default data.

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[25] U.S. Department of Labor, Mine Safety and Health Administration. 2024. "Mine Data Retrieval System." Accessed November 2023. Retrieved from: https://www.msha.gov/data-and-reports/mine-data-retrieval-system

[26] U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration. 2024. "Gas Distribution, Gas Gathering, Gas Transmission, Hazardous Liquids, Liquefied Natural Gas (LNG), and Underground Natural Gas Storage (UNGS) Annual Report Data." Accessed November 2023. Retrieved from: https://www.phmsa.dot.gov/data-and-statistics/pipeline/gas-distribution-gas-gathering-gas-transmission-hazardous-liquids

[27] North Dakota Pipeline Authority. 2023. "Gas Plants." Accessed November 2023. Retrieved from: https://northdakotapipelines.com/gas-plants/

[28] U.S. Energy Information Administration. 2023. "Petroleum & Other Liquids, Number and Capacity of Petroleum Refineries." Accessed November 2023. Retrieved from: https://www.eia.gov/dnav/pet/pet_pnp_cap1_dcu_SND_a.htm

[29] National Interagency Fire Center. January 14, 2024. "InFORM Fire Occurrence Data Records." Accessed November 2023. Retrieved from: https://data-nifc.opendata.arcgis.com/datasets/60a94840152b4a89bec467a9f052f135_0/explore?location=47.510446%2C-102.091757%2C9.69

INVENTORY RESULTS

As each of the modules were completed, summary files were loaded into the SIT synthesis tool. The aggregate data from the modules were then separated into the appropriate sector resulting in the baseline North Dakota state GHG inventory. The following subsections describe each sector, including results and associated modules.

AGRICULTURE, NATURAL AND WORKING LANDS

Agriculture, natural and working lands consists of CO_2, CH_4 and N_2O emissions in the agriculture module as well as CO_2 emissions and sinks in the LULUCF module. The highest agriculture emissions came from enteric fermentation and manure management associated with livestock. The largest component of LULUCF as a sink of emissions is attributed to agricultural soil carbon flux and grasslands. This emissions sink removed 4.8 million metric tons of carbon dioxide equivalent ($MMtCO_2e$) from the atmosphere, offsetting North Dakota's GHG emissions. The amount of carbon stored in cropland is a function of the acres of cropland, crop, farming practices and climate. Differences existed between the EPA state-level estimate and this estimate were attributed to how each inventory counted agriculture transportation and energy emissions.

OIL AND NATURAL GAS

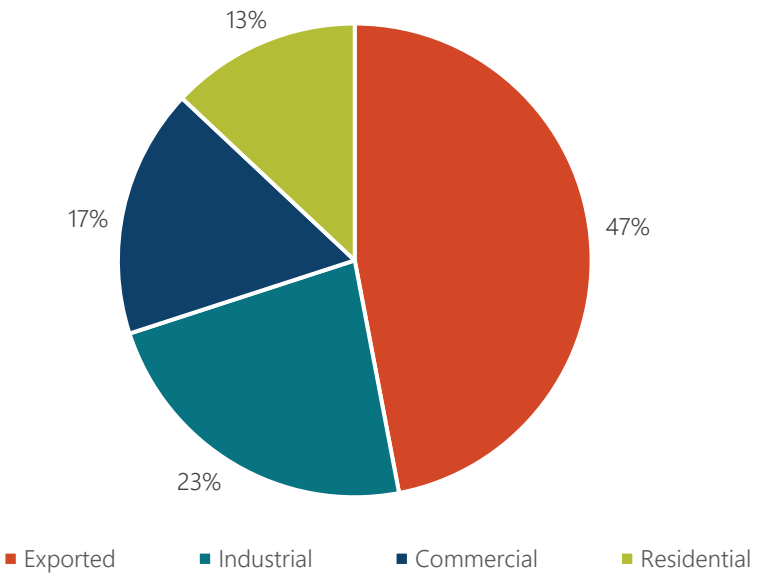
Oil and natural gas consists of CO_2 and CH_4 emissions in the natural gas and oil systems module. Emissions from oil and natural gas are primarily CH_4 emissions, where the GHG potential has been converted to $MMtCO_2e$. Additionally, CO_2 emissions from flaring are directly counted. Next to industry, this sector accounted for the largest share of direct emissions.

ELECTRIC POWER GENERATION

Electric power generation consists of CO_2 emissions from the electric utilities total in the CO_2FFC module, CH_4 and N_2O emissions from the electric utilities total in the stationary combustion module and CO_2 emissions from end-use consumption in the electricity consumption module. Electric power generation also included CH_4 emissions from the coal module since the end-use of coal was for power generation.

Electric power generation emissions totaled 28.45 $MMtCO_2e$. Figure 4 demonstrates allocation of emissions to their end-uses in exported, industrial, commercial and residential. The exported end-use accounts for 13.53 $MMtCO_2e$ and is representative of the emissions associated with electricity exported via the grid to end-uses outside of North Dakota. Due to the end-use of this power occurring outside of the state, it is worth noting the net GHG emissions are 67.24 $MMtCO_2e$, a difference of 17%. Differences existed between EPA and this state inventory estimate primarily due to EPA keeping emissions from electrical production together, whereas this state inventory organizes electric power generation emissions according to sectors.

Figure 4. North Dakota Electric Power Generation by End-Use



INDUSTRY

Industry consists of total emissions in the industrial processes module, CO_2 emissions from the industrial total in the CO_2FFC module, CH_4 and N_2O emissions from the industrial total in the stationary combustion module, and total emissions from the industrial total in the electricity consumption module. This category is the largest contributor to emissions. Differences existed between EPA and this state inventory estimate primarily due to EPA combining the oil and gas sector with the industry sector.

COMMERCIAL AND RESIDENTIAL BUILDINGS AND WASTE

Commercial and residential buildings and waste consists of CO_2 emissions from the residential and commercial totals in the CO_2FFC module; CH_4 and N_2O emissions from the residential and commercial totals in the stationary combustion module; total emissions from the residential and commercial totals in the electricity consumption module; CH_4 and N_2O emissions in the MSW module; and CH_4 and N_2O emissions in the wastewater module. Commercial and residential buildings and waste is broken down

into three subtotals. This group was kept together as they are largely associated with the population of the state. Waste included a breakdown by equivalent emissions of NO_2 and CH_4 associated with MSW and wastewater treatment. Any carbon sinks such as landfilling of yard waste, trimmings or food scraps are not counted in the MSW section and were calculated/included in the LULUCF model.

TRANSPORTATION

Transportation consists of CO_2 emissions from the transportation total in the CO_2FFC module. CH_4 and N_2O emissions from the mobile combustion module were added to the CO_2e total. Transportation consisted of 9.71 $MMtCO_2e$ in 2019, based on combustion of fossil fuels and the equivalent emissions for NO_2 and CH_4. Any transportation associated with electrical vehicles was counted in the module for indirect CO_2 from electricity consumption. Electrical power for transportation was not included in this section and was otherwise included in residential and commercial power consumption.

Table 1 summarizes the emissions totals by sector and provides the module(s) used to contribute to the overall sector total. Gross emissions for 2019 totaled 89.8 $MMtCO_2e$ and net emissions for 2019, which is the sum of sources and sinks, totaled 85.0 $MMtCO_2e$.

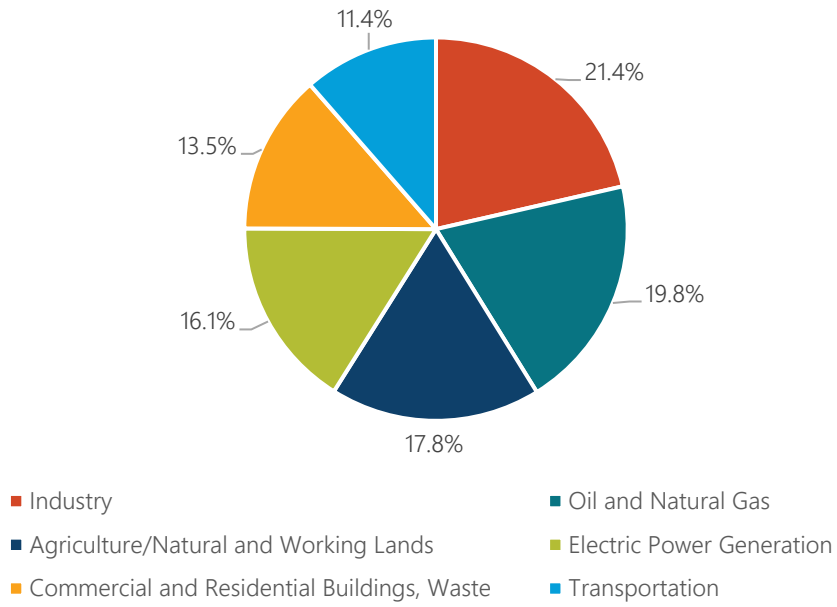
Table 1. GHG Emissions by Sector and Module

Sector	Emissions in $MMtCO_2e$
Agriculture, natural and working lands (excluding sequestered CO_2)	**15.1**
Agriculture	19.9
Oil and natural gas	**16.8**
Equivalent from CH_4	6.5
Flaring	10.2
Electric power generation	**13.7**
CO_2FFC electric utilities	28.3
Indirect CO_2 from electricity consumption	-14.9
Stationary CO_2e	0.12
Coal	0.15
Industry	**18.2**
Industrial processes	0.78
CO_2FFC industrial	10.9
Stationary CO_2e industrial	0.04
Indirect CO_2 from electricity consumption industrial	6.5
Commercial and residential buildings and waste	**11.5**

Sector	Emissions in $MMtCO_2e$
CO_2FFC residential	1.3
Stationary CO_2e residential	0.01
Indirect CO_2 from electricity consumption residential	3.6
CO_2FFC commercial	1.3
Stationary CO_2e commercial	0.01
Indirect CO_2 from electricity consumption commercial	4.9
Equivalent from MSW	0.41
Equivalent from wastewater	0.07
Transportation	**9.7**
CO_2FFC	9.6
Mobile CO_2E	0.13
Gross GHG emissions	**89.8**
Sequestered CO_2 from LULUCF	**−4.8**
Net GHG emissions	**85.0**

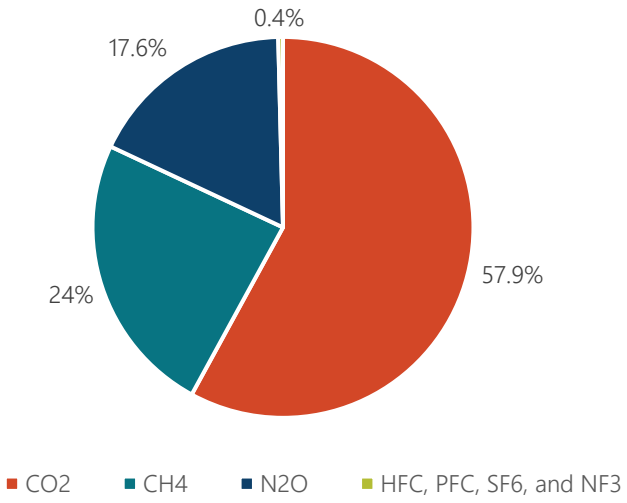
As shown in Figure 5, the largest contributors of GHG emissions by sector are industry (21.4%), followed by oil and natural gas (19.8%), agriculture/natural and working lands (17.8%) and electric power generation (16.1%).

Figure 5. North Dakota Net GHG Emissions by Sector



As shown in Figure 6, the majority of the GHG emissions for the state of North Dakota come from CO_2 (57.9%) and CH_4 (24%). Only a small percentage of fluorinated gases (0.4%) are emitted from the state's industrial operations. The remaining 17.6% of GHG emissions come from N_2O.

Figure 6. North Dakota Net GHG Emissions by Greenhouse Gas



4. PRIORITY GHG REDUCTION MEASURES

This PCAP includes five implementation-ready GHG reduction measures for the agriculture, energy and natural lands sectors. These opportunities reflect the priorities and needs of North Dakotans identified through extensive stakeholder engagement, offering expanded funding opportunities and increased access to programs to reduce GHG emissions and benefit communities. The following GHG reduction measures will help to fuel local economies, strengthen energy independence and reduce pollution throughout North Dakota:

1. Energy Conservation Grant Program – Expand the program to provide a greater amount of funding to support public and tribal building energy efficiency improvements across the state.
2. Alliance to Advance Climate-Smart Agriculture Program – Extend the program and expand its reach to support farmers and ranchers in up to eight additional SCDs with financial incentives for climate-smart agriculture practices on working lands.
3. Soil Health Cover Crop Program – Expand the program eligibility and incentives to support producers in 54 SCDs with implementing cover crops to promote soil health and increasing access to no-till drill equipment.

4. **City of Fargo LED Streetlight Upgrades** – Upgrade all remaining streetlight replacements throughout the City of Fargo to more energy-efficient and longer-lasting LEDs that use approximately 50% less electricity and provide benefits to surrounding communities.
5. **ND Statewide Tree Planting Initiative** – Expand the program to support additional producers in 54 SCDs with tree and shrub planting to improve soil health and energy efficiency upgrades for tree seedling storage coolers.

ENERGY CONSERVATION GRANT

4.1	GHG Reduction Measure #1 **Energy Conservation Grant Program** 
Description	The Energy Conservation Grant program provides funding to political subdivisions (including tribal governments) to support public building energy efficiency improvements. The North Dakota Department of Commerce will expand this program to provide a greater amount of project funding to support more upgrades, include larger county buildings and schools as eligible applicants, target LIDAC areas with additional points in applications, and provide workforce training opportunities in schools. The expanded program will continue to support energy efficiency upgrades, such as installation of insulation; efficient lighting; HVAC upgrades; weather sealing; and replacement of windows and doors that would reduce building energy costs and GHG emissions. The expansion would allow for more energy efficiency upgrades to be installed in public and tribal facilities, including buildings in up to 50 counties and 40 schools across the state, and enable larger projects that would make a greater impact on GHG reductions and community benefits.
Estimate of GHG Emissions Reductions	Cumulative emissions saved 2025-2030 (metric tons of carbon dioxide equivalent [MT CO_2e]): 217,967 Cumulative emissions saved 2025-2050 (MT CO_2e): 1,222,618
Implementing Entity	North Dakota Department of Commerce
Implementation Authority Milestones	North Dakota Department of Commerce has the authority to implement, no other actions necessary.
Implementation Schedule	Q4 2024: Determine metrics associated with full state efforts for increased GHG reductions.

	November/December 2024: Revise program guidelines. Ongoing: Market eligibility and increased opportunity with grant. Ongoing: Metrics reported and associated requirements for federal compliance. Q1 2027: Report to state legislature on success stories and opportunities for enhancing existing program to increase GHG reduction effort. Ongoing: Audit and monitor projects. Q4 2028: Final report completed.
Geographic Location	North Dakota statewide
Funding Sources	North Dakota Legislature Continuing Appropriation provides $600,000 in biennium funding for the current program. Funds to expand the program's reach would be used in addition to the state funds.
Metrics to Track Progress	Near term measurable success is implementation of GHG reducing energy efficiency components in public and tribal facilities. Specifically, tracking project measures installed, energy savings and estimated GHG reductions. Without this funding, many of the facilities will not consider updating their buildings or energy facilities as it would put a burden on the citizens and tribal residents by new and increasing taxes. Long-term benefits will include reduction in GHGs by moving to more economical and efficient energy and heating sources, addition of new and innovative energy features in renovations to public buildings.
Sector	Energy & Buildings

ALLIANCE TO ADVANCE CLIMATE-SMART AGRICULTURE PROGRAM

4.2	GHG Reduction Measure #2 Alliance to Advance Climate-Smart Ag Program 
Description	The NDFU will implement the Alliance to Advance Climate-Smart Agriculture Program from 2024 to 2026 throughout seven SCDs in North Dakota. The program provides voluntary incentives to producers and landowners, including early adopters, that reflect the value of the public benefit created by adopting climate-smart agriculture practices on working lands, accounting for benefits such as carbon sequestration, erosion control and water quality improvements. NDFU will extend the program for the growing seasons 2026 to 2029 and expand the program's reach to support farmers and ranchers in up to eight additional SCDs. The program will target 40% of enrollees considered underserved producers, including beginning farmers, socially disadvantaged farmers, veteran farmers, limited resource farmers, women farmers, small producers and specialty crop growers. The expanded program will provide $50-$100 per acre or animal unit engaged in eligible climate-smart agriculture practices. Socially disadvantaged and limited resource producers will receive an additional equity payment of 25% of the base payment. The expanded program will provide financial incentives for increased adoption of high-value conservation practices approved by the NRCS, such as cover cropping, reduced and no-till, crop rotation, prescribed grazing, silvopasture, riparian buffers and covers, pasture and hay planting and tree and shrub establishment. Funds would also support changes to fertilizer and water use management, support feed management practices that reduce the amount of enteric methane produced by beef and dairy cattle, and support the establishment of agricultural waste management practices that reduce GHGs such as roofs and covers, and waste separation facilities.
Estimate of GHG Emissions Reductions	Cumulative emissions saved 2025-2030 (MT CO_2e): 238,795 Cumulative emissions saved 2025-2050 (MT CO_2e): 907,153
Implementing Entity	NDFU
Implementation Authority Milestones	NDFU has the authority to implement, no other actions necessary.

Implementation Schedule	2025: Develop parallel systems to ensure continuity with existing applications, contract management and producer outreach processes. Issue request for applications to soil conservation district sub-awardees. Confirm SCD sub-awardees. Make any appropriate modifications to the program based on feedback from the existing project. 2026: Implement program in up to 15 SCDs. Award $9 million in producer payments. Verify environmental outcomes. Host producer roundtables to support producer interest in the program and conservation practices and to gather feedback on program improvements and barriers to participation. 2027: Same as 2026. 2028: Same as 2026. 2029: Same as 2026. 2030: Complete producer reporting and environmental outcome verification.
Geographic Location	Current SCDs covered: Cass, Foster, McKenzie, Mercer, Rolette, Stark/Billings and Ward. The program will expand to include up to eight additional SCDs through a competitive application process.
Funding Sources	U.S. Department of Agriculture (USDA) Partnership for Climate Smart Commodities is providing funding to implement the Alliance to Advance Climate-Smart Agriculture Pilot Program that ends in 2026.
Metrics to Track Progress	Quantify GHG benefits using COMET Planner and COMET Farm, USDA NRCS tools used to measure GHG mitigation and carbon sequestration. In addition, the program will track total enrollment and acres impacted. The program will target and track the number of underserved producers enrolled, using a streamlined enrollment process to support producers, along with a consistent payment per acre/animal unit regardless of farm size or the percentage of acres enrolled.
Sector	Agriculture

SOIL HEALTH COVER CROP PROGRAM

4.3	GHG Reduction Measure #3 Soil Health Cover Crop Program
Description	NDASCD implements the Soil Health Cover Crop Program, providing producers across the state's 54 SCDs with per-acre reimbursements for planting eligible cover crops to address soil health across the state. The program will be expanded to support an additional 202,500 acres of planted cover crops across the 2025 to 2027 growing seasons, resulting in improved soil health, water quality and stored carbon across the state. The financial assistance from this program will help producers match the increased cost of implementing soil health practices. The program expansion will allow for $100 per acre with no acre caps for the traditional applicant, while limited resource, socially disadvantaged, veteran or beginning farmers or ranchers would qualify for $120 per acre with no acre caps. SCDs that do not participate in the Alliance to Advance Climate-Smart Agriculture Program would be eligible for cover crop reimbursements through this program, ensuring support for producers across the state. The expanded program will also support the purchase of 10 no-till drills that would allow more producers to implement no-till practices that help to reduce soil erosion and improve soil carbon storage, using this shared and energy-efficient equipment at lower costs.
Estimate of GHG Emissions Reductions	Cumulative emissions saved 2025-2030 (MT CO_2e): 52,366 Cumulative emissions saved 2025-2050 (MT CO_2e): 92,655
Implementing Entity	NDASCD
Implementation Authority Milestones	NDASCD has the authority to implement, no other actions necessary.
Implementation Schedule	2025-2027: Contracting and implementation. 2028-2029: Practice delay for extensions. 2030: Reporting and contracting completion.
Geographic Location	North Dakota statewide, 54 SCDs

Funding Sources	North Dakota Legislature, program funding expires at the end of 2024.
Metrics to Track Progress	Producers will work with their local SCD for mentoring and plan development along with application assistance. Application acceptance would be ongoing based on funding and field conditions. The program administrator will be required to track all applications through a database and ensure all applicable boxes are complete for approval. Once the producer has accepted the contract, they will be required to complete the practice installation. When the practice is completed, the staff at the local SCD will verify the practice has been installed, track GHG reductions and work with the producer to provide adequate documentation for payment submission. The payments will be made based on actual acres planted. The program administrator will be required to complete the final database submission, entering acres planted and highlighting any underserved categories within the system for tracking purposes. A full quarterly report with matrix totals, applications and acres will be required for accountability.
Sector	Agriculture and Energy

CITY OF FARGO LED STREETLIGHT UPGRADES

4.4	GHG Reduction Measure #4 City of Fargo LED Streetlight Upgrades
Description	The City of Fargo has over 15,000 city-owned streetlights that operate on a nightly basis. Of these lights, approximately 7,000 are over 12 years old and use high-pressure sodium bulbs that use about 50% more electricity to operate than efficient LED bulbs. The city will upgrade all the remaining 7,000 streetlights to LEDs over three years. The streetlights that will be converted are located mostly on local streets and are located throughout the entire city.
Estimate of GHG Emissions Reductions	Cumulative emissions saved 2025-2030 (MT CO_2e): 3,030 Cumulative emissions saved 2025-2050 (MT CO_2e): 6,770
Implementing Entity	City of Fargo Engineering Department, Engineering Services Division
Implementation Authority Milestones	The City of Fargo Engineering Department's Engineering Services Division has the authority to implement, no other actions necessary.
Implementation Schedule	October/November 2024: Design and bid a project out. Q1 2025: Order the lights and prepare for the work to begin. Q2 and Q3 2025: Complete installations. Q3 2025: Design and bid. Q2 and Q3 2026: Complete installations. Q3 2026: Design and bid. Q2 and Q3 2027: Complete installations.
Geographic Location	City of Fargo, N.D.
Funding Sources	The local funding source to match any additional funds for this project would come from the city's Municipal Street Lighting & Traffic Control

	Device Utility Fund. This fund covers the operations and maintenance of Fargo's streetlights, traffic signals, traffic signs and pavement markings.
Metrics to Track Progress	The project will track energy savings and workforce metrics. The estimated kWh reduced per light would be nearly 400 kW/hour/year, and cumulatively, the city would reduce energy usage by 2,800,000 kW/hour per year for all streetlights. There will be two full-time employees working on the project from an electrical contracting company for 40 hours/week for an eight-month period, for three consecutive years. It will also have a city employee overseeing the work for this same period, at an average of 10 hours/week, for three consecutive years.
Sector	Energy & Buildings

N.D. STATEWIDE TREE PLANTING INITIATIVE

4.5	GHG Reduction Measure #5 N.D. Statewide Tree Planting Initiative
Description	North Dakota's SCDs have been implementing the N.D. Statewide Tree Planting Initiative since 2017, assisting producers with the implementation of tree and shrub planting to reduce erosion and improve soil health, water quality, livestock protection, highway and road safety and wildlife habitat protection. The program has been oversubscribed, having averaged over 550 applications each year, with only being able to fund roughly 325 applicants due to funding limitations. NCASCD will expand this program from 2025 through 2028, establishing additional tree and shrub plantings across nearly 2,500 acres and reducing GHG emissions for years to come. The expanded program will also support energy efficiency upgrades to tree seedling storage coolers across North Dakota's 53 counties. Energy efficiency upgrades resulting in GHG emissions reductions for these facilities would include improved insulation, LED lighting and more efficient compressors.
Estimate of GHG Emissions Reductions	Cumulative emissions saved 2025-2030 (MT CO_2e): 19,400 Cumulative emissions saved 2025-2050 (MT CO_2e): 105,622
Implementing Entity	NDASCD
Implementation Authority Milestones	2025 to 2030: Duration of program expansion Fall 2024: Marketing, mentoring and program application deadlines. 2025 & beyond: Practice implementation for the tree and shrub establishment. 2025-2028: Program implementation. 2029: Manage delays or extensions with plantings. 2030: Reporting and contracting completion.
Implementation Schedule	NDASCD has the authority to implement, no other actions necessary.

Geographic Location	North Dakota statewide, 54 SCDs
Funding Sources	USDA's Environmental Quality Incentive Program and the North Dakota Outdoor Heritage Fund provide some funding to support existing program.
Metrics to Track Progress	Producers will work with their local SCD for application assistance, on-site field preparations and staking measures for applicable footage installation. The SCD will provide the tree and shrub establishments. Upon completion, the SCDs are required to measure all installation areas for exact footage for practice completion and complete the necessary paperwork for practice installation payments. Plantings take place in the spring of each year with a short duration of six weeks and a follow-up field status is required in the fall for the maintenance and survivability of the establishment. If an installation requires replacements, handplants are needed the following year to meet the compliance of practice standards. NDASCD will track the actual footage installed, payment submissions and required paperwork of the granting agency, targeting the metrics by pre-installation and completion. The program also tracks job opportunities, six additional seasonal workers hired for seasonal employment with local Soil Conservation Districts. There are roughly six additional seasonal workers hired by individual SCDs for a duration of two months, resulting in 324 jobs created for this conservation effort. All practice installations of this project will follow USDA standards and specifications developed by the Field Office Technical Guide. Each individual project year will be submitted upon completion with a yearly report tracking the progress of the project.
Sector	Agriculture, Natural Lands, Energy & Buildings

5. LOW-INCOME AND DISADVANTAGED COMMUNITIES BENEFITS

The benefits of GHG emissions reductions can be gained by all residents of North Dakota but can particularly benefit LIDAC residents. Such benefits can include improved health outcomes, increased economic opportunities and reduced costs. This section describes the process of identifying LIDAC areas, includes a qualitative discussion of climate risks and impacts specific to LIDAC residents, and describes the methods used to engage and generate feedback from LIDAC residents throughout the PCAP stakeholder engagement process.

LIDAC IDENTIFIED IN NORTH DAKOTA

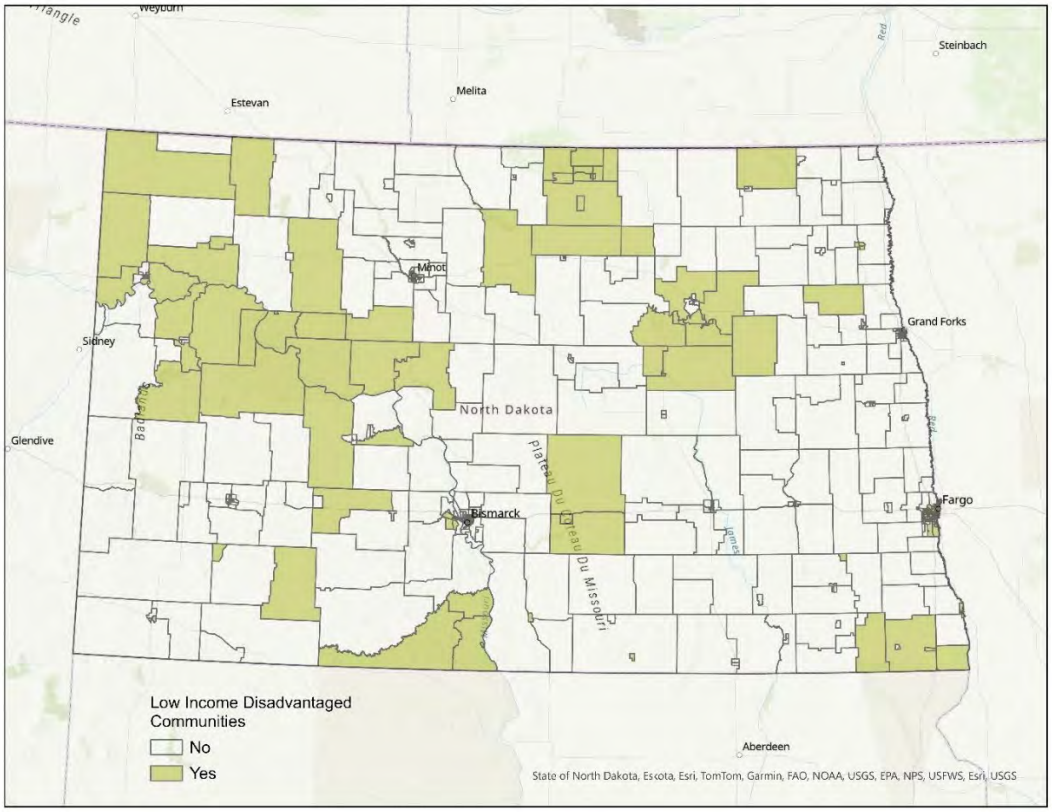
North Dakota defined LIDAC areas using EPA's definition, which includes the following characteristics:

- Identified by disadvantaged by the Council on Environmental Quality's Climate and Economic Justice Screening Tool (CEJST), or

- Any census block group that is at or above the 90th percentile for any of EPA' Environmental Justice Screening and Mapping Tool's (EJScreen) Supplemental Indexes compared to the nation or state; or
- Any geographic area within tribal lands as included in EJScreen.[30]

Figure 7. shows those areas in North Dakota determined to be LIDAC using EPA's recommended mapping tools, a compilation of CEJST, block groups in EJScreen that have at least one Supplemental Index greater than 90th percentile, or census block groups that contain American Indian Reservation lands or Native American Trust lands. 37% of the census block groups across North Dakota are considered LIDAC. See Appendix F for the list of census block groups in the state, denoting which are identified as LIDAC based on the above criteria.

Figure 7. LIDAC Census Block Groups in North Dakota



[30] U.S. Environmental Protection Agency. 2023. "Climate Pollution Reduction Grants: Low Income/Disadvantaged Communities (LIDAC) Benefits Analysis." Accessed January 2023. Retrieved from: https://www.epa.gov/system/files/documents/2023-08/Low%20Income%20%20Disadvantaged%20Communities%20Benefits%20Analysis.pdf

IDENTIFYING CLIMATE IMPACTS AND RISKS FOR LIDAC IN NORTH DAKOTA

To assess the climate impacts and risks specific to LIDAC residents in North Dakota, the planning team relied on recommended reports from EPA,[31, 32] and resources from the North Dakota Department of Health and Human Services (NDHHS) State Health Assessment[33] and the North Dakota Department of Emergency Services (NDDES) efforts to update their Hazard Mitigation Plan. NDHHS periodically conducts a statewide health needs assessment as part of its accreditation process with the Public Health Accreditation Board. The most recent report identifies concerns from targeted populations in North Dakota, including LIDAC in both urban and rural North Dakota, pertaining specifically to Social Vulnerability Index rankings, health statistics and Social Determinants of Health. As of the publication of this PCAP, NDDES is in the process of updating North Dakota's Hazard Mitigation Plan. The weather and climate in North Dakota are dynamic and extreme.[34] Climatic disasters such as floods, blizzards, extreme cold, extreme heat, drought, hail and wind and wildfires have impacted all regions of North Dakota. Existing climate risks, impacts and vulnerabilities among LIDAC residents in North Dakota include, but are not limited to the following:

- Increased energy costs
- Increased cost for transportation (increased gas prices or unaffordable electric vehicles)
- Property loss, crop failure and subsequent lost income due to flood events
- Property loss due to wildfires
- Crop failure, culling of livestock herds and low water supplies due to drought
- Lack of awareness of problems faced by vulnerable populations
- Hidden homelessness, hunger and poverty in both rural and urban areas
- Lack of access to fresh foods or lack of local grocery stores, especially in rural areas
- Access and availability of energy-efficient low-income housing
- Availability and access to greenspace amenities such as public parks, walking or biking paths
- Worsening of chronic health conditions
- Fear of the unknown for a state with an energy- and agriculture-rich economy

[31] U.S. Environmental Protection Agency. September 2021. "Climate Change and Social Vulnerability in the United States." Accessed February 2024. Retrieved from: https://www.epa.gov/system/files/documents/2021-09/climate-vulnerability_september-2021_508.pdf

[32] NOAA National Centers for Environmental Information. 2022. "State Climate Summaries – North Dakota." Accessed February 2024. Retrieved from: https://statesummaries.ncics.org/chapter/nd/

[33] State of North Dakota Department of Health & Human Services. 2022. "State Health Assessment." Accessed February 2024. Retrieved from: https://www.hhs.nd.gov/health/data-and-statistics/SHA

[34] NOAA National Centers for Environmental Information. 2022. "State Climate Summaries – North Dakota." Accessed February 2024. Retrieved from: https://statesummaries.ncics.org/chapter/nd/

- Loss of jobs in fossil fuel-based industries

MEANINGFUL ENGAGEMENT

NDDEQ focused on building a plan that reflected North Dakotans' needs and supported local planning efforts, including efforts to meet the needs and concerns of LIDAC residents. When performing outreach to LIDAC residents for the Round One Sustainability Input Forums, the planning team experienced challenges in fully engaging LIDAC members to participate. The challenges included the vast geographic area covered in the short timeframe the forums were held, limited notice of meetings, lack of vouchers or reimbursement for transportation or childcare and potential mistrust of government. The planning team determined that because of the limited NDDEQ staff time available to acquire, manage, determine eligibility and distribute funds, transit or childcare vouchers for potential LIDAC participants could not be offered.

Distance was a primary challenge for engaging LIDAC residents. While public transportation does exist in rural North Dakota, oftentimes it requires reservations. During winter months, when the input forums were held, the potential for extreme cold and reduced daylight hours made it difficult or impossible for LIDAC residents to leave their homes to attend public meetings. It was determined that based on successful past experiences with virtual and hybrid public meetings during COVID, virtual and hybrid meeting options would allow for additional community members who would not normally attend a public meeting to attend the input forums. The planning team offered a variety of times for each of the 24 input sessions and the availability of a virtual meeting option widened the opportunities for LIDAC residents to attend.

Engaging a community member in North Dakota oftentimes means establishing and relying on personnel connections, sharing direct invitations during in-person meetings (planned or impromptu), sending direct email and making phone calls to ensure intentional outreach is effective. As a result, the most effective strategies to get North Dakotans to participate in a new or different initiative, such as the Sustainability Input Forums, are most often from word of mouth, direct communication and direct messages via email or printed mail. Social media such as Facebook, X (formerly Twitter) and LinkedIn are also effective means of reaching organizers within LIDAC areas or those who work directly with LIDAC residents. Ultimately, while the project team recognized there is no ideal community engagement strategy, the process designed for both rounds of input forums allowed for continuous improvement to take place based on community feedback.

NDDEQ's Environmental Justice Coordinator used in-person conversations, emails, phone calls, personal social media accounts, amplification of NDDEQ's social media and LinkedIn posts, and the Change Network Community, a private Mighty Network online community, to connect with community members who are LIDAC leaders in North Dakota. Change Network members are people throughout North and South Dakota who have received a Bush Foundation/Arts Strategies "Change Network Grant." There are currently 185 members in seven different cohorts who have received grants since 2017. Promotion specific to LIDAC advocates and residents are included in Appendix G.

The quality of the Input during the Sustainability Input Forums was high, with some participants expressing surprise and appreciation for the conversational nature of the forums. The structure of the forums helped to create a sense of trust and collaboration and increased transparency in the process that NDDEQ will continue for future engagement.

ROUND ONE SUSTAINABILITY INPUT FORUMS

Appendix A summarizes the input received from LIDAC residents during the Round One Sustainability Input Forums. By design, all Round One Sustainability Input Forum comments (both online and in-person) were collected anonymously. Online comments, however, can be coded to ZIP codes, as requested in the survey. An analysis using EJScreen and CEJST identified the following ZIP codes as LIDAC from which NDDEQ received online survey responses: 58103, 58369, 58381, 58385, 58757, 58801, 58854. Appendix H describes the process used to determine which zip codes across the state could be considered LIDAC. The number of online survey respondents that could specifically be tied to a LIDAC area totaled 9%. The depth and detail of their comments provide themes that can speed further engagement and exploration within LIDAC communities.

ROUND TWO SUSTAINABILITY INPUT FORUMS

Appendix C summarizes the participation from LIDAC residents and input received during the Round Two Sustainability Input Forums. The online input forums used the Mentimeter platform to collect participant feedback. Due to the platform's anonymous nature, specific responses cannot be linked to a LIDAC-identified ZIP code, and none of the three participants who filled out the online survey were from a LIDAC-identified ZIP code. However, due to a request on the forum registration that asked for participants' zip codes, the planning team determined that 9% of forum participants were from ZIP codes described by the EJScreen and CEJST tools as a likely LIDAC area.

LIDAC BENEFITS FROM PRIORITY GHG REDUCTION MEASURES

The project team conducted a qualitative benefits analysis of the priority GHG reduction measures to assess the benefits within LIDAC areas (direct benefits) as well as the benefits that may impact LIDAC residents due to actions occurring outside of their community (indirect benefits). The benefits identified by participants during the input sessions include:

- Better health and quality of life due to improved environment.
- Increased economic opportunities for LIDAC members in jobs in emerging technologies, renewable or sustainable agriculture industries.
- Pass on cost savings to residents for cities implementing energy efficiency measures.
- Increased energy efficiency of low-income housing can result in decreased heating and cooling costs for residents and homeowners. Residential energy-efficiency measures can include better insulation, windows and high-efficiency appliances.
- Increased urban green spaces can offer urban heat island mitigation as well as outdoor spaces for recreation.

- Educational opportunities to support residential conservation and energy efficiency measures can increase the engagement from LIDAC in North Dakota.
- Educational opportunities for producers to support sustainable smart agricultural practices.
- Improved soil health by increasing amounts of no-till or reduced-till agriculture (also has the potential to improve water quality).

GHG REDUCTION MEASURE #1: ENERGY CONSERVATION GRANT PROGRAM

The North Dakota Department of Commerce will expand the Energy Conservation Grant Program to provide a greater amount of funding to support energy efficiency improvements to public buildings. This program is statewide and can have a significant positive impact on North Dakota's LIDAC residents. Eligible projects include installation of insulation, efficient lighting, HVAC upgrades, weather sealing, window and door replacements and other energy efficient measures. The program will provide preference points when scoring applicants for facilities within LIDAC areas.

Because the program targets energy efficiency upgrades for both public buildings and schools, direct benefits for the LIDAC can be realized by improvements in schools in LIDAC school districts. Eligible measures include school upgrades, such as HVAC installations that can directly impact students' health and comfort,[35,36] as students spend an average of six hours per day during the school year in a school building. Local public health unit buildings and other public facilities that serve North Dakota's LIDAC residents can be eligible for energy efficiency upgrades. Low-income public housing units would also be eligible for energy efficiency upgrades that could lower the energy burden for LIDAC community members.

Indirect benefits of energy conservation programs will include reduced energy costs for the public entity, be it the public entity school district, local government or local public health unit. Improved indoor air quality can translate into the indirect benefit of reduced hospital visits for sufferers of chronic respiratory illnesses such as asthma.

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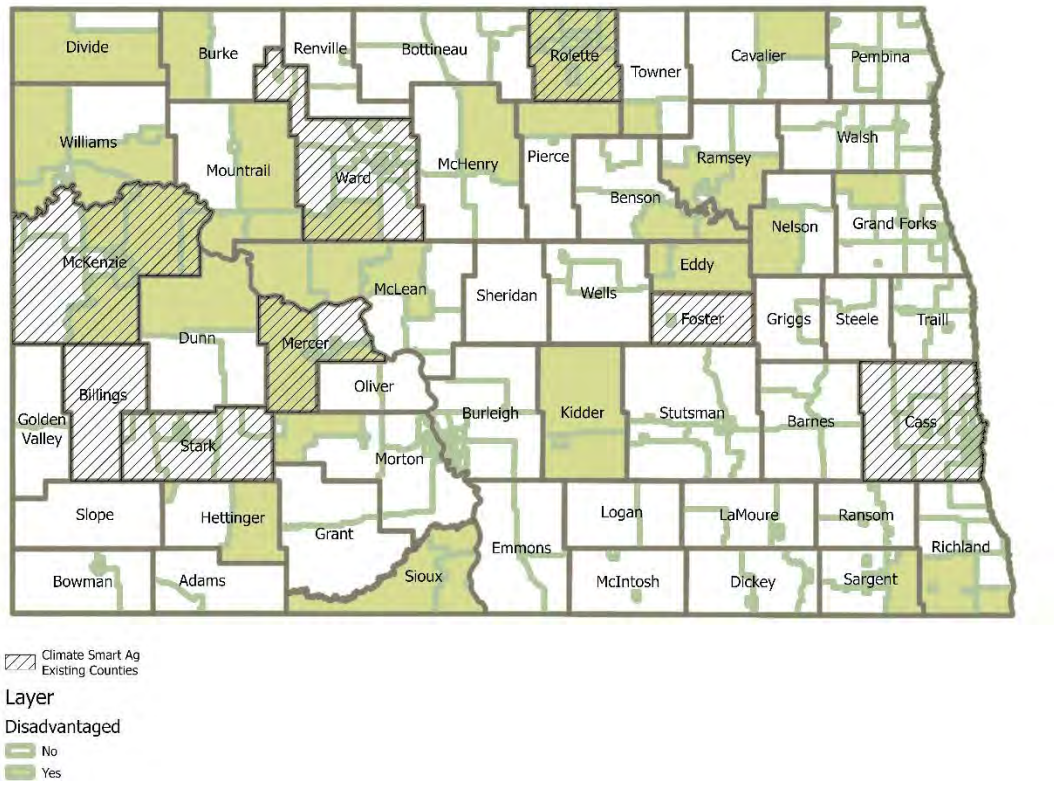
[35] Sadirazdah, Sasan, et. Al. October 2021. "Indoor air quality and health in schools: A critical review for developing a roadmap for the future school environment." Journal of Building Engineering Volume 57. Retrieved from: https://www.sciencedirect.com/science/article/pii/S2352710222009202?via%3Dihub

[36] Kabirikopaei, Adel, et. al. September 10, 2021. "Identifying the K-12 classroom's indoor air quality factors that affect student academic performance." Science of the Total Environment Volume 786. https://www.sciencedirect.com/science/article/abs/pii/S0048969721025699?via%3Dihub

GHG REDUCTION MEASURE #2: ALLIANCE TO ADVANCE CLIMATE-SMART AGRICULTURE PROGRAM

The Alliance to Advance Climate-Smart Agriculture Program will be extended and expanded to support farmers and ranchers across up to eight additional SCDs with incentives to adopt high-value conservation practices such as cover crops, no-till/low-till and prescribed grazing. The program specifically targets 40% of recipients from underserved, socially disadvantaged and limited resource producers. The program currently includes McKenzie, Mercer, Rolette, Stark, Foster, Ward and Cass counties that all have LIDAC census blocks within their boundaries (Figure 8). Expansion of the program with implementation funds could open additional counties with a high percentage of LIDAC areas.

Figure 8. Counties Currently Eligible to Participate in the Alliance to Advance Climate-Smart Agriculture Program



Climate smart agriculture is an integrated approach to managing producer landscapes; in North Dakota, this includes cropland and livestock operations. The program will have a direct economic impact on limited resources, socially disadvantaged and underserved farmers and ranchers to begin soil-health and sustainable livestock production or crop practices that would otherwise be cost-prohibitive. The program provides guidance and support for the participants to ensure underserved groups are represented. The program supports practices to increase carbon storage and sequestration, improve nutrient management, reduce water usage and increase water conservation. Direct benefits to the LIDAC participants of this program include expanded markets for climate-smart commodities, increased

market price premiums and profits, incentives for producing climate-smart commodities and training and technical assistance. In addition, LIDAC participants could experience more productive land and increased yields, lower input costs, improved resilience to climate and weather impact events, and an increased understanding of the economic and environmental climate-smart benefits on the farm.[37]

Indirect benefits will accrue for both LIDAC participants in the program and residents in the surrounding community, including improved water quality, improved water conservation and soil health and reduced agricultural emissions. If commodities are sold locally, nearby LIDAC residents can benefit from locally produced climate-smart commodities. Indirect benefits can also include a diversified commodity base that can respond to climate variability.

GHG REDUCTION MEASURE #3: SOIL HEALTH COVER CROP PROGRAM

The Soil Health Cover Crop Program will expand eligibility and incentives to support more producers with planting cover crops to address soil health and increasing access to no-till drill equipment. The program expansion will increase the number of acres utilizing cover crops and increasing the dollar amount provided to producers while continuing to support producers in all SCDs across North Dakota. The program will provide additional incentives to farmers or ranchers who meet USDA eligibility criteria, including a limited resource, socially disadvantaged, veteran or beginning farmer or rancher.

Cover crops can be intimidating for a producer who has no experience utilizing them. Additionally, some government farm programs have burdensome and confusing paperwork or lottery requirements that can be barriers to participation. This program will remove some of the barriers to participation for LIDAC producers by having an ongoing application process and increase the dollars per acre provided to plant cover crops. The program will also include equipment rental to offset barriers around purchasing equipment for LIDAC producers interested in planting cover crops, including targeting Tribal areas with an increased equipment rental disbursement rate. As the program is available in all SCDs, LIDAC areas across the state will be impacted. Direct benefits to LIDAC farmers and ranchers include equipment availability and increased financial benefits. Other financial benefits include increased yields and reduced machinery costs and chemical inputs, as cover crops can provide a natural weed barrier. Carefully managed cover crops can improve soil nutrient cycling and minimize soil erosion, compaction and loss of nutrients during intense rainfall events. Indirect benefits for LIDAC farmers and ranchers who utilize cover crops are improved water quality and long-term improvement in soil health.

[37] U.S. Department of Agriculture. N.D. "Partnerships for Climate Smart Commodities." Accessed February 2024. Retrieved from: https://www.usda.gov/sites/default/files/documents/partnerships-for-climate-smart-commodities-producer-benefits-infographic.pdf

GHG REDUCTION MEASURE #4: CITY OF FARGO LED STREETLIGHT UPGRADES

The City of Fargo has over 15,000 city-owned lights that operate on a nightly basis. Over half of the city's streetlights located throughout the city are over 12 years old and will be replaced with more energy-efficient and longer-lasting LEDs, which use approximately 50% less electricity. Fargo is North Dakota's largest and one of the state's most diverse cities. The city also has a greater than average share of low-income citizens; 13.2% of Fargo's residents live in poverty,[38] higher than the state poverty rate of 11.1%. Installing energy-efficient lighting will lead to improved nighttime safety in LIDAC neighborhoods. Due to better lighting and increased longevity of the light source, the city won't have to change burnt out light bulbs so often. LED lighting also emits very little heat, which could reduce urban heat island effects, especially in paved areas of the city during the hot summer months.

Energy-efficient streetlights throughout the entire city can lead to indirect benefits for LIDAC residents. The streetlight upgrades will result in improved operational efficiency and economic performance of Fargo's assets. The resulting energy bill savings could be put into city programs and services that help LIDAC members. The LED lights can also be recycled and do not contain mercury, thereby decreasing the amount of waste the city must handle and truck traffic to the city's landfill.

GHG REDUCTION MEASURE #5: N.D. STATEWIDE TREE PLANTING INITIATIVE

NDASCD will expand the N.D. Statewide Tree Planting Initiative to meet unmet demand, as the program has been oversubscribed with current funding. The expanded program will help producers establish tree and shrub plantings across nearly 2,500 acres and support energy efficiency upgrades to tree seedling storage coolers in more North Dakota SCDs. New energy-efficient watering and cooling systems can reduce energy costs and water consumption for the SCDs. Tree and shrub plantings will improve soil health, decrease erosion and develop wildlife habitat, along with sequestering carbon. The program will utilize producer certification to prioritize funding for farmers or ranchers who meet USDA eligibility criteria, including a limited resource, socially disadvantaged, veteran or beginning farmer or rancher. The plantings in LIDAC areas can improve water quality, reduce soil erosion and sequester carbon.

[38] North Dakota Compass. 2024. "Geographic Profiles." Accessed February 2024. Retrieved from: https://www.ndcompass.org/profiles/New%20Profiles/index_new.php

6. IMPLEMENTATION AUTHORITY REVIEW

This section provides an overview of the process used to verify implementation authority in municipal and state code for each priority GHG reduction measure. Informed by detailed project descriptions, the planning team reviewed existing statutory language for each of the five GHG reduction measures detailed in Section 4. For example, the City of Fargo LED Streetlight Upgrades description included the name of the implementing entity and the process and cost of changing each streetlight to an LED. For each GHG reduction measure, statutory text delineated the requirements (i.e., permits, approvals, etc.) necessary for an entity to obtain the authority to implement the measure in the specified location. If no relevant statutory or regulatory language could be found confirming implementation authority, the planning team reviewed county and state ordinances. This section describes the specific state and federal statutes verifying each entity's authority to implement the relevant GHG reduction measure and confirms that each measure has completed all mandatory approval steps per the referenced ordinances.

GHG REDUCTION MEASURE #1: ENERGY CONSERVATION GRANT PROGRAM

The North Dakota Department of Commerce, Division of Community Services, is authorized under the N.D.C.C. to implement energy efficiency measures in public buildings and schools to aid in mitigating GHG emissions within the building sector. Per N.D.C.C. Chapter 54-44.5, section 05.1 Energy Conservation Grant Fund – Continuing Appropriation,[39] the code indicates that the Department of Commerce holds the authority to implement said grant, under the provision that the project holds a payback period of 10 years, matching requirement of one dollar of funding for every dollar of grant funds.

GHG REDUCTION MEASURE #2: ALLIANCE TO ADVANCE CLIMATE-SMART AGRICULTURE PROGRAM

The implementing entity for this GHG reduction measure, NDFU, is a nonprofit, and therefore, does not need to obtain implementation authority to administer contracts to farmers applying for federal grant funding under the Alliance to Advance Climate-Smart Agriculture pilot program. Additionally, NDFU plans to issue a subaward or contract to Virginia Polytechnic Institute and State University (Virginia Tech) to develop a parallel online application portal and website for North Dakota, since Virginia Tech is the administering and researching entity for the pilot program's four initial states (North Dakota, Virginia, Arkansas and Minnesota). NDFU will act as a facilitator and liaison between Virginia Tech and its member farmers and does not require statutory authority due to its nonprofit status.

GHG REDUCTION MEASURE #3: SOIL HEALTH COVER CROP PROGRAM

NDASCD is authorized under the provisions within N.D.C.C. 4.1-20-24, to perform such powers and duties as districts in implementing items "a–q", to develop plans and support activities pertaining to soil conservation, soil erosion prevention and other duties.[40] Per N.D.C.C. 4.1-20-24-1-l, holds perpetual succession unless terminated. NDASCD's implementation authority lies within the powers of the individual districts of a political subdivision as outlined per definition 4.1-20-02.3 of the code, to support the use of cover crops to build soil health and carbon sequestration within the state.[41]

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[39] State of North Dakota. North Dakota Century Code. "Chapter 54-44.5 Division of Community Services, p. 2." Accessed January 2024. Retrieved from: https://ndlegis.gov/cencode/t54c44-5.pdf

[40] State of North Dakota. North Dakota Century Code. "Chapter 4.1-20 Soil Conservation, p. 7." Accessed January 2024. Retrieved from: https://ndlegis.gov/cencode/t04-1c20.pdf

[41] Ibid.

GHG REDUCTION MEASURE #4: CITY OF FARGO LED STREETLIGHT UPGRADES

The City of Fargo Engineering Department's Engineering Services Division has the authority to implement, authorized under Fargo municipal code,[42] changing existing streetlights to LEDs. According to emails shared by the Engineering Services Division with the planning team, the Engineering Services Division has continually upgraded the streetlights for 12 years and does not need to obtain permits to do so going forward. The statutory language gives the city engineer sole authority to conduct and delegate within the Engineering Services Division maintenance on the streetlights and traffic control devices.

GHG REDUCTION MEASURE #5: N.D. STATEWIDE TREE PLANTING INITIATIVE

NDASCD is authorized under the provisions within 4.1-20-24 of the N.D.C.C., Chapter 4.1-20 Soil Conservation, to perform such powers and duties as districts in implementing items "a – q," to develop plans and support activities pertaining to soil conservation, soil erosion prevention and other duties.[43] Per item 4.1-20-24-1-l, N.D.C.C. holds perpetual succession unless terminated. NDASCD's implementation authority lies within the powers of the individual districts of a political subdivision as outlined per definition 4.1-20-02.3 of the code, to support tree and shrub plantings to strengthen soil erosion prevention and contribute to carbon sequestration within the state.

[42] City of Fargo. "Code of Ordinances, Chapter 38, Section 0107 - Installation of Street Lights and Traffic Control Devices." Accessed February 2024. Retrieved from: https://library.municode.com/nd/fargo/codes/code_of_ordinances?nodeId=FARGO_MUNICIPAL_CODECIFANODA_CH38CISTLISYUT.

[43] State of North Dakota. North Dakota Century Code. "Chapter 4.1-20 Soil Conservation, p. 7." Accessed January 2024. Retrieved from: https://ndlegis.gov/cencode/t04-1c20.pdf

7. INTERSECTION WITH OTHER AVIALABLE FUNDING

The priority GHG reduction measures in this PCAP expand upon existing programs. The planning team explored federal and non-federal funding sources to determine whether these sources could apply to the priority GHG reduction measures. To identify funding gaps, the planning team researched additional funding sources at the federal, regional, state and local level. This section reviews the process for identifying and evaluating potential additional funding sources.

Each priority GHG reduction measure was evaluated individually for potential funding sources. The planning team first reviewed federal funding opportunities through the Bipartisan Infrastructure Law[44]

[44] The White House. May 2022. "Building a Better America: A Guidebook to the Bipartisan Infrastructure Law." Accessed February 2024. Retrieved from: https://www.whitehouse.gov/build/guidebook/

and Inflation Reduction Act.[45] Additional investigation into current and forecasted federal funding sources through Grants.gov was conducted. Relevant federal agencies such as the USDA and U.S. Department of Energy were reviewed for potential funding opportunities. Next, the planning team assessed funding sources at the state, regional and local level. State departments such as N.D. Department of Commerce and N.D. Department of Agriculture were evaluated for potential funding opportunities. Programs operating at a state and regional level were investigated, such as the Regional Conservation Partnership Program and State Energy Program. Opportunities through regional entities, such as the North Central Sustainable Agriculture Research and Education, were also assessed. The planning team also reviewed local initiatives through key non-profit organizations and educational institutions. After completing this research, a list of potential funding sources from all relevant agencies and organizations was compiled for further review.

The planning team then conducted an additional review of the identified potential funding sources to ensure that the proposed GHG reduction measures met the eligibility criteria for each of the funding sources identified. Criteria such as implementing agency and submitting entity, requested amount, matching requirements and program objectives were assessed for alignment between proposed GHG reduction measures and potential funding sources. Opportunities with funding application deadlines closing before mid-February 2024 were excluded.

A final list of funding sources that aligned with proposed projects was developed for each individual GHG reduction measure. The planning team developed a range of potential funding amounts based on the funding amount available, award minimums and maximums and likelihood of receiving the award, to identify remaining funding gaps. Tax credits, rebates and loans were not included in this range.

[45] The White House. January 2023. "Building a Clean Energy Economy: A Guidebook to the Inflation Reduction Act's Investments in Clean Energy and Climate Action." Accessed February 2024. Retrieved From: https://www.whitehouse.gov/cleanenergy/inflation-reduction-act-guidebook/

8. NEXT STEPS

This PCAP is the first deliverable under the CPRG planning grant awarded to NDDEQ. NDDEQ and its partners will continue planning, engagement and action to reduce emissions; invest in sustainable infrastructure, technologies and practices; build our economy; and enhance the quality of life for all North Dakotans. In 2025, NDDEQ will publish a CCAP that establishes equitable and sustainable economic development strategies that reduce emissions across all sectors. The CCAP will include near- and long-term emissions projections, a suite of emission reduction measures, a robust analysis of measure benefits, plans to leverage federal funding and a workforce planning analysis. In 2027, NDDEQ will publish a Status Report that details implementation progress for measures included in the PCAP and CCAP, any relevant updates to PCAP and CCAP analyses and next steps and future budget and staffing needs to continue implementation of CCAP measures.

The stakeholder outreach conducted during the PCAP planning process created a sense of empowerment and positive energy among community members. NDDEQ intends to build on the momentum achieved through the PCAP planning process to deepen connections and partnerships with North Dakotans across all sectors and interests through the next CCAP planning phase for positive change should be maintained.

If you have questions about this PCAP or suggestions for the upcoming CCAP and Status Report, contact NDDEQ at deq@nd.gov.

REFERENCES

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APPENDIX A SUSTAINABILITY INPUT FORUMS – ROUND ONE SUMMARY REPORT

Sustainability Input Forums

Round 1 Summary Report

PREPARED FOR

North Dakota | Environmental Quality
Be Legendary.

DATE
FEBRUARY 2024

CONTENTS

North Dakota Department of Environmental Quality (NDDEQ) is leading the state's planning process to meet North Dakota's goals of creating vibrant economies and finding innovative ways to reduce greenhouse gas (GHG) emissions into the atmosphere. Input received through an extensive stakeholder engagement process will assist North Dakota in forming the basis for sustainability planning and actions in 2024 and for years to come, including the state's participation in U.S. Environmental Protection Agency's (EPA) Climate Pollution Reduction Grant (CPRG) program.

This report summarizes processes and learnings from the first round of stakeholder engagement, Round One Sustainability Input Forums, which included:

- 24 Sustainability Input Forums in eight North Dakota communities between October 30 and November 8, 2023; and
- Online survey available to the public from October 30 to December 1, 2023.

1. BACKGROUND

North Dakota was awarded a planning grant through EPA's CPRG program to develop a plan that identifies innovative strategies to build a sustainable future and transform energy economies. As part of this planning grant, NDDEQ is collaborating with North Dakotans to ensure the state's plan reflects communities' needs and is supportive of local planning efforts. The CPRG program requires NDDEQ to submit a Priority Climate Action Plan (PCAP), a short-term plan with implementation-ready strategies to reduce GHG emissions, by March 1, 2024. Following the PCAP, NDDEQ will develop a Comprehensive Climate Action Plan (CCAP), a long-term plan with a more comprehensive set of strategies to reduce GHG emissions, due to EPA by fall 2025. To inform this planning process, NDDEQ is focused on collecting North Dakotans' ideas to develop the state's Priority Community Action Plan and capturing long-term planning ideas to inform NDDEQ's future CCAP planning process.

NDDEQ gathered North Dakotans' ideas through a variety of engagements:

- Round One Sustainability Input Forums – Three forums in each of eight communities throughout the state, offered simultaneously in-person and online (via ZOOM) between October 30 and November 8, 2023. Video recordings and site-specific reports from the forums were posted to NDDEQ's website (www.deq.nd.gov/sustainability).
- Online survey (Round 1) – An online survey paralleled questions asked during Round 1 in-person forums and was made available to the public from October 30 to December 1, 2023. The survey was completed by 121 participants, two of whom were from outside of North Dakota.

In addition to engagement conducted through the Round One Sustainability Input Forums, NDDEQ is performing the following outreach:

- Round Two Online Sustainability Input Forums – Three additional online forums, held January 9 to January 11, 2024, offered further opportunities for North Dakota stakeholders to inform the state's Priority Climate Action Plan as specific implementation-ready GHG reduction strategies are being considered and refined. A corresponding online survey was available online to the public from January 9 through January 19, 2024.

- Consultation and engagement with the state's five tribal nations was conducted by NDDEQ through the North Dakota Indian Affairs Council regular meeting on November 20, 2023. Three of North Dakota's tribes hold independent CPRG planning grants from EPA, and all were invited to provide input and comments as part of the state's planning process.
- Options for direct stakeholder contact with NDDEQ staff, including voicemail and email.
- Engagement with state and local governments and key sectors (e.g., energy and agriculture) occurred through coordination meetings and one-on-one conversations to gather ideas, collaborate, and inform planning processes.

Following the completion of the state's Priority Climate Action Plan, NDDEQ will begin the second phase of planning to inform the development of the Comprehensive Climate Action Plan. As of the release of this report, the specific process and timeline for CCAP planning has not been determined.

2. APPROACH

NDDEQ is focused on building a plan that reflects North Dakotans' needs and is supportive of local planning efforts. The forums were structured to try and engage North Dakotans from all backgrounds across the state in meaningful conversation. Round One Sustainability Input Forums focused on these questions:

- What BENEFITS do you see for North Dakotans by reducing GHG emissions here?
- What DOWNSIDES are there for North Dakotans by reducing GHG emissions here?
- What IS ALREADY being done in North Dakota to reduce GHG emissions? Who is doing it?
- In what ways would you want to see the state INCENTIVIZE, SUPPORT, or just generally HELP with GHG reductions?

Each forum was held in-person and offered live via ZOOM. The forums were held at the following sites:

Bismarck, October 30 – NDDEQ meeting room (day-time forums) and Bismarck Veterans Memorial Library (evening forum)

Devils Lake, November 8 – Agricultural Center at Lake Region State College

Dickinson, November 1 – Veterans Pavilion

Fargo, November 2 – West Acres Mall Community Room

Grand Forks, November 6 – Choice Health & Fitness Community Room

Jamestown, November 1 – Knights of Columbus

Minot, November 6 – Carnegie Center

Williston, November 2 – James Memorial Art Center

NDDEQ held three sector-specific forums at each of the eight meeting sites. The forums were scheduled during the morning, afternoon, and evening to maximize accessibility for participants at each meeting site. The original intent was for the morning forums to focus on energy, the

afternoon on agriculture, and the evening on community and public service; however, conversations in each forum naturally meandered across sectors and topics.

2.1 CONVERSATION DESIGN

Conversations for the Round One Sustainability Input Forums borrowed from *Art of Hosting*[1] and *Appreciative Inquiry*[2] methods, which are practices already being used in North Dakota and tribal communities for decision-making. Such methods can allow for efficient and effective capacity building, and greater ability to respond to opportunity, challenge, and change.

Round One Sustainability Input Forums were structured to gain perspectives and ideas to form the foundation of a climate pollution reduction plan that truly reflects North Dakota.

Across platforms and meeting sites, the following information was provided as framing for participants:

Forums were not designed to be debates; rather they were structured as conversations held in a circle format to enable sharing and listening. Each conversation was documented through written comment cards and online prompts for those participating via ZOOM, and conversations were recorded and transcribed.

The questions and sample greenhouse gas (GHG) reduction strategies posed during each conversation were carefully selected to be neutral and open-ended to ensure that all participants felt welcome to share their perspectives.

NDDEQ staff were present at every meeting and provided information and introductory framing, with a primary role as listeners. Experienced facilitators were hired from ERM, a sustainability consulting firm, to keep the two-hour conversations moving during each forum through facilitation.

[1] Art of Hosting, available online: https://artofhosting.org/what-is-aoh/methods/
[2] Center for Appreciative Inquiry, available online: https://www.centerforappreciativeinquiry.net/resources/what-is-appreciative-inquiry-ai/

Participants were invited to bring their whole selves into the forums, even if they typically represented an organization or a particular point of view. Self-introductions were optional; all that was asked was for participants to provide their ZIP codes to allow NDDEQ to track participation across the state. Interpretive services and other assistance were offered.

3. RESULTS

3.1 PARTICIPATION

Participants in live forums totaled 65 in person and 125 via the ZOOM online platform. In addition, NDDEQ received 121 online survey responses. Turnout varied across meeting sites, with as many as 21 participants in-person and 22 on ZOOM. Participants navigated snow and wind at some meeting sites.

Nine percent of online ZOOM forum participants and online survey respondents were from ZIP codes considered low-income or disadvantaged community (LIDAC). Potential LIDAC residents were identified statewide using the Environmental Justice Screening and Mapping Tool (EJScreen)[3] and the Climate and Economic Justice Screening Tool (CEJST).[4] Those communities were cross-referenced by ZIP code. Participants were asked to share their ZIP codes when registering for the Round One Sustainability Input Forums in order to determine which participants may be in LIDAC areas. Among those attending in-person, there were at least two people participating in each location who were from geographic areas qualifying as LIDAC.

3.2 QUANTITY AND QUALITY OF DATA

Each forum was designed to be intimate, and the number of participants was expected to be somewhat low. Factors contributing to limited participation at some meeting sites included inclement weather and limited notice, along with NDDEQ establishing a new conversational format for public participation that had not been conducted in previous NDDEQ public meetings. Some participants were surprised by the forums' conversational nature and had come prepared with messages and testimony as though it would be a typical public meeting as NDDEQ has held in the past. Forum feedback suggested that participants appreciated the forum engagement and the opportunity to create impact and meet fellow stakeholders. The quality of input received was high. Participants engaged in robust feedback around each key question. Patterns are visible in the data as described further in the following report sections, as are high-value, unique perspectives. The diffuse responses and range of perspectives shared suggest a high degree of safety felt by participants.

One variable between meeting sites was the strength of available internet access, which did affect the quality of audio and corresponding transcription for some sites. However, written comment cards and responses typed directly into online chats or surveys were readily captured.

[3] U.S. EPA, EJScreen: Environmental Justice Screening and Mapping Tool, available online: https://www.epa.gov/ejscreen
[4] Council on Environmental Quality, Climate and Economic Justice Screening Tool, available online: https://screeningtool.geoplatform.gov/en/#8.68/7.0256/-126.0798

3.3 MAJOR THEMES

Detailed reports from each of the eight meeting sites are available at the NDDEQ website here: www.deq.nd.gov/sustainability. This summary report focuses on themes common across North Dakota, including all meeting sites and online survey responses, while highlighting perspectives that showed meaningful differences between regions.

"Word clouds" are used in this section to represent how often a forum/geographic area included mention of a specific word or concept in answer to the four key questions listed in Section 2 (Approach) related to benefits, downsides, what already is being done, what the state could be doing, and reactions to specific example GHG reduction strategies. Word color in the first four word clouds (Figures 1 - 4) is solely meant to enhance readability. Word color in Figure 5 is used to represent support (blue) and opposition (red). The size of each word in a cloud reflects the number of forum participants and online survey responses where the word or concept surfaced, so the larger the word the more widespread the reaction. Lists of words and concepts are further detailed in Appendix B.

3.3.1 GHG REDUCTION BENEFITS

Benefits to North Dakotans from reduced greenhouse gas emissions generally centered on enhanced quality of life (e.g., human health, cleaner air and water, jobs), fewer extreme weather events, increased access to GHG-sensitive markets (e.g., low-carbon energy), stability and resiliency of communities, and communities that are more attractive to investors, young people and workers. This pattern held across the state.

FIGURE 1: FORUMS WHERE A BENEFITS WORD/CONCEPT WAS MENTIONED

3.3.2 GHG REDUCTION DOWNSIDES

Participants were also asked what the dis-benefits, or downsides, might be from reducing GHG emissions for North Dakotans. Common responses proved to be more regional, although perceived cost and regulation were widely named, as was general concern with change, regulation, and a loss of control. Responses mirrored local economies, with threats perceived to employment in oil and gas industries and ranching livelihoods in the western part of the state. In the eastern part of the state, threats were more often perceived to be specific to farming. Disposal of windmill blades and solar panels were often mentioned among those with alternative energy concerns.

FIGURE 2: FORUMS WHERE A PARTICULAR DOWNSIDE WORD/CONCEPT WAS MENTIONED

3.3.3 GHG REDUCTION STRATEGIES ALREADY HAPPENING

Across all forums, participants provided extensive lists of actions already being taken among North Dakotans to reduce greenhouse gas emissions. No-till farming and other agriculture conservation practices, carbon capture and sequestration from manufacturing and energy processes, efforts to eliminate flaring, reduce emissions from coal-fired power plants, and the destruction of methane from municipal waste sites were among actions commonly named.

FIGURE 3: HOW OFTEN FORUMS INCLUDED MENTION OF GHG REDUCTION STRATEGIES THAT ARE ALREADY HAPPENING

3.3.4 STATE INCENTIVES, HELP AND SUPPORT

This conversation centered on ideas for what could be done by the state to incentivize emissions reductions. Among the forum topics, it generated the most diverse responses from participants. Programs that provide education (e.g., public, K-12, trades, sector) were most often mentioned, followed by solar, energy efficiency (e.g., weatherization) for residents and businesses, research, and financial incentives. There were a wide range of ideas for information-sharing and education mentioned throughout the state.

FIGURE 4: HOW OFTEN FORUMS INCLUDED MENTION OF SOMETHING THAT THE STATE COULD DO TO INCENTIVIZE, HELP, OR GENERALLY SUPPORT GHG EMISSION REDUCTIONS

3.3.5 GHG REDUCTION EXAMPLE STRATEGIES

To further gauge North Dakotans' interests in specific GHG reduction strategies, facilitators provided a list of examples of GHG reduction strategies from various sectors for participants' reaction. The list of strategies were examples of best practice approaches seen across the U.S. by ERM rather than specific proposals being put forth by NDDEQ.

For those participating in-person at the meeting sites, the facilitators listed the examples of GHG reduction strategies on large posters. Online forum attendees participated by responding via the ZOOM chat or poll. In-person participants were invited to use as many blue (support) or red (opposition) stickers as they chose to indicate the strength of their opinions. This exercise was intended to stimulate conversation and was not structured as a ranking or voting exercise. The descriptions of GHG reduction strategies provided to participants may be found in Section.

Figure 5 represents the responses from all forum participants in support and in opposition to the list of example GHG reduction strategies. The more often an example strategy was supported or opposed by forum participants, the larger the size of the word. Words in blue show levels of support; words in red show opposition.

FIGURE 5: NORTH DAKOTANS' SUPPORT AND OPPOSITION FOR EXAMPLE GHG STRATEGIES.

Note: Blue represents support, red represents opposition.

Overall, every example GHG reduction strategy received at least some support, with conservation practices and energy efficiency strategies receiving a high degree of support statewide. The strength of reactions to various GHG reduction strategies did differ by region, which can best be seen in the detailed site-specific reports (available online at www.nd.deq.gov/sustainability). For example, electric vehicles and related charging stations overall drew both moderate support and opposition and, at some meeting sites, very strong support or opposition.

3.4 LIDAC-SPECIFIC RESULTS

By design, all Round One Sustainability Input Forum comments (both online and in-person) were collected anonymously. Online comments, however, can be coded to ZIP codes requested in the survey. An analysis using EJScreen and CEJST identified the following ZIP codes as LIDAC from which NDDEQ received online survey responses: 58103, 58369, 58381, 58385, 58757, 58801, 58854.

The following four sections summarize themes from online survey responses to the four key questions listed in Section 2 (related to benefits, downsides, what is already being done, and what the state could be doing) received from respondents in LIDAC areas.

3.4.1 GHG REDUCTION BENEFITS - LIDAC

The opportunity to improve local air quality and quality of life were commonly mentioned as benefits, as were possibilities of new jobs in the wind and solar industry, improved human health, and the health of soils and water. Examples of comments received include:

- "The efforts it takes to reduce GHG will introduce a new era of technology and jobs into the state. In addition, there is an opportunity to create cleaner air for ND and the world. Cleaner water for our rivers and streams. Ultimately, less energy expenses for businesses, farms, and homeowners. And a better quality of life for all residents."
- "Cleaner air, soil, animals and people. A safer and more diversified energy grid."
- "Quality of life to attract more citizens."

3.4.2 GHG REDUCTION DOWNSIDES - LIDAC

As with North Dakotans overall, those in LIDAC areas named cost as their primary concern as GHG reduction strategies are implemented. In addition to affordability, these respondents raised concerns about potential changes to standard of living, mistrust over who profits from strategies such as carbon capture and sequestration, competitive disadvantage versus polluting countries, private landowner rights, and energy grid instability. Examples of comments received include:

- "Explosive rise in energy costs leading to a cascade of cost increases down the line. More poverty."
- "Maintaining current standards of living because we are a fossil fuel-based economy."
- "Times are tough financially for ND citizens. Now would be a terrible time to increase energy costs."

3.4.3 GHG REDUCTION STRATEGIES ALREADY HAPPENING - LIDAC

Respondents cite efforts across agriculture, energy, transportation, and waste sectors already in progress in North Dakota to reduce GHG emissions. Policy and regulation already changed and in place also are cited, although continuing strife is evident. Examples of comments received include:

- "Some farmers, businesses and individuals are working to change the way they exist and do business to ensure a safer environment and future for the next generations."
- "Much of this has been accomplished through regulation, such as requirements to reduce NG flaring or reduce well-head methane emissions. Having said that, they have made these changes."
- "Some people are reducing their carbon footprint. We have a ways to go in recycling in North Dakota and on reservations."

3.4.4 STATE INCENTIVES, HELP AND SUPPORT - LIDAC

Suggestions of ways the state might incentivize, support or help with GHG reductions ranged widely from financial incentives to do nothing. Education and giving credit for existing action are themes among LIDAC area respondents that are similar to the broader population. Examples of comments received include:

- "We should monetize grasslands that are managed in a manner that optimizes carbon sequestration."
- "Get the word out to all communities in North Dakota on the importance of the reduction of greenhouse gasses and protecting our Mother Earth for future generations."
- "Please leave it alone."
- "Make it mandatory without compensation for the larger offenders."

While the number of online survey respondents that could specifically be tied to a LIDAC area was relatively low (12 respondents), the depth and detail of their comments provide themes that can speed further engagement and exploration within LIDAC communities.

4. OPPORTUNITIES

Conversation among North Dakotans continued through January 2024 to further refine understandings and priorities to inform the state's Priority Climate Action Plan, the short-term plan intended to identify implementation-ready GHG reduction strategies (due to EPA March 1, 2024).

During the Round Two Online Sustainability Input Forums in January 2024, NDDEQ focused on sharing the feedback aggregated from the Round One Sustainability Input Forums. Round Two also gave North Dakotans an opportunity to provide more detailed input on an updated set of implementation-ready GHG reduction strategies. Additional details about the Round Two Online Sustainability Input Forums will be available in the Round Two Summary Report.

Tables 1 – 4 describe categories that NDDEQ created for the sector-specific GHG reduction strategies, primarily as a result of the feedback received during the Round One Sustainability Input Forums and online survey responses. The strategies listed in Tables 1 – 4 are the same example GHG reduction strategies discussed by participants during Round One Sustainability Input Forums. Here they are categorized according to degree of public support and consideration for short-term or long-term planning efforts, informed by:

- Feedback from North Dakotans via the Round One Sustainability Input Forums and online survey comments.
- Researching existing North Dakota state and local plans.
- Reviewing best practices that have been implemented in other communities.
- Considering EPA's grant criteria required for North Dakota's short-term plan, the Priority Climate Action Plan.

The Round Two Online Sustainability Input Forums focused on public feedback related to the implementation-ready strategies listed in Tables 1 – 2 to support the state's short-term plan development. The long-term strategies listed in Tables 3 – 4, along with any additional strategies received through public feedback remain under consideration for the state's long-term planning and stakeholder engagement process that will commence by Summer 2024.

TABLE 1 - IMPLEMENTATION-READY GHG STRATEGIES WITH **HIGH** PUBLIC SUPPORT

Agriculture	Conservation Practices: Implement programs that support best practices in agricultural conservation to help protect soil health, including cover crops, no till, other runoff reduction techniques. Fertilizer Application Practices: Incentives for technologies and techniques that reduce nitrous oxide emissions from fertilizer application such as precision agriculture practices.
Energy	Energy Efficiency: Incentives for installing end-use energy efficiency measures in commercial and residential buildings.
Waste	Waste Stream Reduction: Increase the efficiency or effectiveness of waste reduction, reuse, recycling, or composting programs. Reducing the amount of materials entering landfills.

TABLE 2 - IMPLEMENTATION-READY GHG STRATEGIES WITH **MODERATE** PUBLIC SUPPORT

Agriculture	Using Natural Fertilizers: Reinforcing soil health with the life cycle of the animal.
Energy	Energy Storage: Funding for battery technology to store solar energy at commercial businesses. Financing Programs: Establish a financing program (e.g., grants or low-interest loans) for energy efficiency and renewable energy installations in new and existing buildings. Renewable Energy: Incentives for installing renewable energy systems on commercial properties.
Industry	Industrial Efficiency: Programs to support or incentivize implementation of energy efficiency measures in industry, including energy audits, strategic energy management, equipment upgrades, and waste heat utilization.
Transportation	Walking and Biking Paths: Additional walking and biking paths throughout the community.
Waste	Sustainable Building Materials: Utilizing sustainable building materials for local buildings.

TABLE 3 - LONG-TERM GHG STRATEGIES TO CONSIDER: **LOCATION-SPECIFIC** PUBLIC SUPPORT

Agriculture	Anerobic Digesters: Incentives to promote anaerobic digesters to capture methane and generate renewable energy or produce renewable fuel. Alternative Fuels Equipment: Incentive programs to fund agricultural equipment technologies that use alternative fuels. Economic Development: Programs for local and regional economic development partners to establish food- and agriculture-based economic development strategies, such as community-based food co-ops.
Industry	Low- or No-Carbon Fuels: Programs to support or incentivize greenhouse gas emission reductions in industrial energy use and industrial processes, including use of low/no carbon fuels, electrification, renewable energy, and process improvements. Low-Carbon Materials: Programs to develop, expand, and support markets for low-embodied carbon materials and products, such as cement and steel.
Transportation	Freight Efficiency: Increasing efficiency in freight movement. Public Transportation: Increasing the availability and access to public transportation in your community.
Waste	Reducing Landfill Emissions: Incentives to reduce methane emissions from landfills and wastewater treatment facilities, including through collection for use. Wastewater Facility Efficiency: Incentives for installing renewable energy and energy efficiency measures at wastewater treatment facilities.

TABLE 4 - LONG-TERM GHG STRATEGIES TO CONSIDER: **VARYING** PUBLIC SUPPORT

Energy	Renewable Permitting: Streamline permitting for renewable energy projects.
Industry	Carbon Capture: Programs to support or incentivize carbon capture, utilization, and storage (CCUS) at industrial and energy facilities.
Transportation	Electric Vehicles and Charging: Incentives to increase the share of electric vehicles (e.g., leasing and purchasing), and to expand electric vehicle charging infrastructure.

APPENDIX A ENGAGEMENT

NEWS RELEASE

NORTH Dakota | Environmental Quality
Be Legendary.

NEWS | **FOR IMMEDIATE RELEASE** | Oct. 24, 2023

Department of Environmental Quality Announces Sustainability Input Forums

North Dakotans invited to share their ideas for reducing carbon emissions at listening events throughout the state starting Oct. 30

BISMARCK, N.D. – North Dakotans from all backgrounds are coming together to share ideas to meet the state's goals of creating vibrant economies and finding innovative ways to reduce carbon emissions into the atmosphere. Three listening sessions, each with a special focus, will be held in eight locations throughout North Dakota from Oct. 30 through Nov. 8.

North Dakota Sustainability Input Forums will form the basis for planning and actions over the next few months and years to come. Focused sessions will be held:

- Oct. 30 – **Bismarck** - Daytime sessions (9:30 and 1:00) at the Department of Environmental Quality board room (4201 Normandy St.) and evening session (6:30) at Bismarck Veterans Memorial Public Library (515 N. 5th St.)
- Nov. 1 – **Dickinson** at Stark County Veterans Pavilion (801 5th Ave, W.) and **Jamestown** at Knights of Columbus (519 First Ave. S.)

- Nov. 2 - **Fargo** at West Acres Mall community room on the lower level, JC Penney wing (3902 – 13th Ave S.)
- Nov. 2 – **Williston** at James Memorial Art Center (621 First Ave W)
- Nov. 6 – **Minot** at Carnegie Center (105 Second Ave SE) and Grand Forks at Choice Health and Fitness community room (4401 S 11th St.)
- Nov. 8 – **Devil's Lake** at Lake Region State College Agricultural Center (1801 College Drive North)

At each location, three forum sessions will be held with the specific focus on Energy Implementation and Development (9:30 a.m. – noon), Agriculture (1:00 – 3:30 p.m.) and Community, Public Service and Government (6:30 – 9:00 p.m.).

Each session will be livestreamed via ZOOM. Please see https://deq.nd.gov/sustainability/ for specific links for each session and other ways to provide input to the North Dakota plan.

North Dakota received a planning grant to support this effort. The Climate Pollution Reduction Grants (CPRG) program through U.S. Environmental Protection Agency supports innovative strategies to build a sustainable future and transform energy economies.

"North Dakota is uniquely positioned with its innovation, experience and resources to embrace this opportunity to fuel local economies, strengthen U.S. energy independence, and reduce carbon emissions," said Dave Glatt, Environmental Quality Director. "These listening forums are the first step in shaping North Dakota's approach. All ideas are welcome and needed."

For more information contact:

Jennifer Skjod

Public Information Officer

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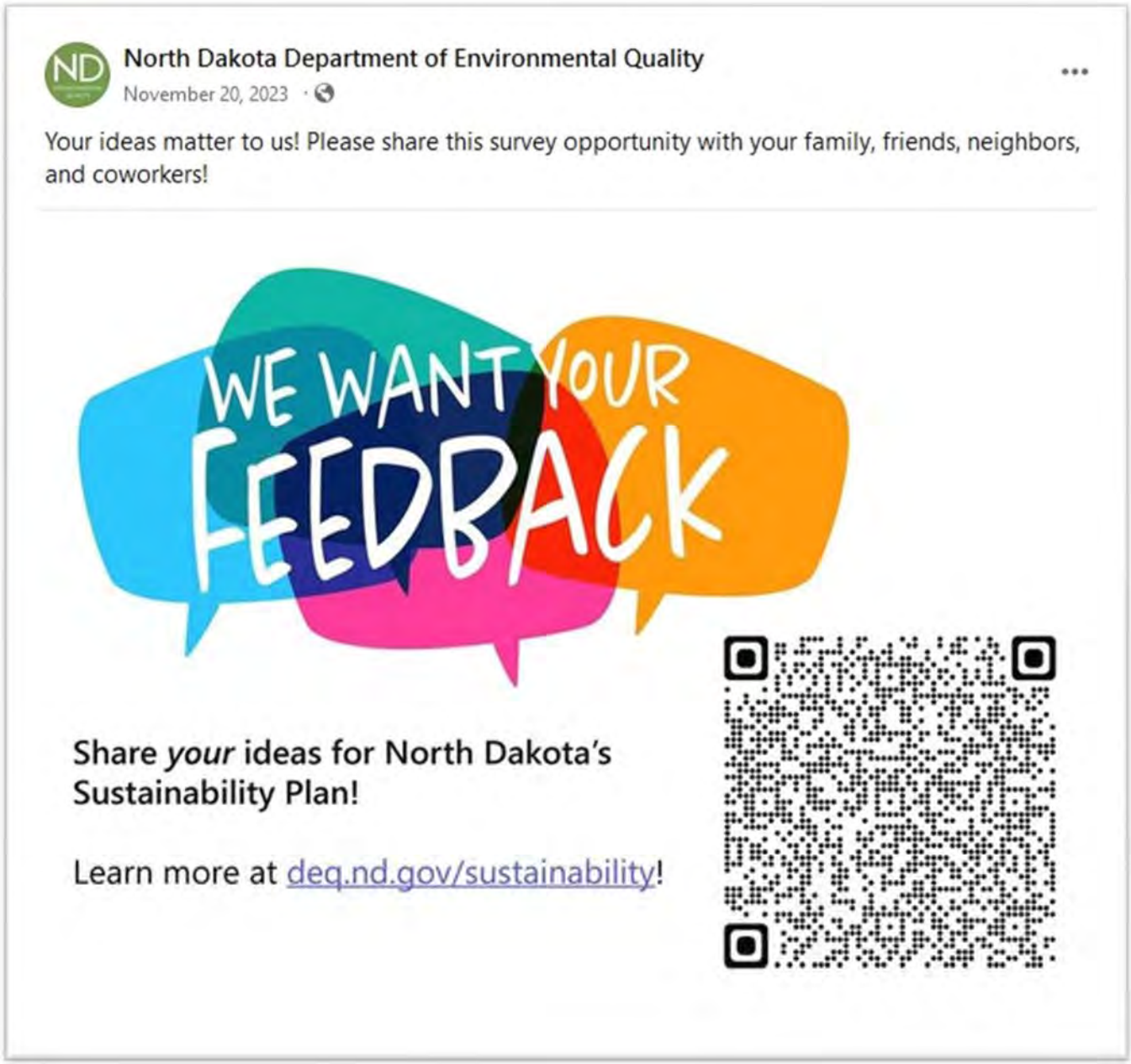
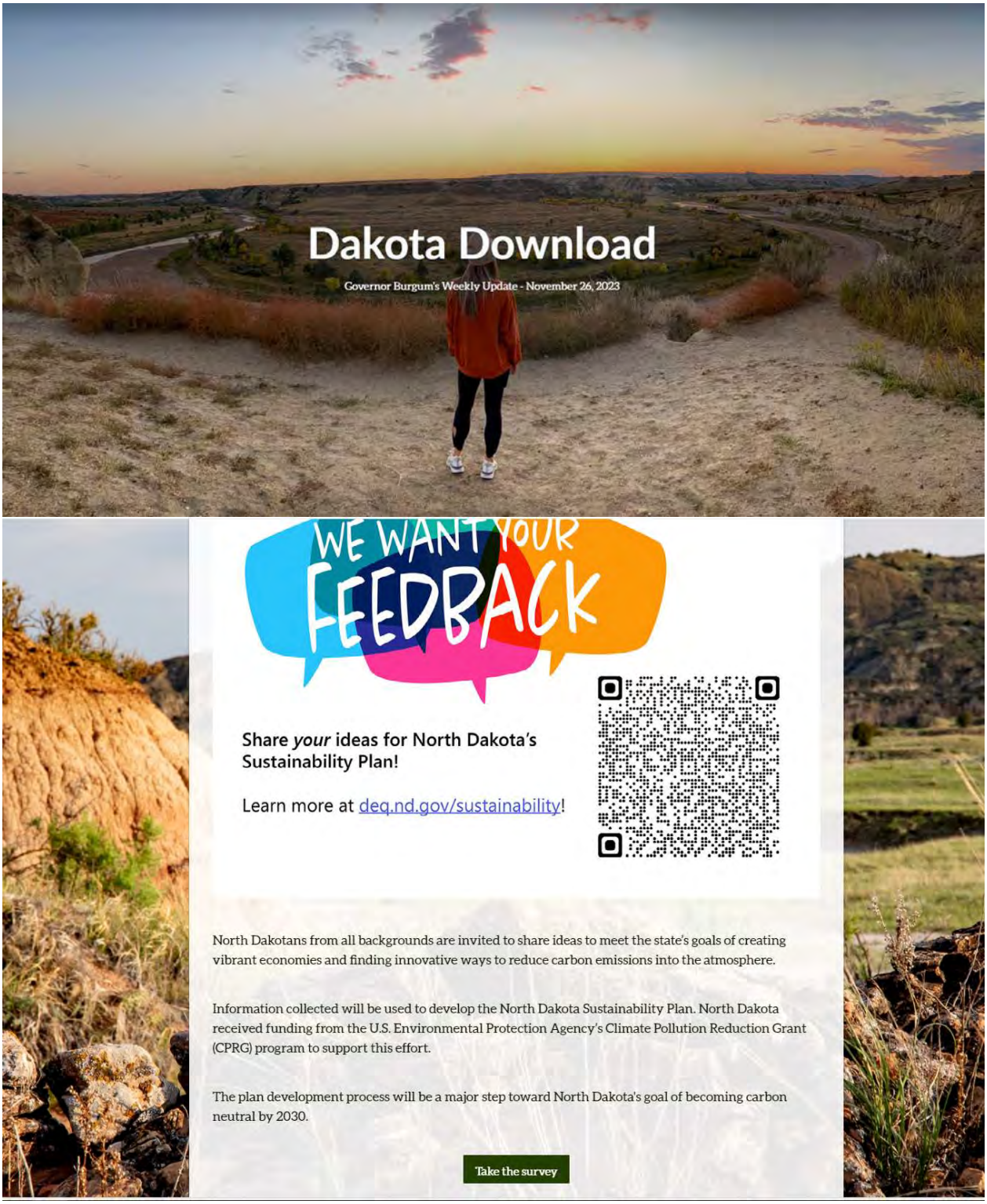
PHONE: (701) 328-5226 | EMAIL: jskjod@nd.gov

www.deq.nd.gov

FACEBOOK POSTS


North Dakota Department of Environmental Quality
November 20, 2023
Your ideas matter to us! Please share this survey opportunity with your family, friends, neighbors, and coworkers!
WE WANT YOUR FEEDBACK
Share your ideas for North Dakota's Sustainability Plan!
Learn more at deq.nd.gov/sustainability!

GOVERNOR BURGUM'S WEEKLY UPDATE (ONLINE)



APPENDIX B RAW DATA

BENEFITS

What BENEFITS do you see for North Dakotans by reducing greenhouse gas emissions here? (Note: Italic type used to show inputs received through the online survey.)

BISMARCK

Cleaner air

Grant opportunities

Keep existing industries competitive in the market

Electrical literacy and energy literacy

Technology development

Potential business development

Potential new tax base for North Dakota

Potential employment opportunities

GHGs are not bound by boarders, reductions contribute to global reductions

Limiting the effects of climate change

Better quality of life

Addressing inequality

Economic opportunities

Changing awareness from individualism to collectivism

Ease regulations

Improve investor relations, opens corporate lending for development

Healthier ecosystems

Longevity for our communities, industries, and families

Global partner

Decreased demand for finite resources (assuming reduction in fuel/coal use)

Decreases in healthcare costs (asthma, COPD, and respiratory ailments)

ESG corporation benefits

Increased tourism

Healthier soils

Protect growing seasons

New/emerging industry that can be locally directed and controlled (ideally not giant corporations moving in from outside

Better relationships with Indigenous communities/tribes concerned about land and environment

Better balance of weather to produce better-quality crops

Enhanced water quality

Food security

Cleaner infrastructure and working conditions

Energy efficiency and cost savings

Ability to use natural resources available to us

Participate in a global effort

DEVILS LAKE

Cleaner environment = air, food, and water quality improvements

Improved energy efficiency

Potential to address climate change

Potential to reduce climate disasters

A livable, Sustainable future for all

Better quality of life

Keep weather from getting warmer

DICKINSON

Less federal/state overreach

Expanded production opportunities

Potential of new partnerships

Job creation

Less regulations

Economic opportunities

Innovation potential

A cleaner environment

Reduction in health issues

Climate stability

Very few benefits

FARGO

Cleaner air

Fewer extreme weather events

Improved quality of life

Lower carbon emissions

Improved perception of North Dakotans' attitudes toward the environment

Improved sunlight exposure for crops

Maintain planet for future generations

Less production cost

Soil and water health

Economic opportunity

Growth of renewable fuels

Increased market opportunities for commodities

Remain competitive on global markets

Diversify economy

Be a good neighbor to our country

Encourage Innovation

Healthier animals

Waste reduction by utilizing biodiesel made from fat/cooking oil waste

Reduce dependency on fleeting fossil fuels

Energy security- reduce reliance on foreign oil production providing protection against geopolitical instability

Rural development with additional income opportunities

Additional jobs

Slow global warming

Increased resiliency

Decrease in climate related refugees

GRAND FORKS

Improved quality of water

Reduced use of urea-based fertilizers

Reduced air pollution

Low carbon products

CO2 for EOR (enhanced oil recovery)

There are no benefits- it is not necessary to reduce carbon; plant life does it just fine.

JAMESTOWN

Property tax incomes and increased property owner income from CO_2 pipelines

Tax incentives for businesses

Improved health

Continual operation of ethanol plants

Cleaner air

Increased allure to new, younger residents

Increased diversity of industry

Monetary incentives

Change in growing season

Being part of a global effort

New industries and markets

Potential weather stabilization

Redirection of funds away from more harmful practices

Become a change leader

Decrease cost of insurance related to weather disasters

Increased job opportunities

Energy security- reduce reliance on foreign oil production providing protection against geopolitical instability

Rural development with additional income opportunities

Additional jobs

MINOT

Federal funding and support

Less produced water and oil spills

Better soil with land management changes (better yields)

More equitable quality of life

Maintain wild spaces in North Dakota and preserving badlands/prairies

Decrease cost to combat effects of climate change

Making all citizens of North Dakota responsible

Better air quality

Bringing more workers to North Dakota

More regular growing seasons

Less health issues

Global stability

Save our natural land from oil developments

New economies around renewable energy

Clean water

Less dependence on oil and gas companies

Innovation in industry

New job creation using clean technology

Decrease in dependence on foreign oil

WILLISTON

Improvements in soil health lead to improved ag profitability due to better yields, better resilience, and reduced input costs

Healthier landscapes

Improvements in health

A more stable environment resulting in a more stable economy

Reduction in global warming impacts

Collaboration across industries

New industry opportunities bringing jobs, tax revenue, and landowner benefits

An expansion of ND's identity

More federal funding

Less defensive measures, more proactive approaches

Innovation in industry

Promotion of ND as national/global player

Reduction in energy expenses for businesses, farms, and homeowners

Many businesses have pledged to reduce greenhouse gas emissions and chose to locate their data centers where energy is produced with lower emissions

DOWNSIDES

What DOWNSIDES are there for North Dakotans by reducing greenhouse gas emissions here?

BISMARCK

Regulatory burdens

Limited global impact

Lifestyle changes/resistance to change

Economic impact (transformation adjusting to a new paradigm)

Not following the science

Placement of new infrastructure needed for energy (NIMBY)

Technology may not exist

Insufficient infrastructure will create a large investment for needed infrastructure

Ability to obtain ROWs for infrastructure

Increases in operating cost

Reduction in economic justification for corporations to invest

Forced reductions could lead to a decrease in quality-of-life

May require regulation of processes/technologies

Alternatives may not be viable

Loss of jobs

Education challenges

Short-term thinking and planning could lead to other problems

Not planning big enough to consider limitations to industry (Hard to keep up with technology, money involved should be innovative)

Transition and cost of labor

North Dakota will do the work but may not see the benefits

Taxes on GHG

Fight over who gets to make the profit with the transition

Less meat to eat

Loss of strategic flexibility

Oil/coal economies negatively impacted if reduction not planned well

Higher cost of living

Political strife and breakdown of public discourse

The false pressure to closing coal mines in North Dakota and across the country

Adds additional costs and regulations to businesses, may discourage some businesses from coming to ND

Increase in government spending

Higher energy costs

Restrictions on consumer preferences that make very little return in emissions reduction

Windmills are visual pollution

Unintended consequences (For example, renewable energy technologies impact land use, biodiversity, and local ecosystems)

Increased cost/investment for change

NONE

Limited space

DEVILS LAKE

Additional cost to economy

How long could it take to transition?

Is it sustainable?

What are the unintended consequences?

Potential waste of resources

May not be as impactful as we hope

Less power or electricity

Limited public knowledge

DICKINSON

Increase in regulation

Job elimination

Individuals will not be able to afford the change

More regulation; job elimination

More federal government involvement

Transition costs to the state

FARGO

How are we measuring improvements?

Potential cost to producers

Cost of new infrastructure

Risk to public health

Dramatic change to oil and Agriculture based economy

Added controversy- misinformation

Time consuming

Change of traditional practices causes unrest

Reduced power in engine units/equipment

Loss of local control over regulation

Destruction of current economic model

Less reliable power grid

Product affordability

Loss of jobs and need for alternative revenue

Cost outweighs the benefits by adding emissions elsewhere in the production of new materials

There are no downsides

No readily available solutions to heavy-duty transportation/machinery

GRAND FORKS

Change in lifestyle/tradition

Higher valued products/more expensive energy

Unfair regulation

Undue burden on farmers who cannot adapt practices

De-facto taxes on traditional farming materials including diesel and fertilizer perpetuates bad policy practices

Upfront cost to transition

Risk to human health if done wrong

Increased taxes on citizens

Carbon capture is unsustainable and will contribute to waste long-term

JAMESTOWN

Higher utility costs

Increased taxation

Increased regulation

Political issues

Cost of food grade CO2

Additional competition for resources

Cost vs benefit concerns

We are alone in our efforts

Loss of local control

Infringement on personal property rights

None

Change of current economic model

Risks associated with storage of carbon

Potential green-washing

Reduction of energy efficiency

"There are no downsides unless Republicans want to create them"

Dry gas will be harder to control

MINOT

Financially damaging to the current mode of operation for the coal and gas industry (local and state revenue)

Impact to gas sales tax revenue as vehicles move to electric

Reduction in personal travel independence as Electric Vehicles (EVs) don't have the ability to travel long distances yet

Controversial

Increased expenses and regulations that cost money or decrease productivity

Contributor calling out the other to place blame

Educating the public

People may move away to find opportunities

Change is difficult

Coal/oil towns will struggle

Political backlash

Individuals will need job trainings for new industries

Loss of jobs

Limits or changes to farming practices

Visual pollution from wind turbines and their short lifespan requires regular maintenance

WILLISTON

Reduced agricultural production (i.e., crop response to higher CO_2 levels)

Carbon offsets (i.e., ND reduces emissions, but big corporations take advantage of it to offset their emissions)

More mandates/restrictions

Reducing GHG could cause a swing towards over regulation resulting in harm to industries that are beneficial to ND

Economic downturn

Long-term benefits, but at the expense of a short-term downturn

Changes in lifestyle

Confusion around net vs total emissions

Money funded by government

Loss of workforce/jobs

If cattle grazing is removed, this will destroy our native rangeland

Long term impacts and the uncertainty that creates

Creation of new goals, who decides and how far do we take it

Who will regulate reduction measures

What happens to those not pulling their weight

Public Opposition

Upfront economic costs of transitioning towards new practices

EXISTING

What ALREADY is being done in North Dakota to reduce greenhouse gas emissions? Who is doing it?

BISMARCK

Capturing most of released gas and decreasing flaring

Coal drying technology

No-till/ low-till farming

Weatherization

Low Income Home Energy Assistance Program (LI-HEAP)

Solar electric, solar thermal, geothermal, wind, automation, and energy efficiency has been done by various groups

Turtle Mountain Community College has combined automation, geothermal, and wind to create a 99% renewable campus

Cannon Ball, ND solar farm on Standing Rock.

Ethanol (Capture technology)

Methane Capture (Landfill Fargo)

Carbon Capture/Sequestration (DCC)

GTL/Plastics

Flaring Elimination - Gas Capture

Geologic Sequestration - Direct Capture

EV/Cars- Lawn equipment

Satellite and onsite emission monitoring

Building code improvement

Company public commitments for zero routine flaring by certain date

EERC research (Pyrolysis, Hydrogen)

New industry to consume methane to ammonia (i.e. hydrogen); CO2 sequestration (Project Tundra)

Clean sustainable energy authority

BPOP, PCOR, OGRP

Sustained coal electric generation

Directional drilling

Cooperative energy efficiency programs

City planning/development

Governor's carbon neutrality goals

Developing emissions inventory

Outdoor Heritage Fund

Rotational grazing

Studies to understand processes/implementation factors

Cover cropping fields to build soil and store carbon

Environmentally Minded People of Minot doing community outreach

Grassland livestock management (grazing systems) reduce net carbon and methane

Coal plant has scrubbers and a high level of emission reducing technology

Fungi in native grasslands use CO2 and methane for fuel (energy) to help grasslands be a big sink

Local sourcing (buy local/shop local)

Farmers markets

Restrictions on industry (regulations)

Conservation planning incentives

Shift to different energy sources (local sourcing)

Global partnerships with other countries

Primacy for Class VI UIC for carbon storage

Red Trail Energy Ethanol Plant - almost zero emissions

Industry is setting reduction goals

The Mandan Refinery considers GHG impact with every proposed engineering project: The owner of the refinery has committed to decreasing GHG at its fleet of refineries by 30% by 2030

Coal fired power plant emissions are amongst the lowest in the nation

High voltage DC lines

Dakota Capture East

Anaerobic digesters

State agencies are incorporating climate change into their planning

Power plant emissions scrubbers

Crop rotation and livestock integration to reduce soil erosion and biodiversity to retain soil nutrients

Recycling in homes

Increase in bike lanes/paths

DEVILS LAKE

Midkota Power plants trees and checks that they are growing

Local recycling programs

Equipment programs: FSA/NRCS, CRP-CSP

Progressive farming techniques like reduced tillage

Carbon capture in Bakken

The state government is discussing ways to reduce emissions

DICKINSON

Flare reduction in oil and gas

CO2 sequestration

Tracking what emissions are being captured by the landscape

Pipelines (trucks off the roads)

Zero emission premature controls (oil and gas)

Oil and gas efficiencies

Soil quality improvements

Education events and demonstrations

EERC collaboration in enhanced oil recovery from CO2

Carbon Capture in Beulah (Red Trail Ethanol Plant)

Pipeline companies maintaining lines for leaks

Emission regulations in energy production

FARGO

Wind turbines

Rebates/tax credits for energy efficient appliances

Farmers/ranchers using adaptive practices

Scrubbers on smokestacks

Prairieland research on species impacted

USDA

Soil Conservation Districts

Land and Water Conservation

Nongovernmental organizations (NGOs) incentivizing farmers for changes and food stewardship

DEF fluid and biofuels

Underground storage

Utility companies offering peak differential rates

Red Tail Energy- CCS

Primarcy for Class VI UIC wells

Electric vehicles

Methane capture

Nonprofits like Audubon and Pheasants Forever

Recycling concrete for roads

Development of carbon capture and sequestration technologies

Production of renewable diesel by Marathon Petroleum at South Heart

Biodiesel by ADM at Velva

Additional bus stops increasing accessibility

Ethanol-based public transportation

Private solar power

I don't know

GRAND FORKS

Red Trail and Blue Flint are ethanol plants that inject CO2

Continue development/investment in wind energy

DGC research and regulatory framework for capture and sequestration of CO2

Geo-thermal energy in workplace

No-till and other adaptive farming practices

Oil field operations addressing fugitive methane emissions

Great Plains Synfuels plant capturing and sequestration of CO2

Tax credits for energy star appliances and practices

Regulations on flaring from petroleum and gas production

JAMESTOWN

Drying coal before using

Windfarms

Plans for a water to fertilizer plant powered by wind

Corn and soybean biofuel production

Modern ag practices including no-till, cover crops and rotational grazing

Electric car charging stations

Hydroelectric power

Red Trail and Project Tundra sequestration

Capture of flare gas

Improved rail access

Soil and Water Outcomes Fund

Electric vehicles and charging stations

Land preservation/conservation efforts such as ND Game and Fish, USFWS

Businesses are reducing fuel use

Minimize food waste

Increased use of personal practices such as turning off lights, recycling and using less water

Environmental monitoring/compliance checks

Basin Electric is working on carbon capture

MINOT

Increased use of cover crops/ no-till farming

Family farms/local food production

Prairie restorations in Minot (Ramstad, Minot Air Force Base (MAFB))

1000 Trees for Minot

Carbon capture in oil/gas

EV implementation

Waste management

Oil well flaring regulations

Renewable regenerative fuels

Rotational grazing systems

Minot Pollinator Project

Minot Recycling

Commitment to be carbon neutral by 2030

City compost bins

Minot bike lanes

"Kiss the Ground" movie screening

Project at Minot State University (MSU) for prairie restoration

Research center in Mandan

Net metering

Carol Davis at Turtle Mountain Water Keepers

Keller Paving solar panels on buildings

There are state programs for energy efficiency upgrades (Rural Economic Area Partnership Program (REAP) and Low-Income Home Energy Assistance Program (LI-HEAP))

New solar installation for research within agriculture in ND

New local food hub potentially coming to Minot

Standing Rock standing against Dakota Access Pipeline (DAPL)

Wind and solar farm developments

Geothermal heating

Small-scale efforts to store CO2 underground

Investment into new technologies

Williston

Agriculture practices that protect soil, improve soil organic matter, and soil health

Coal-fired generating plants have taken steps to reduce emissions

No-till farming and cover crops

Equipment that is being regulated to be more environmentally friendly

Carbon capture in soil

Conservation programs

Introduction of Kernza grain (perennial agriculture)

Improved grazing management by ranchers

Seeding cropland back to grass for grazing production

Leadership in communities to understand the task at hand and benefits

ND investing in a team to explore CPRG

Wind energy expansion

Blue Flint aggregating at facilities

Change in regulation/legislation/politician's perspectives

NRCS and SCD-led conservation efforts

Richardton Ethanol plant with CO2 storage on-site

CCS efforts with Project Tundra

University of North Dakota research on CCS and deep geothermal electricity production

Dr. Rebecca Phillips of Ecological Insights is researching natural carbon sequestration in grassland when coupled with managed cattle grazing

Summit Carbon Solutions is working within North Dakota and surrounding states to capture carbon from ethanol production and sequester it in North Dakota

INCENTIVES

In what ways would you want to see the state INCENTIVIZE, SUPPORT, or just generally HELP with greenhouse gas reductions?

BISMARCK

Support research and development

Create realistic approaches, targets and timelines

Financial incentives

Collaborative approach

Increase incentives to choose energy efficiency equipment

Cooperatives and utilities should offer locals fair compensation for solar DERs

EPA Solar for All and other incentives should be embraced by the state and commerce department and fully staffed

Continue CSEA and Ag research (assistance in providing technical development)

Improve building codes (statewide development) for energy savings

Understand the current condition (Scope 1,2,3) and inventory

Partner in technology deployment (silent partner)

Educate the public

Energy efficient building incentives

Secure ROW for infrastructure

Renewable portfolio standard (RPS)

Net metering up to 1 MW for wind/solar

Use state buildings, fleets, operations as a living example of net zero concepts

Streamline permitting

State Conservation Reserve Program (CRP)

Carbon bank

State Program: Low Income Home Energy Assistance Program (LI-HEAP) to be open to more groups of people

Federal Program: Rural Energy America Program (REAP) could have easier access to funding incentives

Incentivize things that sequester carbon like our grassland managers (ranches) - Give them support for doing what is right and helping the whole state

TR Library: Certification for carbon building

Fertilizer management incentive - voucher for seed cost

One stop permitting shop under offices of DEQ or state and local (or more clearly identify which agency does what)

Consistency and collaboration in offices offering information and assistance to homeowners for solar energy efficiency, ways to install those systems, etc.

Help industry with carbon capture incentivizing and help them be efficient also with their boilers and heaters because some are not covered by the rules

Test soil (use appropriate fertilizers/inputs, seed vouchers)

Incentivize in a way that does not use tax credits, as this excludes those who have no tax liability (municipalities, coops, nonprofits, low-income people)

Do not let those who profited on polluting also profit on removing carbon

Deregulate the electricity market

Let both sides (industry and individuals) win at the same time

Prepare colleges and universities to train new workforce

Workforce opportunities

Publicity for companies that are offsetting emissions

Backdated incentives of those who have offset

Retrain workers from oil/coal/gas to work in wind/solar/green building etc.

More equitable distribution of resources

Incentivize organizations to turn unused greenspace into prairie restoration areas

More focus on better utilization of consumption of energy resources

Utility companies could offer reduced rates for switching energy sources

Tax breaks for those who use fuel efficient vehicles

State support of green industries

Advanced bussing or transportation systems/land use planning

Support sustainable communities with selective industry advertisement

Publish information on websites using video, photos, reports, etc.

Support proper use of electronic disposal

Teach correct principles and let the people govern themselves

Sufficient tax credits: A program for citizens to be reimbursed a portion of expenses to purchase upgraded high efficiency items/appliances or green products

For example, credits to replace windows with triple paned well insulated models; to add insulation to houses, or to utilize spray foam insulation on new buildings; installing electric car chargers in personal garages.

Ability to install car chargers running off separate electrical meters that charge less per KWH to encourage PHEV or BEV vehicles.

A passenger train system in place for North Dakota that would mean less cars on the road

Access to experts

Gatherings for sharing of ideas and processes

Symposiums for educating citizens, employees, and corporations.

Clear communication of expectations between state and businesses to encourage private investment

Promote bicycle/e-bike travel in the cities

Don't punish traditional nongreen companies

Push back against federal government mandating

Create a state Office of Sustainability under the supervision of the DEQ

Electric buses/public transportation in all major cities

Educate the public on the resources and benefits

DEVILS LAKE

Educational programs for communities, farmers/ranchers, schools and industries

Bring hands-on agriculture education back to schools

Incentivize recycling/waste management with iron, plastics and chemical waste

Facilitate the use of manure management for farmers/ranchers as a fertilizer

State funded charging stations in rural areas

Fair taxation across brackets to support all income levels

Support small businesses/farmers to keep rural towns and families strong- they are the backbone of North Dakota

Invest more in solar energy

DICKINSON

Advocate for industry

Continue to advocate for innovation over reclamation

Work with private industry and incentivize it

Public education

Partner with smaller companies within the state instead of big business

Utilize and incentivize solar energy and solar farms

Install meters on every oil and gas well to monitor emissions

Enforce violations with meaningful fines

Install air quality monitors (for volatiles as well as particulates) in the Western part of the state to enhance knowledge of oil field emissions

Expanded CRP program to use prairie land and grasses for carbon capture

FARGO

Create net metering

Solar community gardens

Focus more on funding transition to energy efficiency

Incorporate people from solar and clean energy on the sustainable energy authority

Balance planting incentives by making more environmentally friendly choices like grasslands vs corn more economically obtainable

Establish solar panel and wind turbine recycling

Reward those who are already working towards environmentally friendly practices

Invest in precision fertilizer application practices/research

Develop and fund educational programs for farmers to improve practices

Promote/work closer with the Soil and Water Outcomes Fund and other programs

Incentivize producers to convert low yield land back to pastures/grasslands

Research measuring carbon sequestration

More environmentally friendly building codes and ordinances

Madate recycling bins in multifamily dwellings

Publicize what is currently being done to educate residents

Incentivize composting facilities in larger cities

State regulated climate friendly purchasing plan

Create a private sector climate council

Empower cities/municipalities through providing programs to report and track sustainability

Pull all investments from fossil fuel and coal industry and redirect funding to clean energy

Prioritize the production and use of biodiesel with state policies

A sustainable surface utilization rating system- incorporating air, soil and water as touchstone receptors

Air quality monitors

GRAND FORKS

Fund GHG reduction research and how to keep current energy dependable

Education of legislatures and citizens

Create trust between regulatory bodies and the people

Continue to offer discussion forums for people to talk collectively and think critically

Utilize state colleges and programs to research fertilizer application rates

Stop throwing our money away

JAMESTOWN

Finance the conversion of wastewater gas to usable gas

Provide data on infrastructure costs vs operational costs

Advocate for grazing and cover crops as a form of carbon storage

Incentivize urban planting and maintenance of trees and the use of trees for carbon sequestration

Provide more educational opportunities

Research CO2 contributions from traffic

Begin a slow transition to renewable fuels

Ensure markets are viable and ready for transitioning

Invest in more biofuel production plants

Improve existing infrastructure such as rails, highways and pipelines

Provide grants for retrofitting/integrating energy efficient tools into new and old construction

Expand DEQ air quality monitoring

Work with municipalities to create local climate action plans

Funding for a highspeed passenger rail

Grants for undergraduate/graduate research

Support for regional food production and processing

Electric buses/public transportation

Support cities who promote walkability/bikeability

Focus more on plant sequestration of carbon

Raise taxes on oil extraction

Mandate advanced biofuel utilization

MINOT

Engage with individuals, organizations, and industries

Address issues at the local level

Support municipal compost efforts

Actively restore prairie

Tougher enforcement of flaring

Cap open frack wells

Partner funding to electrify local bus and municipal fleets

Create an energy efficiency county position

Partner funding to install solar on municipal/ public entity buildings

Increase use of regenerative fuels

Create a knowledge base of carbon sequestration

Utilize North Dakota State University (NDSU) and other institutions for research, especially on quantifying carbon sequestration

Audubon Dakota, Ducks Unlimited, Pheasants Forever, Delta Waterfront, North Dakota Natural Resource Trust all have created programs to help incentivize conservation practices for agricultural interests

Utilize federal money in local communities

Promote no-till/low-till farming and education about sustainable farming practices

Transparency around funding and campaign contributions

Offer education/info about energy efficiency

Use research-based decisions for best environmental outcomes

Invest in renewable energy

Keep oil companies accountable using more enforcement

Offer state grant for churches/nonprofits for solar on roofs and energy efficiency

Transparency in reporting of emissions from the coal plants and industry

Incentivize solar and wind including heat pumps for homes

Direct education from climate scientists research at universities

Job trainings

Food waste reduction programs

Increase accessibility to information (multiple languages, online and in-person resources, etc.)

Policy changes at the local and state levels

Greener building codes

Create a dedicated Sustainability division housed within the NDDEQ

Tax incentives for EVs and hybrid vehicles

Utilization of CO2 capturing bricks in North Dakota

Graphyte (Breakthrough Energy Ventures carbon-laden plant matter blocks)

Change farm subsidy laws

Tax incentives for recycling

WILLISTON

Support educational events to keep producers informed on latest research findings that promote soil health and hear from other producers who have seen benefits form changes

Support on-farm demonstration projects/programs that improve soil health and reduce emissions

Cost share for farmers to adopt some of these practices

Demonstration farms to display these successful practices

Make climate data publicly available in a way that is engaging and easy to understand

Don't limit incentives to new adopters

Reward producers for what they are already doing

Invest in infrastructure - transmission lines

Smart policy to support renewables

Streamline permitting processes

Provide larger grants for projects and conservation practices

Prioritize sustainable and high-density development

Preserve natural habitat

Higher regulation of oil and gas development/operations

Revise building code standards to have higher insulation standards and provide incentives to do so on existing structures

Modernize construction trades' educational programs to encompass sustainable building practices

Electricity codes including at minimum one charging port for EVs

Create sustainability CEU's for contractor licensing requirements

Incentivize solar panels on roofs of businesses

Outline transition from coal to natural gas, to an eventual phase out of most fossil fuels over the next 50 years

Expand incentives for geothermal energy

Rebuild electric energy system as a distributed system, to allow small solar farms and home/business solar installs to easily share with the grid

Include greenhouse gas reduction as a criterion when selecting where state funding goes

Provide resources and information on energy reduction measures

APPENDIX B SUSTAINABILITY INPUT FORUMS – ROUND ONE SITE REPORTS

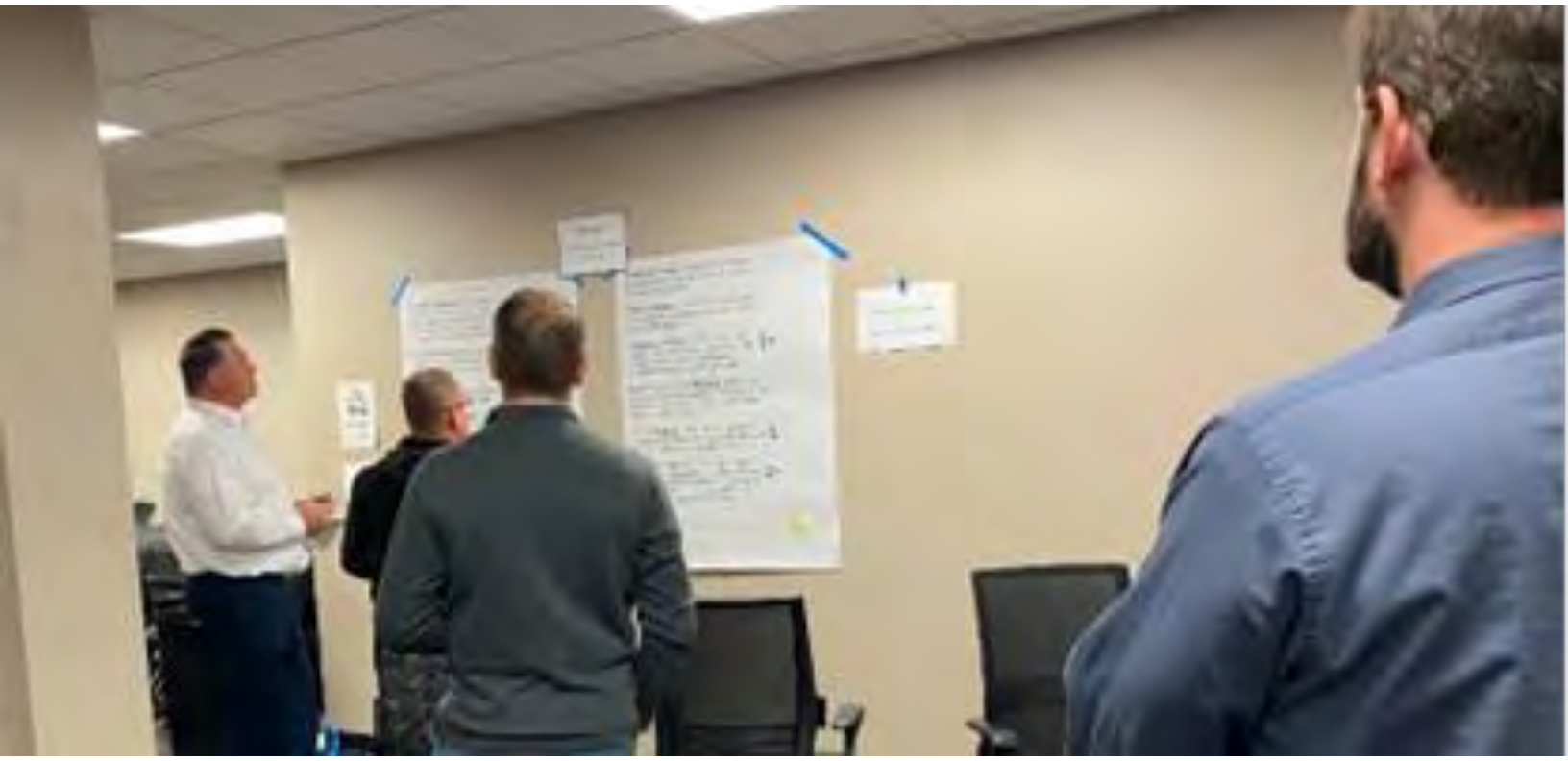
Sustainability Input Forums

Input received in Bismarck, ND

PREPARED FOR

North Dakota Be Legendary. | Environmental Quality

DATE
December 2023



EXECUTIVE SUMMARY

North Dakotans of all backgrounds were invited to come together to share innovative ideas, knowledge, and perceptions related to reducing greenhouse gas emissions during the state's Sustainability Input Forums held from October 31 through November 8, 2023, in eight locations around the state. In addition, more than 100 people shared their thoughts via an online survey through December 5, 2023.

Input received through this process will assist North Dakota in forming the basis for sustainability planning and actions in 2024 and for years to come. Information gathered will be used to inform the state's participation in U.S. Environmental Protection Agency's (EPA) Climate Pollution Reduction Grant (CPRG) program. North Dakota's Sustainability Input Forums are supported with a CPRG planning grant.

This report summarizes input received through conversations held in-person and online during three sessions in Fargo. Subsequent input received through the online comment form are italicized and attributed to this report based on ZIP codes indicated.

CONTEXT

The North Dakota Sustainability Input Forums were open public meetings that were organized to be conversational and informal. The role of the North Dakota Department of Environmental Quality (NDDEQ) was to host and to listen, with the assistance of an independent facilitator.

NDDEQ's goals for the forums were two-fold: 1) hear what North Dakotans are thinking and doing related to reducing greenhouse gas emissions, and 2) fuel conversation and connection between diverse stakeholders. To this end, conversations were held in a circle and lightly facilitated around a handful of core questions, as outlined in the following sections. Each session generated at least two hours of interaction, with comments provided by participants in the form of verbal feedback, comment cards, and online polls and chats.

Bismarck sessions were held in two locations. The energy and agriculture meetings (morning and afternoon) were held in the Department of Environmental Quality offices conference room. The community meeting was held that evening in the Bismarck Veterans Memorial Public Library conference room. Online attendees were able to participate via a live ZOOM feed.

Hosts for the forums were Dave Glatt, NDDEQ; Jennifer Skjod, NDDEQ; Allison Ahcan, ERM, Discussion Facilitator; and Isabella Binger, ERM, Online Chat and Zoom Support.
The attendees of these sessions, including online participants, offered an array of backgrounds. Individuals attending had experience within the oil and gas industry, renewable energy industry, public service, generational farming, agricultural organizations, environmental organizations, and community organizing. A total of 46 people participated in the Bismarck sessions.

1. CONVERSATION SUMMARIES

The overall tone of conversation that occurred within the three sessions held in Bismarck was productive and informative. Each session revolved around topics of community, energy, and agriculture despite an intended focus on just one theme. There was specific interest surrounding the conversation of what is already being done within the state of North Dakota to reduce greenhouse gas emissions, with many specific examples being produced in all sectors. By nature of being the state's capitol city, Bismarck sessions drew participants who were representative of particular interests or sectors. There was significant interest expressed as to how change might have an economic impact or affect quality of life in the state. Additionally, there were many individuals who were interested in how this program will be implemented and how the timeline will impact the quality of work.

Further details of discussion topics follow. Online comments from the region, but submitted subsequent to the meeting dates, have been noted in *italicized type.* Please note that bullets contain verbatim comments from Comment Cards, although similar points may be combined if mentioned more than once.

1.1 BENEFITS

Question: What BENEFITS do you see for North Dakotans as greenhouse gas emissions are reduced?

Participants pointed out intrinsic and extrinsic benefits to reducing greenhouse gas emissions. Intrinsically, people could imagine benefits including increases in quality of life, cleaner air, and improved water quality through slowing climate change. Extrinsically, most people imagined benefits surrounding economic gains, employment opportunities, technology development, and potential state and federal funding.

Comments:

- Cleaner air
- Grant opportunities
- Keep existing industries competitive in the market
- Electrical literacy and energy literacy
- Technology development
- Potential business development
- Potential new tax base for North Dakota
- Potential employment opportunities
- GHGs are not bound by boarders, reductions contribute to global reductions
- Limiting the effects of climate change
- Better quality of life
- Addressing inequality
- Economic opportunities
- Changing awareness from individualism to collectivism
- Ease regulations
- Improve investor relations, opens corporate lending for development
- Healthier ecosystems
- Longevity for our communities, industries, and families
- Global partner

- Decreased demand for finite resources (assuming reduction in fuel/coal use)
- Decreases in healthcare costs (asthma, chronic obstructive pulmonary disease (COPD), and respiratory ailments)
- Environmental Social Governance (ESG) corporation benefits
- Increased tourism
- Healthier soils
- Protect growing seasons
- New/emerging industry that can be locally directed and controlled (ideally not giant corporations moving in from outside)
- Better relationships with Indigenous communities/tribes concerned about land and environment
- *Better balance of weather to produce better-quality crops*
- *Enhanced water quality*
- *Food security*
- *Cleaner infrastructure and working conditions*
- *Energy efficiency and cost savings*
- *Ability to use natural resources available to us*
- *Participate in a global effort*

1.2 DOWNSIDES

Question: What DOWNSIDES do you see for North Dakotans as greenhouse gas emissions are reduced?

This portion of the conversation heavily focused on economic challenges within efforts to reduce greenhouse gas emissions in North Dakota. Within both online and in-person conversations, concerns focused on increases in energy costs, heavier restrictions on industry, loss of workforce, and technological challenges. Additionally, all individuals touched on the impact that this plan will have on North Dakotans' lifestyles and that there may be resistance to change.

Comments:

- Regulatory burdens
- Limited global impact
- Lifestyle changes/resistance to change
- Economic impact (transformation adjusting to a new paradigm)
- Not following the science
- Placement of new infrastructure needed for energy (NIMBY)
- Technology may not exist
- Insufficient infrastructure will create a large investment for needed infrastructure
- Ability to obtain right-of-ways (ROWs) for infrastructure
- Increases in operating cost
- Reduction in economic justification for corporations to invest
- Forced reductions could lead to a decrease in quality-of-life
- May require regulation of processes/technologies
- Alternatives may not be viable
- Loss of jobs
- Education challenges
- Short-term thinking and planning could lead to other problems
- Not planning big enough to consider limitations to industry (Hard to keep up with technology, money involved should be innovative)
- Transition and cost of labor
- North Dakota will do the work but may not see the benefits
- Taxes on GHG

- Fight over who gets to make the profit with the transition
- Less meat to eat
- Loss of strategic flexibility
- Oil/coal economies negatively impacted if reduction not planned well
- Higher cost of living
- Political strife and breakdown of public discourse
- *The false pressure to closing coal mines in North Dakota and across the country*
- *Adds additional costs and regulations to businesses, may discourage some businesses from coming to North Dakota*
- *Increase in government spending*
- *Higher energy costs*
- *Restrictions on consumer preferences that make very little return in emissions reduction*
- *Windmills are visual pollution*
- *Unintended consequences (For example, renewable energy technologies impact land use, biodiversity, and local ecosystems)*
- *Increased cost/investment for change*
- *None*
- *Limited space*

1.3 EXISTING EFFORTS

Question: What ALREADY is being done in North Dakota to reduce greenhouse gas emissions? Who is doing it?

Both the in-person and online participants emphasized many specific examples as to what those in North Dakota are already doing to reduce greenhouse gas emissions. There were multiple comments referencing LI-HEAP, no-till/low-till farming, flaring reductions, methane capture at the Fargo landfill, and the Red Trail Energy Ethanol Plant. Many expressed that North Dakota has already implemented many measures to reduce greenhouse gas emissions and that there needs to be better vocalization of these efforts.

Comments:

- Capturing most of released gas and decreasing flaring
- Coal drying technology
- No-till/ low-till farming
- Weatherization
- Low-Income Home Energy Assistance Program (LI-HEAP)
- Solar electric, solar thermal, geothermal, wind, automation, and energy efficiency has been done by various groups
- Turtle Mountain Community College has combined automation, geothermal, and wind to create a 99% renewable campus
- Cannon Ball, North Dakota solar farm on Standing Rock
- Ethanol (Capture technology)
- Methane Capture (Landfill Fargo)
- Carbon Capture/Sequestration (DCC)
- GTL/Plastics
- Flaring Elimination - Gas Capture
- Geologic Sequestration - Direct Capture
- EV/Cars- Lawn equipment
- Satellite and onsite emission monitoring
- Building code improvement
- Company public commitments for zero routine flaring by certain date

- Energy & Environmental Research Center (EERC) research (Pyrolysis, Hydrogen)
- New industry to consume methane to ammonia (i.e. hydrogen); CO2 sequestration (Project Tundra)
- Clean Sustainable Energy Authority (CSEA)
- Bakken Production Optimization Program (BPOP), Plains CO2 Reduction (PCOR), Oil and Gas Research Program (OGRP)
- Sustained coal electric generation
- Directional drilling
- Cooperative energy efficiency programs
- City planning/development
- Governor's carbon neutrality goals
- Developing emissions inventory
- Outdoor Heritage Fund
- Rotational grazing
- Studies to understand processes/implementation factors
- Cover cropping fields to build soil and store carbon
- Environmentally Minded People of Minot doing community outreach
- Grassland livestock management (grazing systems) reduce net carbon and methane
- Coal plant has scrubbers and a high level of emission reducing technology
- Fungi in native grasslands use CO2 and methane for fuel (energy) to help grasslands be a big sink
- Local sourcing (buy local/shop local)
- Farmers markets
- Restrictions on industry (regulations)
- Conservation planning incentives
- Shift to different energy sources (local sourcing)
- Global partnerships with other countries
- Primacy for Class VI Underground Injection Control (UIC) for carbon storage
- Red Trail Energy Ethanol Plant - almost zero emissions
- Industry is setting reduction goals
- The Mandan Refinery considers GHG impact with every proposed engineering project: The owner of the refinery has committed to decreasing GHG at its fleet of refineries by 30% by 2030
- Coal fired power plant emissions are amongst the lowest in the nation
- High voltage direct current lines
- Dakota Capture East
- Anaerobic digesters
- *State agencies are incorporating climate change into their planning*
- *Power plant emissions scrubbers*
- *Crop rotation and livestock integration to reduce soil erosion and biodiversity to retain soil nutrients*
- *Recycling in homes*
- *Increase in bike lanes/paths*

1.4 POTENTIAL STATE INCENTIVES/SUPPORT

Question: In what ways would you want to see the state INCENTIVIZE, SUPPORT or just generally HELP with greenhouse gas reductions?

Both in-person and online comments suggested support for climate and industry research, financial incentives, public education, accessibility to resources, and energy efficiency measures from the state. In-person sessions emphasized the need to set realistic targets and establish long-term planning that changes as technological processes advance. Online comments focused more

on the need for equitable incentives to be accessible to everyone regardless of income, location, demographics, etc.

Comments:

- Support research and development
- Create realistic approaches, targets and timelines
- Financial incentives
- Collaborative approach
- Increase incentives to choose energy efficiency equipment
- Cooperatives and utilities should offer locals fair compensation for solar distributed energy resources (DERs)
- EPA Solar for All and other incentives should be embraced by the state and commerce department and fully staffed
- Continue CSEA and Ag research (assistance in providing technical development)
- Improve building codes (statewide development) for energy savings
- Understand the current condition (Scope 1,2,3) and inventory
- Partner in technology deployment (silent partner)
- Educate the public
- Energy efficient building incentives
- Secure ROWs for infrastructure
- Renewable portfolio standard (RPS)
- Net metering up to 1 MW for wind/solar
- Use state buildings, fleets, operations as a living example of net zero concepts
- Streamline permitting
- State Conservation Reserve Program (CRP)
- Carbon bank
- State Program: Low Income Home Energy Assistance Program (LI-HEAP) to be open to more groups of people
- Federal Program: Rural Energy America Program (REAP) could have easier access to funding incentives
- Incentivize things that sequester carbon like our grassland managers (ranches) - Give them support for doing what is right and helping the whole state
- Theodore Roosevelt Library: Certification for carbon building
- Fertilizer management incentive - voucher for seed cost
- One stop permitting shop under offices of NDDEQ or state and local (or more clearly identify which agency does what)
- Consistency and collaboration in offices offering information and assistance to homeowners for solar energy efficiency, ways to install those systems, etc.
- Help industry with carbon capture incentivizing and help them be efficient also with their boilers and heaters because some are not covered by the rules
- Test soil (use appropriate fertilizers/inputs, seed vouchers)
- Incentivize in a way that does not use tax credits, as this excludes those who have no tax liability (municipalities, coops, nonprofits, low-income people)
- Do not let those who profited on polluting also profit on removing carbon
- Deregulate the electricity market
- Let both sides (industry and individuals) win at the same time
- Prepare colleges and universities to train new workforce
- Workforce opportunities
- Publicity for companies that are offsetting emissions
- Backdated incentives of those who have offset
- Retrain workers from oil/coal/gas to work in wind/solar/green building etc.
- More equitable distribution of resources
- *Incentivize organizations to turn unused greenspace into prairie restoration areas*

- *More focus on better utilization of consumption of energy resources*
- *Utility companies could offer reduced rates for switching energy sources*
- *Tax breaks for those who use fuel efficient vehicles*
- *State support of green industries*
- *Advanced bussing or transportation systems/land use planning*
- *Support sustainable communities with selective industry advertisement*
- *Publish information on websites using video, photos, reports, etc.*
- *Support proper use of electronic disposal*
- *Teach correct principles and let the people govern themselves*
- *Sufficient tax credits: A program for citizens to be reimbursed a portion of expenses to purchase upgraded high efficiency items/appliances or green products*
- *For example, credits to replace windows with triple paned well insulated models; to add insulation to houses, or to utilize spray foam insulation on new buildings; installing electric car chargers in personal garages*
- *Ability to install car chargers running off separate electrical meters that charge less per KWH to encourage plug-in hybrid electric vehicles (PHEVs) or battery electric vehicles (BEVs)*
- *A passenger train system in place for North Dakota that would mean less cars on the road*
- *Access to experts*
- *Gatherings for sharing of ideas and processes*
- *Symposiums for educating citizens, employees, and corporations*
- *Clear communication of expectations between state and businesses to encourage private investment*
- *Promote bicycle/ebike travel in the cities*
- *Don't punish traditional nongreen companies*
- *Push back against federal government mandating*
- *Create a state Office of Sustainability under the supervision of the NDDEQ*
- *Electric buses/public transportation in all major cities*
- *Educate the public on the resources and benefits*

1.5 OTHER

Question: Is there anything else you want us to know on this topic?

Both in-person and online participants expressed worry about how reduction initiatives will be implemented. Many individuals voiced concern that the process of this may be too largely scoped and will need more precision in its timeline and expectations. It was also stated that there is a need to include more people within these conversations.

Comments:

- How are you going to include research and researchers in this process?
- How continuously will you incorporate innovation as new ideas come forward?
- Workforce is needed (EV/hybrid repairmen, more people who can educate about soil health, environmental science)
- A fact-based nonprofit or state agency that can provide GHG reduction info (Clearinghouse education, school programs)
- Proper insulation also reduces emissions and saves money
- What can the state do? Don't be afraid to do things differently
- Opportunities for communities to get to know each other, build and share neighborly relationships
- *Why is the legislature discussing banning local governments from eliminating the use of plastic shopping bags?*
- *If prairie restoration is a viable option for a carbon sink, it would be very important to ensure that organizations are using native prairie seed blends*

- *"Buy-In" for the transition to low or zero emissions needs to be done in stages and not forced on the consumer*
- *Do not spend taxpayer dollars to incentivize businesses. Rather create conditions where investment makes sense and doing business in North Dakota is easy*
- *Have transparent and clear expectations communicated up front about how to go about the process of getting whatever needed inspections, permits, and contacts for a particular kind of project*
- *Plant more trees in cities and create green ways/green spaces for people to enjoy*
- *The best way to reduce gas emissions is to incentivize bicycle/ebike travel throughout the state*
- *Encourage more electric semis or efficient electric trucks for regional deliveries*
- *Maximize incentives to bolster green technology and carbon free industry*

2. DISCUSSION OF EXAMPLE GHG REDUCTION STRATEGIES

To bring the conversation to a more tactical level, a series of greenhouse gas emissions reductions examples were displayed on posters during each session for participants' reactions. It was noted that these examples were not proposals, just examples of strategies that have been implemented in other communities.

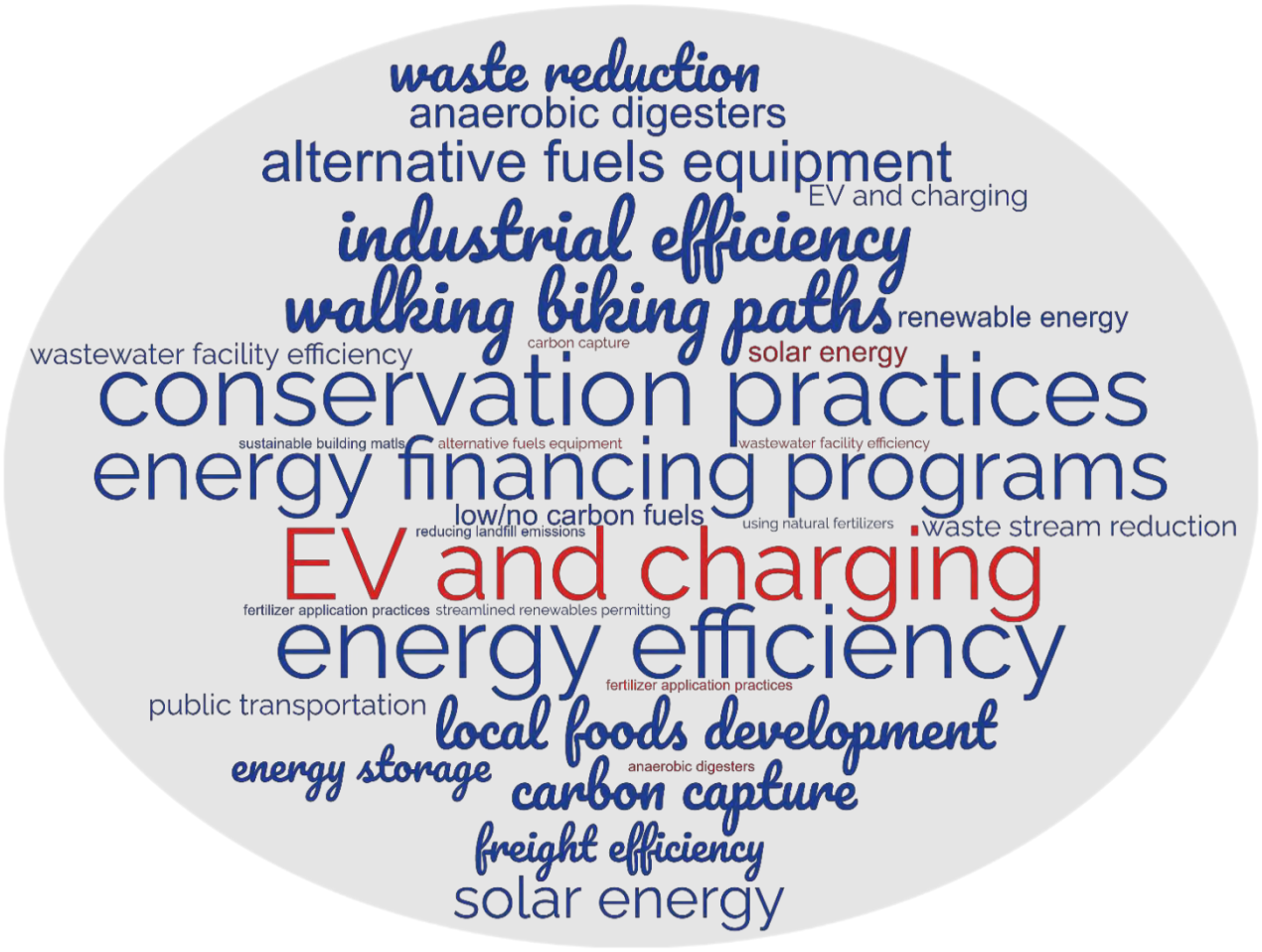
In-person participants were given red and blue sticker-dots to place next to any example on which they had an opinion. Blue was used to indicate support of an example for use in North Dakota; red indicated that they did not support the example for North Dakota. Participants were also given post-it notes to add additional examples, suggestions or comments/questions.

Online participants received a link via the chat in Zoom to a Microsoft form with the same list of examples. They were given the option to click "support", "not support" or "skip" the question. They also were able to elaborate on their responses.

All participants were cautioned that this process was meant to gauge general support or opposition to the various examples, that they were not voting.

The following "word cloud" graphic depicts how often (larger letters = more dots) that examples were selected, and to what degree they were supported (blue) or not supported (red).

SUMMARY OF REACTIONS



Note: The larger the type, the more often a strategy received a dot during this activity in Bismarck.

Blue type = support. Red type = do not support.

In addition to placing red or blue dots on sample greenhouse gas emission reduction strategies posters, participants were invited to discuss the options and compare reactions to the sample strategies.

Strategy	Verbatim Comments
Electric Vehicles and Charging	• When all these EV incentives came out, I was like 'Wait a second, we just completely skipped the whole hybrid technology'. • There are applications in areas where electric vehicles make sense - in cities, downtown, commuting - but North Dakota is a rural state. Driving a couple hundred miles between locations at 40 degrees below zero, EV vehicles aren't going to make it. • I have a first responder extrication background and saving lives, it is hard to get into electric vehicles if there is a crash. • The pollution aspect, you have a one-ton battery, what do you do at the end of that lifecycle? • How do you charge an electric vehicle? You plug it in, electricity comes from somewhere, so are you really having the impact you think? I know Tesla owners and they are convinced they are zero-carbon people. It is just not the case, there is an education component missing. • I have an EV, but I did not put a blue sticker on there because there are already Federal incentives to put charging stations every 50 miles on the major highways. • They electrify forklifts inside plants. They are either electric or propane because they are better for people's respiratory system.
Carbon Capture	• It would be cool if you could do an offshoot of the Governor's Main Street Initiative, where they're using CO2 to actually put into a greenhouse to grow plants. There are ways to connect producers and farmers together with some of these innovative things where they can form partnerships. • If you are going to take your money and focus, capture and sequestration would have a much greater impact early on.
Public Transportation	• I have lived in other places where it is so convenient, I would love a train that goes from Bismarck to Fargo.
Walking and Biking Trails	• We all benefit when we have these reduction proposals that are also beneficial to public health.
Conservation Practices	• I think this is something North Dakota does well, we have a lot of really good conservation programs in place. We have programs that work together. • For example, NRCS has their equip programs. We also have watershed programs that act in Soil Conservation District areas where equip dollars are also available. When those equip dollars run short and producers are still looking for cost share, if they have a 319 project in place, they can still get some of the funding.
Anaerobic Digesters	• How big do you have to be to make anaerobic digestors work as a farmer or rancher? • There is a new biological agent that can be used with manure for digestors to increase the renewable methane by 2-5 times. It needs some further studying and some bench testing. If that works, it would be great for the industry and biodigesters of anerobic digestors. But the problem is, it has to be on some scale that actually works. If you really want to be efficient, what you're really talking about is a 36,000 head feed lot or you're going to have to be a 12,000-14,000 head dairy farm. We're not talking your typical family farm or ranch. • There is a benefit at agricultural food places, like Simplot, in the digestion of their waste. Sugar beat plants also have their wastewater treated through the digestors. Those are applications that bigger corporations maybe haven't thought of in their wastewater treatment processing.

Solar Energy	• When you actually look at the efficiency of solar energy in North Dakota, it is a bad investment of our resources and money. If you want to go after greenhouse gases, there are much better ways to do so. • The payback of solar panels takes a lot of time. • There are lots of variables to determine your price. If you are in North Dakota and have a utility that pays net metering, then you can basically send back your excess as credit at retail rate. As we manage the load, there are many solutions, and distributed energy is one of the best ways to manage the load. It needs to be distributed all over in little places and then the grid itself becomes less reliant on baseload power because it does not need to shift power across the line all the way to the end of the network. • In terms of solar energy incentives, if we criticize the federal government, they have done some great things to incentivize but typically those incentives are based in a tax code. What that does is that over half the people do not have tax liability, and so these tax credit-based incentives aren't applicable to those situations. It is an inequitable distribution of incentives to the people who are rich or have large corporations.
Energy Efficiency	• I see a lot of times when the federal government or states work on certain efficiency projects it doesn't get down to the actual person. • There's a federal program for that but it makes it really hard for farmers because of some of their regulations on how to collect the data on energy bills. Farmers kind of get left out of that whereas rural businesses are totally accepted into that. • I imagine there are some state programs, but I don't know if they are farmer specific, producer specific.
Financing Programs	• My wife and I would like our house to be more energy efficient, but the cost of those windows is high. We're living paycheck to paycheck so it's tough to do that. I get the cost savings down the road but that first investment, I got a quote for $42,000 to put new windows in my house.
Alternative Fuels Equipment	• What types of fuels are we talking about? There are fuels that come from crops, but those are not really efficient. Renewable fuels like what California wants takes a lot of energy to make. • There is a lot of demand, so you are forcing things to move faster without necessarily putting the care into the conservation end of the farming practices since there is such a push to make more, more, more.
Fertilizer Application Practices	• I mean it's great, you can talk about practices, but they need to be applicable and we do that already. We visit with producers and see it. • There are some coatings you can put on fertilizer that are stabilizers and work wonderful. Now, they cost a little money but when people understand the benefits of them and what they do, more people continue to look at that every year.
Using Natural Fertilizers	• Are you saying that natural fertilizers can have an impact on water? Yes, I get beat up for using fertilizers. I say you guys don't like anything; you try to do it organically they don't like it that way either.
Other	• I used to be proud to be a North Dakotan. Not so much anymore. • How are you going incorporate North Dakota research going on. We have a lot of research with EERC, NDSU, research the trust has with carbon sequestration. How will incorporate that so that you keep those innovative ideas going? It is also research happening here in North Dakota, not South Carolina did some study, it's what is happening here and now. • A lot of educational programs are tailored towards new farmers, or farmers looking to transition to their children versus sit-down conversations with the whole family.

	• Messaging is so important; you need to understand the diverse generations and have messaging adapted to each of those generations, so they are getting information in a way that feels comfortable. • Generally, there is a concern, and I don't think there's really a focus to that concern. I think there are potential opportunities and dangers in how you build this out, and you need to be careful. • We need to market ourselves, and actually convey everything we do. You look at conservation programs and how innovative they are, we started doing that back in the 70s (no-till, cover crops, etc.). We should let the public and farmers know the success and let them migrate towards it. • I changed a lot of language in terms of energy transition to expansion. It is going to be an expansion of for a period of time and eventually a transition.

3. WAYS TO ENGAGE

Sustainability Input Forums and the corresponding online survey were the first in a series of engagement opportunities led by North Dakota Department of Environmental Quality in support of long-term sustainability planning and North Dakota's collective greenhouse gas emissions reductions work.

Video recordings, reports, notices of future engagement opportunities, and additional methods to provide feedback may be found at the NDDEQ website: https://deq.nd.gov/sustainability/

For additional information, contact Jennifer Skjod, NDDEQ Public Information Officer, via email at jskjod@nd.gov

Thank you to those who shared their passions and wisdom as part of this conversation.

APPENDIX - EXAMPLE STRATEGIES

The following examples were provided as examples of greenhouse gas emission reduction strategies being implemented in U.S. communities. These examples were provided by ERM to generate discussion and reaction during North Dakota Sustainability Input Forums. Please note that these were not provided as proposals, nor were participants asked to rank or vote on them.

Energy Implementation and Development

- **Renewable Energy** - Incentives for installing renewable energy and energy storage systems on commercial properties
- **Energy Efficiency** - Incentives for installing end-use energy efficiency measures in commercial and residential buildings
- **Financing Programs** - Establish a financing program (e.g., grants or low-interest loans) for energy efficiency and renewable energy installations in new and existing buildings
- **Electric Vehicles and Charging** - Incentives to increase the share of electric vehicles (e.g., leasing and purchasing), and to expand electric vehicle charging infrastructure
- **Carbon Capture** - Programs to support or incentivize carbon capture, utilization, and storage (CCUS) at industrial and energy facilities
- **Industrial Efficiency** - Programs to support or incentivize implementation of energy efficiency measures in industry, including energy audits, strategic energy management, equipment upgrades, and waste heat utilization
- **Low/No Carbon Fuels** - Programs to support or incentivize greenhouse gas emission reductions in industrial energy use and industrial processes, including use of low/no carbon fuels, electrification, renewable energy, and process improvements
- **Low-Carbon Materials** - Programs to develop, expand, and support markets for low-embodied carbon materials and products, such as cement and steel
- **Renewables Permitting** - Streamline permitting for renewable energy projects
- **Waste Stream Reduction -** Increase the efficiency or effectiveness of waste reduction, reuse, recycling, or composting programs. Reducing the amount of materials entering landfills.
- **Wastewater Facility Efficiency** - Incentives for installing renewable energy and energy efficiency measures at wastewater treatment facilities
- **Reducing Landfill Emissions** - Incentives to reduce methane emissions from landfills and wastewater treatment facilities, including through collection for use

Agriculture

- **Anerobic Digesters** - Incentives to promote anaerobic digesters to capture methane and generate renewable energy or produce renewable fuel
- **Alternative Fuels Equipment** - Incentive programs to fund agricultural equipment technologies that use alternative fuels
- **Fertilizer Application Practices** - Incentives for technologies and techniques that reduce nitrous oxide emissions from fertilizer application such as precision agriculture practices
- **Using Natural Fertilizers –** Reinforcing soil health with the life cycle of the animal

- **Conservation Practices** - Implement programs that support best practices in agricultural conservation to help protect soil health, including cover crops, no-till, other runoff reduction techniques
- **Economic Development** - Programs for local and regional economic development partners to establish food- and agriculture-based economic development strategies, such as community-based food co-ops

Community, Public Service and Government

- **Solar Energy** - Increase access and funding for solar panels on your home or businesses in your community
- **Energy Efficiency** - Funding for increasing energy efficiency in your home or businesses in your community, including proper insulation
- **Electric Vehicles and Charging** - Increasing electric vehicle charging stations in your community
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- **Waste Reduction and Elimination Strategies** - Providing residential recycling and composting service
- **Freight Efficiency** - Increasing efficiency in freight movement.

Sustainability Input Forums

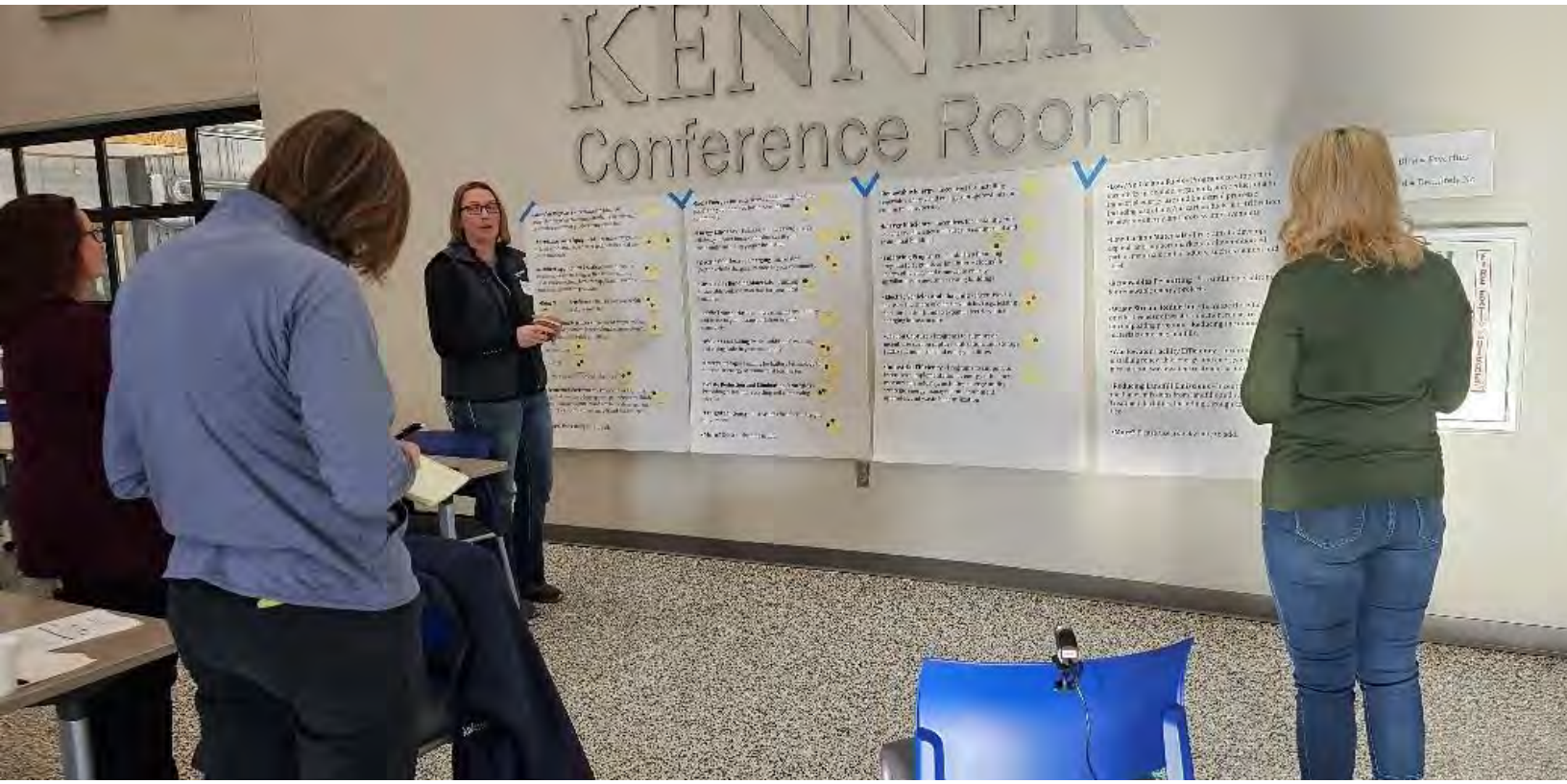
Input received in Devils Lake, ND

PREPARED FOR

North Dakota Environmental Quality

DATE

December 2023



EXECUTIVE SUMMARY

North Dakotans of all backgrounds were invited to come together to share innovative ideas, knowledge, and perceptions related to reducing greenhouse gas emissions during the state's Sustainability Input Forums held from October 31 through November 8, 2023, in eight locations around the state. In addition, more than 100 people shared their thoughts via an online survey through December 5.

Input received through this process will assist North Dakota in forming the basis for sustainability planning and actions in 2024 and for years to come. Information gathered will be used to inform the state's participation in U.S. Environmental Protection Agency's (EPA) Climate Pollution Reduction Grant (CPRG) program. North Dakota's Sustainability Input Forums are supported with a CPRG planning grant.

This report summarizes input received through conversations held in-person and online during three sessions in Devils Lake on November 8 at Hofstad Ag Center. Subsequent input received from participants in this region through the online comment form also is included and indicated by italicized type.

CONTEXT

The North Dakota Sustainability Input Forums were open public meetings that were organized by the North Dakota Department of Environmental Quality (NDDEQ) to be conversational and informal. The role of the NDDEQ was to host and to listen, with the assistance of an independent facilitator.

Goals for the forums were two-fold: 1) hear what North Dakotans are thinking and doing related to reducing greenhouse gas emissions, and 2) fuel conversation and connection between diverse stakeholders. To this end, conversations were held in a circle and lightly facilitated around a handful of core questions, as outlined in the following sections. Each session generated at least two hours of interaction in the form of verbal feedback, comment cards, and online polls and chats.

Hosts for the forums were Ann Fritz, NDDEQ, presenter; Nancy Miller, ERM, facilitator; Monica Zattera, ERM, online facilitator.

Attendees included various individuals from across industries/interests, including but not limited to, family farmers, agricultural industry professionals, ranchers, educators, and local residents. A total of 12 Devils Lake area people provided input.

1. CONVERSATION SUMMARIES

The conversation was educational and well received by attendees. Participants said they were pleasantly surprised by the collaboration and informal, conversational nature as opposed to a traditional public hearing session. Concerns focused primarily on the efforts and impact of current farming/ranching practices and environment and agricultural education in rural areas.
Further details of key discussion topics follow. Online comments from the Devils Lake area, but submitted subsequent to the meeting dates, have been noted in italicized type. Please note that the bullets contain verbatim comments from Comment Cards, although similar points may be combined if mentioned more than once.

1.1 BENEFITS

Question: What BENEFITS do you see for North Dakotans as greenhouse gas emissions are reduced?

Overall, participants agree on the potentially positive impact greenhouse gas reductions will have on North Dakotans, from improving the environment to making energy more efficient to aiding in reducing the frequency/impact of climate disasters. Participants in this meeting voiced a general understanding that change can be good if done correctly and that there are areas upon which to improve.

Comments:

- Cleaner environment = air, food, and water quality improvements
- Improved energy efficiency
- Potential to address climate change
- Potential to reduce climate disasters
- *A livable, Sustainable future for all*
- *Better quality of life*
- *Keep weather from getting warmer*

1.2 DOWNSIDES

Question: What DOWNSIDES do you see for North Dakotans as greenhouse gas emissions are reduced?

Participants voiced significant concerns for the potential personal cost to farmers/ranchers and residents when working to transition to alternative practices in rural areas. Much of this discussion was focused on the longevity of alternative solutions. There was frequent mention of carbon sequestration/storage, the potential deterioration of the infrastructure, and concerns for how it would be regulated and studied. Concerns for its potential impact on soil if a leak were to occur were mentioned repeatedly as soil would be left sterile and irreplaceable, which in turn destroys crop yields and livelihoods. Additionally, there was mention of an overall resistance to change from the general masses due to the need to shift away from traditional/generational practices.

Comments:

- Additional cost to economy
- How long could it take to transition?

- Is it sustainable?
- What are the unintended consequences?
- *Potential waste of resources*
- *May not be as impactful as we hope*
- *Less power or electricity*
- *Limited public knowledge*

1.3 EXISTING EFFORTS

Question: What ALREADY is being done in North Dakota to reduce greenhouse gas emissions? Who is doing it?

Current programs available to agriculture/livestock producers were discussed, however participants agreed there is a long way to go with developing these programs as they are not designed by farmers/ranchers with their needs or timelines in mind. These programs are seen as too rigorous with unrealistic expectations that are not considerate to the natural uncertainty that comes with producing in the state. Current agricultural practices designed to preserve the environment were also mentioned with specific mention of no-tillage, cover crops and use of manure as fertilizer.

Comments:

- Midkota Power plants trees and checks that they are growing
- Local recycling programs
- Equipment programs: FSA/NRCS, CRP-CSP
- Progressive farming techniques like reduced tillage
- Carbon capture in Bakken
- *The state government is discussing ways to reduce emissions*

1.4 POTENTIAL STATE INCENTIVES/SUPPORT

Question: In what ways would you want to see the state INCENTIVIZE, SUPPORT or just generally HELP with greenhouse gas reductions?

Attendees spent a substantial portion of time asking for the reformation of existing programs to be more understanding/inclusive to farmers and ranchers. A suggested modification was for the chemical recycling program to be restructured with more accessible time periods to better aid in the proper disposal of containers. Participants also asked for recycling programs to include materials such as iron, as a common practice currently is to leave discarded equipment on site, impacting productivity of soil.

Additionally, there were requests for general education improvements regarding personal practices to reduce individual impact on the environment ranging from more engagement in schools to free information sessions at community centers/gathering spaces.

Comments:

- Educational programs for communities, farmers/ranchers, schools and industries
- Bring hands-on agriculture education back to schools
- Incentivize recycling/waste management with iron, plastics and chemical waste
- Facilitate the use of manure management for farmers/ranchers as a fertilizer
- *State funded charging stations in rural areas*

- *Fair taxation across brackets to support all income levels*
- *Support small businesses/farmers to keep rural towns and families strong- they are the backbone of North Dakota*
- *Invest more in solar energy*

1.5 OTHER

Question: Is there anything else you want us to know on this topic?

Education was highlighted as a key opportunity, ranging from general education in schools/communities about environmental practices, to hands-on agricultural educational practices. Education regarding agricultural/ production practices also was recommended for bankers and insurance agents in rural farm communities so that they are more attuned to best practices. People in these positions are often seen as resources to farmers and will often make crop and/or program suggestions to farmers (specifically new farmers).

2. DISCUSSION OF EXAMPLE GHG REDUCTION STRATEGIES

To bring the conversation to a more tactical level, a series of greenhouse gas emissions reductions examples were displayed on posters during each session for participants' reactions. It was noted that these examples were not proposals, just examples of strategies that have been implemented in other communities.

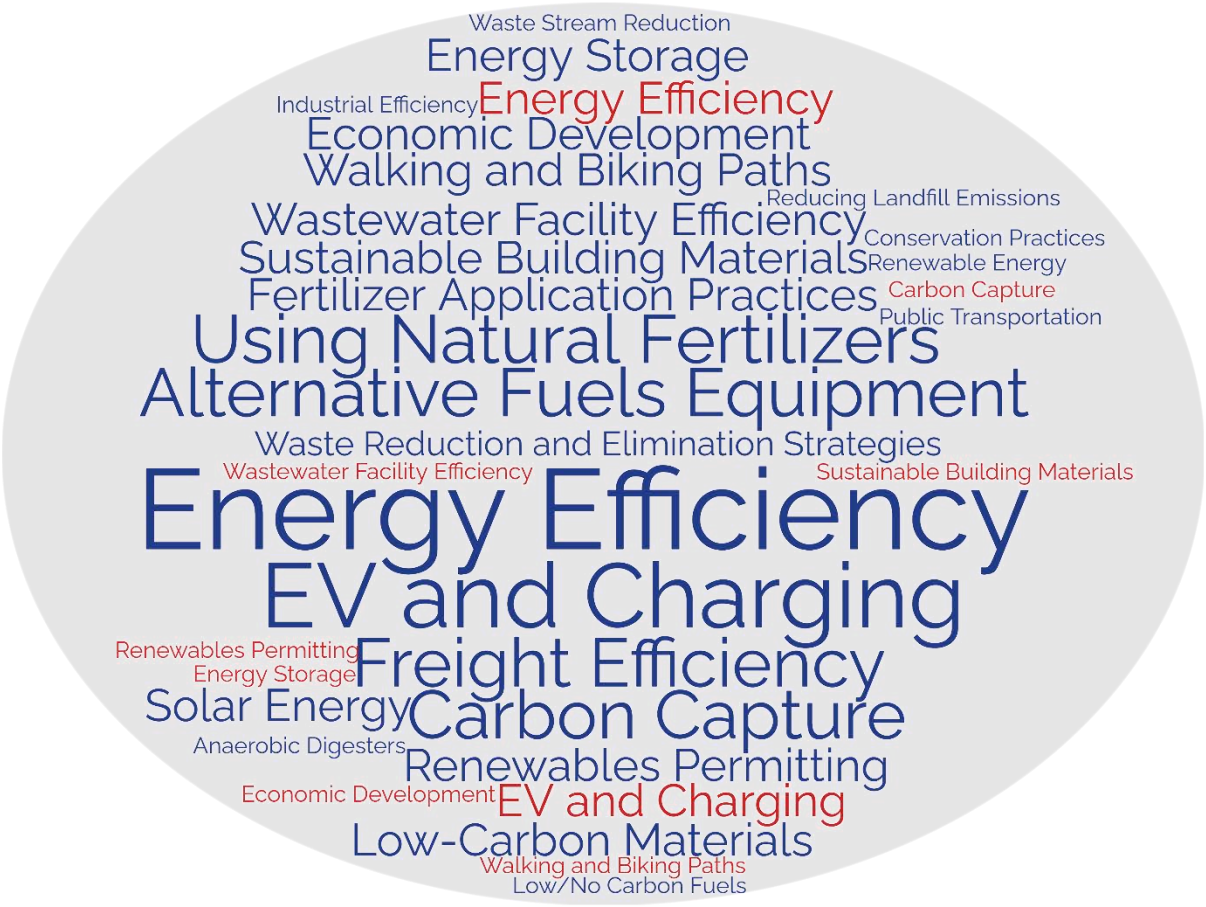
In-person participants were given red and blue sticker-dots to place next to any example on which they had an opinion. Blue was used to indicate support of an example for use in North Dakota; red indicated that they did not support the example for North Dakota. Participants were also given post-it notes to add additional examples, suggestions or comments/questions.

Online participants received a link via the chat in Zoom to a Microsoft form with the same list of examples. They were given the option to click "support", "not support" or "skip" the question. They also were able to elaborate on their responses.

All participants were cautioned that this process was meant to gauge general support or opposition to the various examples, that they were not voting.

The following "word cloud" graphic depicts how often (larger letters = more dots) that examples were selected, and to what degree they were supported (blue) or not supported (red).

SUMMARY OF REACTIONS



Note: The larger the type, the more often a strategy received a dot during this activity in Devils Lake.

Blue type = support. Red type = do not support.

In addition to placing red or blue dots on sample greenhouse gas emission reduction strategies posters, participants were invited to discuss the options and compare reactions to the sample strategies.

Strategy	Verbatim Comments
Renewable Energy	• I want it to be easier, more cost-effective to have solar panels on my house. I would share with my neighbors. • I'm all for renewable energy projects. But they have to be sustainable over the long term, like 25 years. I'm more for incentivizing existing facilities to be more efficient.
Waste Reduction	• I would love to hear more on composting for individuals, retailers and whole communities.

Conservation Practices	• North Dakota is the land of few trees. How might we incentivize people to plant trees? • It's painful to see shelter belts get knocked down and not getting replaced. • Improving crop rotations over the long term would be beneficial from a land management standpoint. • Crop insurance deadlines and bankers need to be based on seasonal demands and crop rotation demands. For example, you can't put a cover crop in after September 5th through some programs. • Common sense needs to come into play with some programs.
Carbon Capture	• Thousands and thousands of dollars are spent to get lots cleaned out and hauled out and then put back in the ground. Why can't we create a facility to capture that? • There's a bridge that needs to be built between crop production and ranching.
Fertilizer Application Processes	• No-till is more prevalent in the western part of the state. As you move east, a full no-till situation may not make sense, but maybe produced reduced tilling.
Carbon Capture	• I have question marks behind carbon capture. Is it sustainable or even possible? And what would those unintended consequences be? • At the end of the day, our food is more important than anything. Feeding the world is more important. So if sinking carbon into the earth harms crops, I'd rather just keep it up in the air.
Energy Efficiency	• Energy efficiency is good, but we also have to make a good product that lasts and can be fixed locally. Otherwise, we're just creating more waste.
Anaerobic Digesters	• I'm curious. But I don't think there are enough animals to make it worth it.
Other	• Sustainability gives North Dakotans marketing advantages, such as environmentally conscious flour.

3. WAYS TO ENGAGE

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Video recordings, reports, notices of future engagement opportunities, and additional methods to provide feedback may be found at the NDDEQ website: https://deq.nd.gov/sustainability/

For additional information, contact Jennifer Skjod, NDDEQ Public Information Officer, via email at jskjod@nd.gov

Thank you to those who shared their passions and wisdom as part of this conversation.

APPENDIX - EXAMPLE STRATEGIES

The following examples were provided as examples of greenhouse gas emission reduction strategies being implemented in U.S. communities. These examples were provided by ERM to generate discussion and reaction during North Dakota Sustainability Input Forums. Please note that these were not provided as proposals, nor were participants asked to rank or vote on them.

Energy Implementation and Development

- **Renewable Energy** - Incentives for installing renewable energy and energy storage systems on commercial properties
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- **Financing Programs** - Establish a financing program (e.g., grants or low-interest loans) for energy efficiency and renewable energy installations in new and existing buildings
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- **Carbon Capture** - Programs to support or incentivize carbon capture, utilization, and storage (CCUS) at industrial and energy facilities
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- **Low/No Carbon Fuels** - Programs to support or incentivize greenhouse gas emission reductions in industrial energy use and industrial processes, including use of low/no carbon fuels, electrification, renewable energy, and process improvements
- **Low-Carbon Materials** - Programs to develop, expand, and support markets for low-embodied carbon materials and products, such as cement and steel
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- **Freight Efficiency** - Increasing efficiency in freight movement.

Sustainability Input Forums

Input received in Dickinson, ND

PREPARED FOR

North Dakota Environmental Quality

Be Legendary.

DATE

December 2023

EXECUTIVE SUMMARY

North Dakotans of all backgrounds were invited to come together to share innovative ideas, knowledge, and perceptions related to reducing greenhouse gas emissions during the state's Sustainability Input Forums held from October 31 through November 8, 2023, in eight locations around the state. In addition, more than 100 people shared their thoughts via an online survey through December 5, 2023.

Input received through this process will assist North Dakota in forming the basis for sustainability planning and actions in 2024 and for years to come. Information gathered will be used to inform the state's participation in U.S. Environmental Protection Agency's (EPA) Climate Pollution Reduction Grant (CPRG) program. North Dakota's Sustainability Input Forums are supported with a CPRG planning grant.

This report summarizes input received through conversations held in-person and online during three sessions in Dickinson. Subsequent input received through the online comment form are italicized and attributed to this report based on ZIP codes indicated.

CONTEXT

The North Dakota Sustainability Input Forums were open public meetings that were organized to be conversational and informal. The role of the North Dakota Department of Environmental Quality (NDDEQ) was to host and to listen, with the assistance of an independent facilitator.

NDDEQ's goals for the forums were two-fold: 1) hear what North Dakotans are thinking and doing related to reducing greenhouse gas emissions, and 2) fuel conversation and connection between diverse stakeholders. To this end, conversations were held in a circle and lightly facilitated around a handful of core questions, as outlined in the following sections. Each session generated at least two hours of interaction, with comments provided by participants in the form of verbal feedback, comment cards, and online polls and chats.

Dickinson Input Forums were held at Stark County Veterans Pavilion. The Department of Environmental Quality had access to the entire building and utilized the large meeting space for each of the sessions. Upon entering, a small circle was created. A combination Bluetooth microphone/speaker was placed at the center of the circle and a camera outside of the circle to connect with online attendees.

Hosts for the forums were: Jennifer Skjod, NDDEQ; Allison Ahcan, ERM, Facilitator; Isabella Binger, ERM, Online Facilitator.

The attendees of these sessions, including online participants, offered an array of backgrounds. Individuals attending had experience within the oil and gas industry, agriculture industry, cattle industry, government, and agricultural organizations. A total of 18 people provided input from the Dickinson area.

1. CONVERSATION SUMMARIES

The forum was productive and enlightening, with the conversation focused on existing industries within the state and potential growth opportunities through greenhouse gas reduction grants. Discussion revolved around topics of community, energy, and agriculture. There was a common interest between groups as to how innovation can drive this funding in a way that does not further limit and restrict agriculture and oil/gas industries but instead fosters new technologies and techniques to meet the needs of the state. Individuals were worried about how regulations from this program will impact current businesses and emphasized that tactics already being utilized to reduce greenhouse gas emissions should be recognized and shown as examples of effective innovation.

Further details of discussion topics follow. Online comments from the region, but submitted subsequent to the meeting dates, have been noted in *italicized type.* Please note that bullets contain verbatim comments from Comment Cards, although similar points may be combined if mentioned more than once.

1.1 BENEFITS

Question: What BENEFITS do you see for North Dakotans as greenhouse gas emissions are reduced?

Participants pointed out that a major benefit of reducing greenhouse gas emissions is the economic opportunity it brings to the state. Innovation that can be brought to existing industries could include more CO2 sequestration measures as part of agriculture and oil/gas production. Potential partnerships could be built between new and existing industries to further strengthen North Dakota's economic structure.

Comments:

- Less federal/state overreach
- Expanded production opportunities
- Potential of new partnerships
- Job creation
- Less regulations
- Economic opportunities
- Innovation potential
- A cleaner environment
- *Reduction in health issues*
- *Climate stability*
- *Very few benefits*

1.2 DOWNSIDES

Question: What DOWNSIDES do you see for North Dakotans as greenhouse gas emissions are reduced?

This portion of the conversation raised concerns around how regulation attached to the implementation of Climate Pollution Reduction Grants could change the economic possibilities within the state. Specifically, changes to regulations may impact small businesses or primacy of

permitting Class VI UIC in the state. Additional worries noted surround the costs of implementing suggested practices, and how that could impact production throughout the state.

Comments:

- Increase in regulation
- Job elimination
- Individuals will not be able to afford the change
- More regulation; job elimination
- More federal government involvement
- Transition costs to the state
- *Rise in energy costs, leading to a cascade of increased costs downstream*

1.3 EXISTING EFFORTS

Question: What ALREADY is being done in North Dakota to reduce greenhouse gas emissions? Who is doing it?

Participants emphasized that North Dakotans are already doing much to assist in the reduction of greenhouse gas emissions, but that is not being amplified inside and outside of North Dakota. Specifically, within agriculture, it was noted that no-till farming has drastically reduced greenhouse gas emissions while simultaneously increasing production. There was also emphasis on how agriculture and oil/gas industries share techniques, such as greenhouse gas reductions and land reclamation practices.

Comments:

- Flare reduction in oil and gas
- CO2 sequestration
- Tracking what emissions are being captured by the landscape
- Pipelines (trucks off the roads)
- Zero emission premature controls (oil and gas)
- Oil and gas efficiencies
- Soil quality improvements
- Education events and demonstrations
- Energy & Environmental Research Center (EERC) collaboration in enhanced oil recovery from CO2
- *Carbon Capture in Beulah (Red Trail Ethanol Plant)*
- *Pipeline companies maintaining lines for leaks*
- *Emission regulations in energy production*

1.4 POTENTIAL STATE INCENTIVES/SUPPORT

Question: In what ways would you want to see the state INCENTIVIZE, SUPPORT or just generally HELP with greenhouse gas reductions?

Both in-person and online comments strongly suggested that the state should not abandon its existing industries. The phrase 'innovation over regulation' was suggested as a practice for the state while implementing the CPRG funds, as it would create the space for existing industries to expand production instead of limiting it. This would include partnership between private industry and the state to fund innovation.

Comments:

- Advocate for industry
- Continue to advocate for innovation over reclamation
- Work with private industry and incentivize it
- Public education
- Partner with smaller companies within the state instead of big business
- *Utilize and incentivize solar energy and solar farms*
- *Install meters on every oil and gas well to monitor emissions*
- *Enforce violations with meaningful fines*
- *Install air quality monitors (for volatiles as well as particulates) in the Western part of the state to enhance knowledge of oil field emissions*
- *Expanded CRP program to use prairie land and grasses for carbon capture*

1.5 OTHER

Question: Is there anything else you want us to know on this topic?

- The in-person participants did not have any additional topics of discussion regarding greenhouse gas reduction, but online comment cards pointed out that the New Zealand Space Agency partnered with MethaneSAT to create a methane tracking satellite in space. This technology will launch in early 2024 and be able to quantify regional-scale methane emissions from oil and gas operations worldwide down to areas of 1 km^2 .
- Additional online comments expressed interest in what job opportunities are expected to arise as a result of CPRG funding.
- *Times are tough financially for North Dakotans. Increasing energy costs now would be further those hardships*

2. DISCUSSION OF EXAMPLE GHG REDUCTION STRATEGIES

To bring the conversation to a more tactical level, a series of greenhouse gas emissions reductions examples were displayed on posters during each session for participants' reactions. It was noted that these examples were not proposals, just examples of strategies that have been implemented in other communities.

In-person participants were given red and blue sticker-dots to place next to any example on which they had an opinion. Blue was used to indicate support of an example for use in North Dakota; red indicated that they did not support the example for North Dakota. Participants were also given post-it notes to add additional examples, suggestions or comments/questions.

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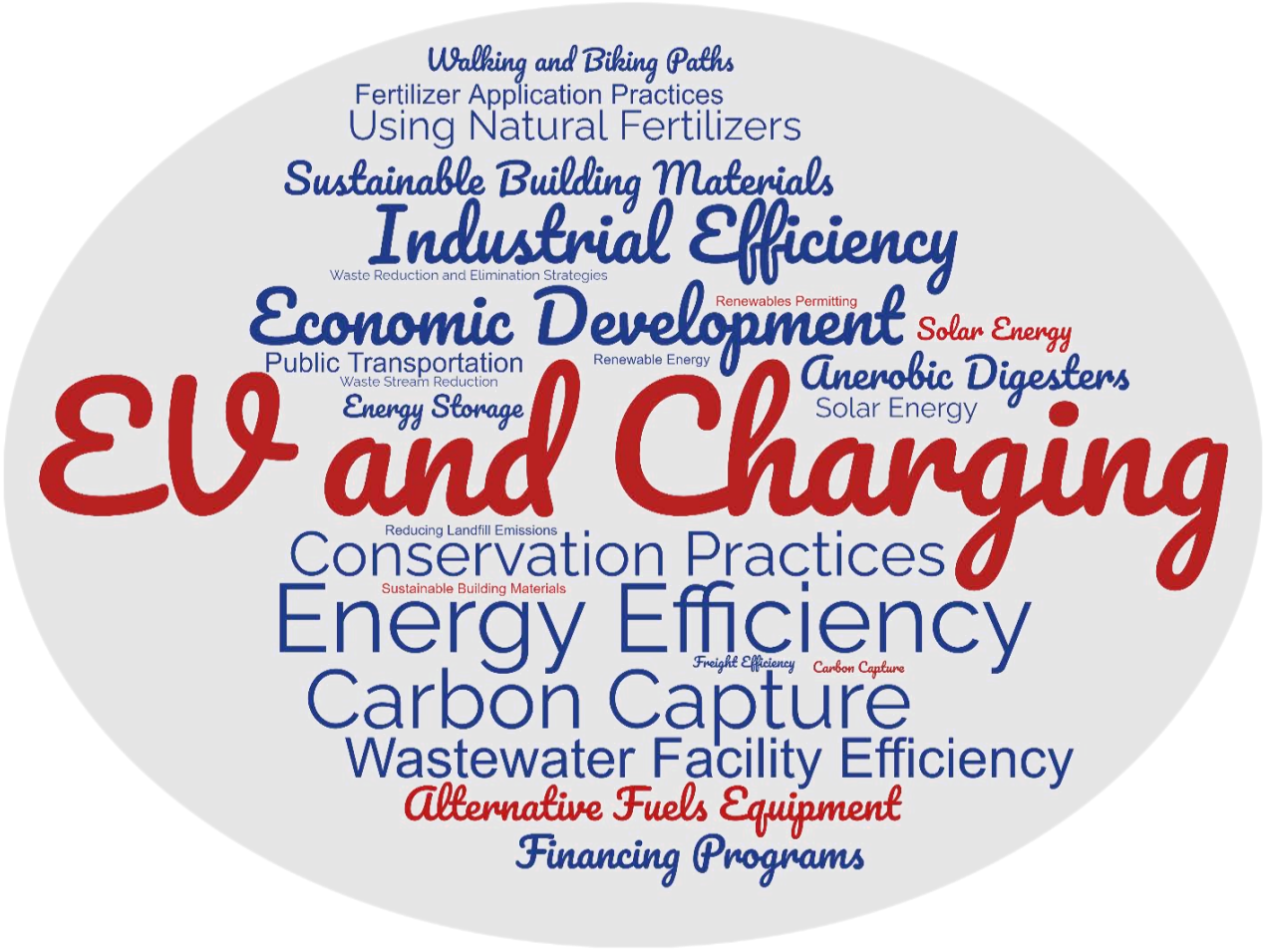

Note: The larger the type, the more often a strategy received a dot during this activity in Dickinson.

Blue type = support. Red type = do not support.

In addition to placing red or blue dots on sample greenhouse gas emission reduction strategies posters, participants were invited to discuss the options and compare reactions to the sample strategies.

Strategy	Verbatim Comments
Electric Vehicles and Charging	• Certain areas they are fine, but they are not a blanket solution • I'm not against them, they just don't work in North Dakota with our severe hot and cold. • I think they are a geographical issue for us more than anything. The infrastructure also isn't there. I don't foresee putting funds behind that.
Alternative Fuels Equipment	• We make them all here out of North Dakota, but we can't buy them because California buys it all. It is all coming from here, but we don't have access to it.

	• There is stuff being looked at like electric tractors and battery run stuff, but it's so far from reality yet. • You have to have a regular tractor while the other is charging
Fertilizer Application	• I'm all about that
Alternative Energy	• I have 1400 acres permitted for a solar farm, they haven't come out to do it yet. It is contracted but we will see if it happens.
Energy Efficiency	• We need to help the regular consumer and the regular citizen figure out how to consume products or utilized services that are going to be focused on greenhouse gas emissions.
Walking and Biking Trails	• We fund them through Outdoor Heritage Walking, biking/biking paths all the time. We just did one the other day in Napoleon. • They are for recreation not to ride to work
Wastewater Facility Efficiency	• In North Dakota we do not have enough water to entice industries to come here. • We are struggling to get enough rural water to rural people • We paid for a pipeline from Dickinson wastewater, recycled water to go to the golf course.
Conservation Practices	• When we first started Cover Crops, we did it and it was pretty short lived, at least in my experience. We didn't know how to manage through. We went away from it because we didn't have technology to support what we did. • What is the intent? To build soil health or to extend grazing for lifestyle? • We are the ultimate recyclers where I come from because we are renderers. All that waste that would go into landfills, we render and put it back into feed and it goes back into cattle and the turkeys and the chickens and the pigs.
Anaerobic Digesters	• We don't use them in this state; we should. We own two of them and are looking at building more.
Other- Permitting Reform	• A lot of ideas that you are going to get with any sort of innovation are going to get bogged down with regulatory review after regulatory review from federal to state to municipality • You can always hope for it, But I feel like if it could happen it would have been done by now • It is a red tape item that needs to be addressed
Other	• An extremely relevant category to everything we're talking about is water in of itself. • If you want to bring a hydrogen plant in and we don't have water here, how can you expand on the greenhouse thing? Water is part of the process that you need there. Any of these things that we're looking at doing, whatever industry, there's some form of water going to be needed • You have this green narrative which you know how well perceived that is in the state in North Dakota. So ESG plays a big part in that, especially from the finance side. And we talked about the insurance and all the all the other entities that you know you reminded us are involved with ESG and how it affects what we do in the state of North Dakota. That's why we have an ESG study because it does have an effect on what we do.

3. WAYS TO ENGAGE

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- **Low/No Carbon Fuels** - Programs to support or incentivize greenhouse gas emission reductions in industrial energy use and industrial processes, including use of low/no carbon fuels, electrification, renewable energy, and process improvements
- **Low-Carbon Materials** - Programs to develop, expand, and support markets for low-embodied carbon materials and products, such as cement and steel
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- **Conservation Practices** - Implement programs that support best practices in agricultural conservation to help protect soil health, including cover crops, no-till, other runoff reduction techniques
- **Economic Development** - Programs for local and regional economic development partners to establish food- and agriculture-based economic development strategies, such as community-based food co-ops

Community, Public Service and Government

- **Solar Energy** - Increase access and funding for solar panels on your home or businesses in your community
- **Energy Efficiency** - Funding for increasing energy efficiency in your home or businesses in your community, including proper insulation
- **Electric Vehicles and Charging** - Increasing electric vehicle charging stations in your community
- **Sustainable Building Materials** - Utilizing sustainable building materials for your local buildings
- **Public Transportation** - Increasing the availability and access to public transportation in your community
- **Walking and Biking Paths** - Additional walking and biking paths in your community
- **Energy Storage** - Funding for battery technology to store solar energy at commercial businesses
- **Waste Reduction and Elimination Strategies** - Providing residential recycling and composting service
- **Freight Efficiency** - Increasing efficiency in freight movement.

Sustainability Input Forums

Input received in Fargo, ND

PREPARED FOR

NORTH Dakota Be Legendary. | Environmental Quality

DATE
December 2023

EXECUTIVE SUMMARY

North Dakotans of all backgrounds were invited to come together to share innovative ideas, knowledge, and perceptions related to reducing greenhouse gas emissions during the state's Sustainability Input Forums held from October 31 through November 8, 2023, in eight locations around the state. In addition, more than 100 people shared their thoughts via an online survey through December 5, 2023.

Input received through this process will assist North Dakota in forming the basis for sustainability planning and actions in 2024 and for years to come. Information gathered will be used to inform the state's participation in U.S. Environmental Protection Agency's (EPA) Climate Pollution Reduction Grant (CPRG) program. North Dakota's Sustainability Input Forums are supported with a CPRG planning grant.

This report summarizes input received through conversations held in-person and online during three sessions in Fargo. Subsequent input received through the online comment form are italicized and attributed to this report based on ZIP codes indicated.

CONTEXT

The North Dakota Sustainability Input Forums were open public meetings that were organized to be conversational and informal. The role of the North Dakota Department of Environmental Quality (NDDEQ) was to host and to listen, with the assistance of an independent facilitator.

NDDEQ's goals for the forums were two-fold: 1) hear what North Dakotans are thinking and doing related to reducing greenhouse gas emissions, and 2) fuel conversation and connection between diverse stakeholders. To this end, conversations were held in a circle and lightly facilitated around a handful of core questions, as outlined in the following sections. Each session generated at least two hours of interaction, with comments provided by participants in the form of verbal feedback, comment cards, and online polls and chats.

Located on the lower level of the West Acres Shopping Mall, the Community Room comfortably hosted the three Sustainability Input Forums in Fargo. The chairs were oriented in a U shape. The camera was centered behind the group with a Bluetooth microphone/speaker placed at the center of the circle to capture video and audio for Zoom participants and the recording.

Hosts for the forums were Ann Fritz, NDDEQ; Renee Hoyos, ERM, Facilitator; Monica Zattera, ERM, Online Facilitator.

Attendees included various individuals from across industries and interests including, but not limited to, family farmers, agricultural industry professionals, economists, public officials, retirees, students and local residents with a passion for the environment, prairielands, forestry and action on climate change. A total of 33 Fargo-area residents contributed input.

1. CONVERSATION SUMMARIES

The conversation was educational and well-received by attendees. Participants said they were pleasantly surprised by the informal and conversational nature of the forums as opposed to a traditional public hearing session. Concerns focused primarily on agricultural practices, education opportunities, and the need for a collective approach with various solutions. Fargo participants noted that cultural hurdles are present and have been in place for generations that make it difficult to find common ground on these topics.

Further details of discussion topics follow. Online comments from the region, but submitted subsequent to the meeting dates, have been noted in *italicized type.* Please note that bullets contain verbatim comments from Comment Cards, although similar points may be combined if mentioned more than once.

1.1 BENEFITS

Question: What BENEFITS do you see for North Dakotans as greenhouse gas emissions are reduced?

In general, the group agreed that there are many potential benefits, and they would like to work towards them. However, concern for how they will be measured and if they would see them in their lifetime was mentioned. Some participants admitted to having a hard time fully comprehending the benefits as realistic and tangible, but ultimately agreed that change is possible.

Comments:

- Cleaner air
- Fewer extreme weather events
- Improved quality of life
- Lower carbon emissions
- Improved perception of North Dakotans' attitudes toward the environment
- Improved sunlight exposure for crops
- Maintain planet for future generations
- Less production cost
- Soil and water health
- Economic opportunity
- Growth of renewable fuels
- Increased market opportunities for commodities
- Remain competitive on global markets
- Diversify economy
- *Be a good neighbor to our country*
- *Encourage Innovation*
- *Healthier animals*
- *Waste reduction by utilizing biodiesel made from fat/cooking oil waste*
- *Reduce dependency on fleeting fossil fuels*

- *Energy security: reduce reliance on foreign oil production providing protection against geopolitical instability*
- *Rural development with additional income opportunities*
- *Additional jobs*
- *Slow global warming*
- *Increased resiliency*
- *Decrease in climate related refugees*

1.2 DOWNSIDES

Question: What DOWNSIDES do you see for North Dakotans as greenhouse gas emissions are reduced?

Participants voiced concern for the cost of transitioning to newer, more environmentally friendly practices. Many reiterated that they are concerned with peoples' resistance to change and voiced that many farmers they have encountered in their professions have resisted change due to the fact it is too expensive for the lack of change perceived as rapid change will also cause a shift in the economy that not everyone can afford. It was also mentioned that many of the suggested changes do not align with the lifestyle and living conditions, being as far North as they are. Electric vehicles are helping, but they are unable to meet the needs of ND for the scope of large-scale machinery. They are expensive and cannot withstand our winters. The production of these vehicles is not factored into its carbon emissions and participants are concerned about the production of the materials to build vehicles outweighing the benefits. Electric vehicles can also add to a class system and isolate those who cannot afford to transition.

Comments:

- How are we measuring improvements?
- Potential cost to producers
- Cost of new infrastructure
- Risk to public health
- Dramatic change to oil and Agriculture based economy
- Added controversy- misinformation
- Time consuming
- Change of traditional practices causes unrest
- Reduced power in engine units/equipment
- Loss of local control over regulation
- Destruction of current economic model
- Less reliable power grid
- Product affordability
- Loss of jobs and need for alternative revenue
- *Cost outweighs the benefits by adding emissions elsewhere in the production of new materials*
- *There are no downsides*
- *No readily available solutions to heavy-duty transportation/machinery*

1.3 EXISTING EFFORTS

Question: What ALREADY is being done in North Dakota to reduce greenhouse gas emissions? Who is doing it?

Much of the conversation focused on North Dakota farmers already implementing adaptive practices. Various participants called for more inclusive programs that rewarded those who have already been utilizing recommended practices. Mention of additional programs including the U.S. Department of Agriculture (USDA), Soil Conservation District, Land and Water Conservation and the Soil and Water Outcomes Fund for farmers was discussed and the state was encouraged to engage more with these programs/organizations. Attendees also recognized rebates/tax credits for homes that transition to energy efficient appliances and rate differentials provided by utility companies. Additionally, ND DOT completed an electric vehicle study; in Fargo specifically, they are looking into the readiness for the city to transition.

Comments:

- Wind turbines
- Rebates/tax credits for energy efficient appliances
- Farmers/ranchers using adaptive practices
- Scrubbers on smokestacks
- Prairieland research on species impacted
- USDA
- Soil Conservation Districts
- Land and Water Conservation
- Nongovernmental organizations (NGOs) incentivizing farmers for changes and food stewardship
- DEF fluid and biofuels
- Underground storage
- Utility companies offering peak differential rates
- Red Tail Energy- CCS
- Primacy for Class VI VIC wells
- Electric vehicles
- Methane capture
- *Nonprofits like Audubon and Pheasants Forever*
- *Recycling concrete for roads*
- *Development of carbon capture and sequestration technologies*
- *Production of renewable diesel by Marathon Petroleum at South Heart*
- *Biodiesel by ADM at Velva*
- *Additional bus stops increasing accessibility*
- *Ethanol-based public transportation*
- *Private solar power*
- *I don’t know*

1.4 POTENTIAL STATE INCENTIVES/SUPPORT

Question: In what ways would you want to see the state INCENTIVIZE, SUPPORT or just generally HELP with greenhouse gas reductions?

Attendees asked for more collaboration between existing programs and the government to further support agricultural practices as the transitioned. They also asked for less urbanization and more incentivization for the preservation of grasslands to help with air quality and environmental improvements. Participants mentioned a need for balance and support to return low-yield cropland to grasslands. Community members also want to see more government funded solar gardens, green spaces, and habitat sanctuaries in addition to education and more robust recycling practices.

Comments:

- Create net metering
- Solar community gardens
- Focus more on funding transition to energy efficiency
- Incorporate people from solar and clean energy on[to] the sustainable energy authority
- Balance planting incentives by making more environmentally friendly choices like grasslands vs corn more economically obtainable
- Establish solar panel and wind turbine recycling
- Reward those who are already working towards environmentally friendly practices
- Invest in precision fertilizer application practices/research
- Develop and fund educational programs for farmers to improve practices
- Promote/work closer with the Soil and Water Outcomes Fund and other programs
- Incentivize producers to convert low yield land back to pastures/grasslands
- Research measuring carbon sequestration
- More environmentally friendly building codes and ordinances
- Madate recycling bins in multifamily dwellings
- *Publicize what is currently being done to educate resident*
- *Incentivize composting facilities in larger cities*
- *State regulated climate friendly purchasing plan*
- *Create a private sector climate council*
- *Empower cities/municipalities through providing programs to report and track sustainability*
- *Pull all investments from fossil fuel and coal industry and redirect funding to clean energy*
- *Prioritize the production and use of biodiesel with state policies*
- *A sustainable surface utilization rating system- incorporating air, soil and water as touchstone receptors*
- *Air quality monitors*

1.5 OTHER

Question: Is there anything else you want us to know on this topic?

- One participant from the session wanted to challenge the state to think about how they can create environmentally sustainable building practices, codes, and ordinances

- Participants also asked for more information about the electric vehicle transition and asked for additional investment in EV charging stations
- Carbon Capture and Storage (CCS) and carbon filtering are different. CCS is not a solution in ND
- There is a huge lack of sustainable options including basic recycling services in multifamily dwellings
- Is the Department of DEI [diversity equity and inclusion] included to ensure equitable distribution or resources once available?
- Increase amount of EV charging stations
- *Thank you for doing this!*
- *Shipping waste or raw product out of the state to be recycled is not a reasonable solution*
- *Add additional incentives for creating wild habitats within neighborhoods*

2. DISCUSSION OF EXAMPLE GHG REDUCTION STRATEGIES

To bring the conversation to a more tactical level, a series of greenhouse gas emissions reductions examples were displayed on posters during each session for participants' reactions. It was noted that these examples were not proposals, just examples of strategies that have been implemented in other communities.

In-person participants were given red and blue sticker-dots to place next to any example on which they had an opinion. Blue was used to indicate support of an example for use in North Dakota; red indicated that they did not support the example for North Dakota. Participants were also given post-it notes to add additional examples, suggestions or comments/questions.

Online participants received a link via the chat in Zoom to a Microsoft form with the same list of examples. They were given the option to click "support", "not support" or "skip" the question. They also were able to elaborate on their responses.

All participants were cautioned that this process was meant to gauge general support or opposition to the various examples, that they were not voting.

The following "word cloud" graphic depicts how often (larger letters = more dots) that examples were selected, and to what degree they were supported (blue) or not supported (red).

SUMMARY OF REACTIONS

Note: The larger the type, the more often a strategy received a dot during this activity in Fargo.

Blue type = support. Red type = do not support.

In addition to placing red or blue dots on sample greenhouse gas emission reduction strategies posters, participants were invited to discuss the options and compare reactions to the sample strategies.

Strategy	Verbatim Comments
Electric Vehicles and Charging	• Electric vehicles are a promising idea, but it is going to be challenging to move beyond charging stations along interstate highways. • Increase the share of electric vehicles through leasing and purchasing
Building Materials	• Design standards and building codes make it difficult to try new building materials.
Renewable Energy	• The best bet for ensuring a sustainable energy grid and reducing greenhouse gases is to keep pushing clean air standards and using the best available technology at coal-fired plants. Then supplement the grid with renewable energy sources. • I'm supportive of installing solar on commercial properties. • Incentivize renewable energy on new construction. • How about solar panels on barns? • One thing I think of related to solar energy is how much room those panels take and we're sitting on some of the best farmland in the world. (Generated an extensive discussion of possibilities such as elevated panels, compatibility with sheep grazing, etc.) • Incorporate people from solar and clean energy on the sustainable energy authority
Renewables Permitting	• Permitting is already streamlined. It is a messy process to permit renewable energy because it's disruptive. For example, a wind farm takes up many square miles and has people who live there must deal with windmill sights and sounds. I don't think you can streamline anymore without ignoring the public. • When compared to the noise of motorcycles and big trucks, the sound of wind farms is minimal.
Carbon Capture	• I would be more supportive of filtering carbon off coal plants versus the Summit model. • Carbon capture is not reducing, just putting underground instead of releasing into the air. • Carbon filtering and carbon capture are two very different projects.
Public Transportation	• Fargo already has increased access to public transportation. Investing more just would not have as much impact. Another participant said: Buses bought recently, though, were diesel, not hybrid or electric like the rest of the country. • I'm in favor of expanding public transportation, but I'd like it to be more towards an electrical or hybrid. • Look at Europe. To make trains work, they made extensive plans to make cities walkable. It wasn't magic, it was planning, policies, and incentives.
Walking and Biking Trails	• When the diversion construction is done, Fargo will have 30 miles of recreational trails. That's already happening.
Landfill Emissions	• Fargo already is capturing emissions from landfills, cleaning it, and selling it. • Discussion included whether this creates a reduction or just redirects gas to beneficial use. • It took an upfront investment to get methane collection going, but it paid off for Fargo in four years and now it's just profit for the city.
Waste Stream Reductions	• We have a lack of sustainability options, such as recycling.

Conservation Practices	• Make the NRCS programs more educational or you could have the Department of Agriculture working with Extension to provide more conservation practice programming. • Include conservation practices in more ag degrees.
Anaerobic Digesters	• I would not be against putting them on existing projects and reducing the carbon for existing feedlots, but putting up new ones would actually incentivize large lots and increase the carbon. Digesters require a large scale to make sense.
Other	• Is the Department of DEI included to ensure equitable distribution or resources once available?

3. WAYS TO ENGAGE

Sustainability Listening Forums and the corresponding online survey were the first in a series of engagement opportunities led by North Dakota Department of Environmental Quality in support of long-term sustainability planning and North Dakota's collective greenhouse gas emissions reductions work.

Video recordings, reports, notices of future engagement opportunities, and additional methods to provide feedback may be found at the NDDEQ website: https://deq.nd.gov/sustainability/

For additional information, contact Jennifer Skjod, NDDEQ Public Information Officer, via email at jskjod@nd.gov

Thank you to those who shared their passions and wisdom as part of this conversation.

APPENDIX - EXAMPLE STRATEGIES

The following examples were provided as examples of greenhouse gas emission reduction strategies being implemented in U.S. communities. These examples were provided by ERM to generate discussion and reaction during North Dakota Sustainability Input Forums. Please note that these were not provided as proposals, nor were participants asked to rank or vote on them.

Energy Implementation and Development

- **Renewable Energy** - Incentives for installing renewable energy and energy storage systems on commercial properties
- **Energy Efficiency** - Incentives for installing end-use energy efficiency measures in commercial and residential buildings
- **Financing Programs** - Establish a financing program (e.g., grants or low-interest loans) for energy efficiency and renewable energy installations in new and existing buildings
- **Electric Vehicles and Charging** - Incentives to increase the share of electric vehicles (e.g., leasing and purchasing), and to expand electric vehicle charging infrastructure
- **Carbon Capture** - Programs to support or incentivize carbon capture, utilization, and storage (CCUS) at industrial and energy facilities
- **Industrial Efficiency** - Programs to support or incentivize implementation of energy efficiency measures in industry, including energy audits, strategic energy management, equipment upgrades, and waste heat utilization
- **Low/No Carbon Fuels** - Programs to support or incentivize greenhouse gas emission reductions in industrial energy use and industrial processes, including use of low/no carbon fuels, electrification, renewable energy, and process improvements
- **Low-Carbon Materials** - Programs to develop, expand, and support markets for low-embodied carbon materials and products, such as cement and steel
- **Renewables Permitting** - Streamline permitting for renewable energy projects
- **Waste Stream Reduction -** Increase the efficiency or effectiveness of waste reduction, reuse, recycling, or composting programs. Reducing the amount of materials entering landfills.
- **Wastewater Facility Efficiency** - Incentives for installing renewable energy and energy efficiency measures at wastewater treatment facilities
- **Reducing Landfill Emissions** - Incentives to reduce methane emissions from landfills and wastewater treatment facilities, including through collection for use

Agriculture

- **Anerobic Digesters** - Incentives to promote anaerobic digesters to capture methane and generate renewable energy or produce renewable fuel
- **Alternative Fuels Equipment** - Incentive programs to fund agricultural equipment technologies that use alternative fuels
- **Fertilizer Application Practices** - Incentives for technologies and techniques that reduce nitrous oxide emissions from fertilizer application such as precision agriculture practices
- **Using Natural Fertilizers –** Reinforcing soil health with the life cycle of the animal
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Sustainability Input Forums

Inputs received in Grand Forks, ND

PREPARED FOR

North Dakota | Environmental Quality
Be Legendary.

DATE
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Hosts for the forum were: Rebekah Pfaff, NDDEQ, presenter; Nancy Miller, ERM, facilitator; Monica Zattera, ERM, Online Facilitator.

Attendees included various individual from across industries/interests including, but not limited to, family farmers, agricultural industry professionals, public officials, and local residents with passion for the environment, wetlands, forestry and climate change. A total of 12 people contributed input from the Grand Forks area.

1. CONVERSATION SUMMARIES

Conversations in Grand Forks were adapted to accommodate some participants who had already seen previous presentations and came with their comment cards completed and ready to engage. This provided an opportunity to go deeper into topics of greatest participant interest.

Further details of discussion topics follow. Online comments from the region, but submitted subsequent to the meeting dates, have been noted in italicized type. Please note that bullets contain verbatim comments from Comment Cards, although similar points may be combined if mentioned more than once.

1.1 BENEFITS

Question: What BENEFITS do you see for North Dakotans as greenhouse gas emissions are reduced?

Concerns regarding current fertilizer use were raised, specifically related to regulation of dosage. By limiting or replacing the use of fertilizer there is a potential for improving water quality and reducing greenhouse gas emissions.

Comments:

- Improved quality of water
- Reduced use of urea-based fertilizers
- Reduced air pollution
- *Low carbon products*
- *CO2 for EOR (enhanced oil recovery)*
- *There are no benefits- it is not necessary to reduce carbon; plant life does it just fine.*

1.2 DOWNSIDES

Question: What DOWNSIDES do you see for North Dakotans as greenhouse gas emissions are reduced?

Participants highlighted the need for understanding the complexities of the compound effects of urbanization and how continual change can impact the people and economy. One participant mentioned that the natural variability of North Dakota's climate has left many residents unaware of climate change by comparison, creating a resistant perspective on change. No-till practices and other adaptive practices have also caused unintentional consequences such as higher phosphate levels that then bleed into waterways after flooding.

Comments:

- Change in lifestyle/tradition
- Higher valued products/more expensive energy
- Unfair regulation
- Undue burden on farmers who cannot adapt practices
- De-facto taxes on traditional farming materials including diesel and fertilizer perpetuates bad policy practices
- *Upfront cost to transition*
- *Risk to human health if done wrong*

- *Increased taxes on citizens*
- *Carbon capture is unsustainable and will contribute to waste long-term*

1.3 EXISTING EFFORTS

Question: What ALREADY is being done in North Dakota to reduce greenhouse gas emissions? Who is doing it?

Current programs available to agriculture/livestock producers were discussed, however participants agreed there is a long way to go with developing these programs as they are not designed by farmers/ranchers with their needs or timelines in mind. These programs are seen as too rigorous with unrealistic expectations that are not considerate to the natural uncertainty that comes with producing in the state. Current agricultural practices designed to preserve the environment were also mentioned with specific mention of no-tillage, cover crops and use of manure as fertilizer.

Comments:

- Red Trail and Blue Flint are ethanol plants that inject CO2
- Continue development/investment in wind energy
- DGC research and regulatory framework for capture and sequestration of CO2
- Geo-thermal energy in workplace
- *No-till and other adaptive farming practices*
- *Oil field operations addressing fugitive methane emissions*
- *Great Plains Synfuels plant capturing and sequestration of CO2*
- *Tax credits for energy star appliances and practices*
- *Regulations on flaring from petroleum and gas production*

1.4 POTENTIAL STATE INCENTIVES/SUPPORT

Question: In what ways would you want to see the state INCENTIVIZE, SUPPORT or just generally HELP with greenhouse gas reductions?

Attendees spent a substantial portion of time asking for the reformation of existing programs to be more understanding/inclusive to farmers and ranchers. A suggested modification was for the chemical recycling program to be restructured with more accessible time periods to better aid in the proper disposal of containers. Participants also asked for recycling programs to include materials such as iron, as a common practice currently is to leave discarded equipment on site, impacting productivity of soil.

Additionally, there were requests for general education improvements regarding personal practices to reduce individual impact on the environment ranging from more engagement in schools to free information sessions at community centers/gathering spaces.

Comments:

- Fund GHG reduction research and how to keep current energy dependable
- Education of legislatures and citizens
- *Create trust between regulatory bodies and the people*
- *Continue to offer discussion forums for people to talk collectively and think critically*
- *Utilize state colleges and programs to research fertilizer application rates*
- *Stop throwing our money away*

1.5 OTHER

Question: Is there anything else you want us to know on this topic?

Education was highlighted as a key opportunity, ranging from general education in schools/communities about environmental practices, to hands-on agricultural educational practices. Education regarding agricultural/ production practices also was recommended for bankers and insurance agents in rural farm communities so that they are more attuned to best practices. People in these positions are often seen as resources to farmers and will often make crop and/or program suggestions to farmers (specifically new farmers).

Comments:

- North Dakotans are used to variable weather and therefore don't notice alterations as much
- We need to educate the world on smart energy, clean energy
- Really need to look at the word Sustainability for the whole – all the elements that go into supposed "solutions" and calculate the environmental cost

2. DISCUSSION OF EXAMPLE GHG REDUCTION STRATEGIES

To bring the conversation to a more tactical level, a series of greenhouse gas emissions reductions examples were displayed on posters during each session for participants' reactions. It was noted that these examples were not proposals, just examples of strategies that have been implemented in other communities.

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SUMMARY OF REACTIONS

Note: The larger the type, the more often a strategy received a dot during this activity in Grand Forks.

Blue type = support. Red type = do not support.

In addition to placing red or blue dots on sample greenhouse gas emission reduction strategies posters, participants were invited to discuss the options and compare reactions to the sample strategies.

Strategy	Verbatim Comments
General	• There's nothing on this list that I immediately go, "oh no, that's a bad idea." • I'm definitely an all-of-the-above type person for this challenge. • Where is the state going to come up with the money to incentivize these things and how effective are they going to be? I need more information before I can support anything. • There's a much bigger conversation that needs to happen. • We need to know what net costs are from both economic and environmental standpoints. • The things I like best on the list are ideas that fit with something that the state can do versus something the state doesn't really have control over. But I'm not really sure what those things are.

	• What's clear is the science. What is less clear right now is what effect that greenhouse gases are having on the environment right here in North Dakota, and how those impacts vary across the state (e.g., colder places will be impacted more).
Economic Development	• Synergies can develop between existing industries, like between ethanol production industry and the oil and gas industry. • There are opportunities for new industries to be created.
Energy Efficiency	• The state could do a better job of getting information out to the general public (e.g., a website) on ways that they can save energy. • Educate the public about personal action we can take. • We need to know better what would work here from both private consumer and industry standpoints. • It would be great to have ways for people to easily find information on costs and benefits, including for elective vehicles. • Have to be able to explain costs – benefit vs. cost to sustainability
Industrial Efficiency	• Pursue research and a regulatory environment to address greenhouse gases from the industrial standpoint.
Renewable Energy	• When you start talking about electricity generation, how is it going to fit with our existing infrastructure and delivery systems? • Is adding more renewables going to be effective, or is it just going to mess things up because it adds instability to the grid? OBJ • My comment is about storage for renewable energy that's generated. A lot of times, you've got the wind and you've got the sun, but the demand isn't there for use of all that. • Not everybody can afford renewables like solar. How do we help them get a leg up in obtaining some of these technologies? • Is it even going to make sense to put solar on low-income housing? I'm guessing most low-income people don't own their own home and so are solar panels even a benefit to them? Can a credit or incentive be passed on to renters? • Could farmers produce biodiesel right at the farm for what they need for fuel? • I'm uncomfortable with solar cell and battery storage technology. From extraction through manufacture, use and disposal we have to be careful not to embrace those things that are as toxic or worse. • Can't rely on solar in ND; only effective small parts of the year •
Conservation Practices	• I'm not really seeing a need for more green space in North Dakota.
Public Transportation	• If public transportation in Grand Forks was effective, we would already have it because we've tried with the bus system. But we don't have enough population to warrant a more effective transportation network.
Fertilizer Application Processes	• The lack of regulation on the application of fertilizers. Plus, you have the emissions from manufacturing and transportation. • Regulation of fertilizer is difficult because there are so many scientific variables. • We have little ability to do good soil testing for all the variables in a field. So, it is a lot of expense to try to solve. • Tiling systems and low-till, no-till farming here keeps non-natural phosphates on top, out of water. But when there are flood events, phosphate gets picked up, as well straw that hasn't been tilled into the soil and gets into the runoff. You get not only dissolved phosphate that runs off into the river, but you actually get particulate phosphate from the straw. • So it goes back to figuring out where those flood-prone areas are. And perhaps managing those in a different way.

	• There already is inherent extreme climate variability in this part of the country. And the likelihood is high that that is only going to continue, possibly increase. • But there still are simple things, like buffer strips on fields, that I think the U.S. Department of Agriculture would argue is still pretty viable and useful. • Surface-based aircraft and satellite-based sensors are providing observations that can be integrated to make data available down to the farmer level. (UND/Red River Basin Commission project)
Electric Vehicles	• What it takes to produce the steel and everything else to produce a car is much more polluting than to keep using the car you have • Having everyone switch to another type of car is not a solution • Buring up resources to manufacture multiple cars is not sustainable, people should use their existing cars as long as possible

3. WAYS TO ENGAGE

Sustainability Input Forums and the corresponding online survey were the first in a series of engagement opportunities led by North Dakota Department of Environmental Quality in support of long-term sustainability planning and North Dakota's collective greenhouse gas emissions reductions work.

Video recordings, reports, notices of future engagement opportunities, and additional methods to provide feedback may be found at the NDDEQ website: https://deq.nd.gov/sustainability/

For additional information, contact Jennifer Skjod, NDDEQ Public Information Officer, via email at jskjod@nd.gov

Thank you to those who shared their passions and wisdom as part of this conversation.

APPENDIX - EXAMPLE STRATEGIES

The following strategies were provided as examples of greenhouse gas emission reduction strategies being implemented in U.S. communities. These examples were provided by ERM to generate discussion and reaction during North Dakota Sustainability Input Forums. Please note that these were not provided as proposals, nor were participants asked to rank or vote on them.

Energy Implementation and Development

- **Renewable Energy** - Incentives for installing renewable energy and energy storage systems on commercial properties
- **Energy Efficiency** - Incentives for installing end-use energy efficiency measures in commercial and residential buildings
- **Financing Programs** - Establish a financing program (e.g., grants or low-interest loans) for energy efficiency and renewable energy installations in new and existing buildings
- **Electric Vehicles and Charging** - Incentives to increase the share of electric vehicles (e.g., leasing and purchasing), and to expand electric vehicle charging infrastructure
- **Carbon Capture** - Programs to support or incentivize carbon capture, utilization, and storage (CCUS) at industrial and energy facilities
- **Industrial Efficiency** - Programs to support or incentivize implementation of energy efficiency measures in industry, including energy audits, strategic energy management, equipment upgrades, and waste heat utilization
- **Low/No Carbon Fuels** - Programs to support or incentivize greenhouse gas emission reductions in industrial energy use and industrial processes, including use of low/no carbon fuels, electrification, renewable energy, and process improvements
- **Low-Carbon Materials** - Programs to develop, expand, and support markets for low-embodied carbon materials and products, such as cement and steel
- **Renewables Permitting** - Streamline permitting for renewable energy projects
- **Waste Stream Reduction -** Increase the efficiency or effectiveness of waste reduction, reuse, recycling, or composting programs. Reducing the amount of materials entering landfills.
- **Wastewater Facility Efficiency** - Incentives for installing renewable energy and energy efficiency measures at wastewater treatment facilities
- **Reducing Landfill Emissions** - Incentives to reduce methane emissions from landfills and wastewater treatment facilities, including through collection for use

Agriculture

- **Anerobic Digesters** - Incentives to promote anaerobic digesters to capture methane and generate renewable energy or produce renewable fuel
- **Alternative Fuels Equipment** - Incentive programs to fund agricultural equipment technologies that use alternative fuels
- **Fertilizer Application Practices** - Incentives for technologies and techniques that reduce nitrous oxide emissions from fertilizer application such as precision agriculture practices
- **Using Natural Fertilizers –** Reinforcing soil health with the life cycle of the animal

- **Conservation Practices** - Implement programs that support best practices in agricultural conservation to help protect soil health, including cover crops, no-till, other runoff reduction techniques
- **Economic Development** - Programs for local and regional economic development partners to establish food- and agriculture-based economic development strategies, such as community-based food co-ops

Community, Public Service and Government

- **Solar Energy** - Increase access and funding for solar panels on your home or businesses in your community
- **Energy Efficiency** - Funding for increasing energy efficiency in your home or businesses in your community, including proper insulation
- **Electric Vehicles and Charging** - Increasing electric vehicle charging stations in your community
- **Sustainable Building Materials** - Utilizing sustainable building materials for your local buildings
- **Public Transportation** - Increasing the availability and access to public transportation in your community
- **Walking and Biking Paths** - Additional walking and biking paths in your community
- **Energy Storage** - Funding for battery technology to store solar energy at commercial businesses
- **Waste Reduction and Elimination Strategies** - Providing residential recycling and composting service
- **Freight Efficiency** - Increasing efficiency in freight movement.

ERM

PREPARED FOR

NORTH Dakota Be Legendary. | Environmental Quality

Sustainability Input Forums

Input received in Jamestown, ND

DATE
December 2023

EXECUTIVE SUMMARY

North Dakotans of all backgrounds were invited to come together to share innovative ideas, knowledge, and perceptions related to reducing greenhouse gas emissions during the state's Sustainability Input Forums held from October 31 through November 8, 2023, in eight locations around the state. In addition, more than 100 people shared their thoughts via an online survey through December 5, 2023.

Input received through this process will assist North Dakota in forming the basis for sustainability planning and actions in 2024 and for years to come. Information gathered will be used to inform the state's participation in U.S. Environmental Protection Agency's (EPA) Climate Pollution Reduction Grant (CPRG) program. North Dakota's Sustainability Input Forums are supported with a CPRG planning grant.

This report summarizes input received through conversations held in-person and online during three sessions in Jamestown. Subsequent input received through the online comment form are italicized and attributed to this report based on ZIP codes indicated.

CONTEXT

The North Dakota Sustainability Input Forums were open public meetings that were organized to be conversational and informal. The role of the North Dakota Department of Environmental Quality (NDDEQ) was to host and to listen, with the assistance of an independent facilitator.

NDDEQ's goals for the forums were two-fold: 1) hear what North Dakotans are thinking and doing related to reducing greenhouse gas emissions, and 2) fuel conversation and connection between diverse stakeholders. To this end, conversations were held in a circle and lightly facilitated around a handful of core questions, as outlined in the following sections. Each session generated at least two hours of interaction, with comments provided by participants in the form of verbal feedback, comment cards, and online polls and chats.

The Jamestown Sustainability Input Forums were held in the banquet facility of the Knights of Columbus building. Hosts for the forums were Dave Glatt, NDDEQ, Presenter; Renee Hoyos, ERM, Facilitator; Monica Zattera, ERM, Online Facilitator.

Attendees included various individual from across industries/interests including, but not limited to, family farmers, agricultural industry professionals, ranchers, educators, and local residents with a passion for the environment, wetlands, forestry, and climate change. A total of 17 Jamestown area residents provided input.

1. CONVERSATION SUMMARIES

Jamestown conversations were productive and informative with a heavy agriculture orientation throughout the day. Various individuals participated in multiple sessions to listen in and contribute to multiple sessions. Each person was given the opportunity to participate and share their perspectives and knowledge. The Jamestown sessions drew a number of questions related to the sustainability planning process, especially how people/industries, specifically the agricultural industry, might benefit from the Climate Pollution Reduction Grant process. There also were questions related to a slide depicting 2021 sources of greenhouse gases in North Dakota, a representation of data provided by EPA. NDDEQ Director Dave Glatt was on hand to field questions prior to diving into the listening portion of the forum. Participants came prepared to participate, having seen materials from previous presentations.

Further details of discussion topics follow. Online comments from the region, but submitted subsequent to the meeting dates, have been noted in *italicized type.* Please note that bullets contain verbatim comments from Comment Cards, although similar points may be combined if mentioned more than once.

1.1 BENEFITS

Question: What BENEFITS do you see for North Dakotans as greenhouse gas emissions are reduced?

Participants focused primarily on the economic potential new industry could provide the area including additional income from taxes and the possibility to draw younger residents. There was brief mention acknowledging the opportunity to be part of a global collective effort and changing the traditional mentality to one focused more on collective efforts.

Comments:

- Property tax incomes and increased property owner income from CO_2 pipelines
- Tax incentives for businesses
- Improved health
- Continual operation of ethanol plants
- Cleaner air
- Increased allure to new, younger residents
- Increased diversity of industry
- Monetary incentives
- Change in growing season
- Being part of a global effort
- New industries and markets
- Potential weather stabilization
- Redirection of funds away from more harmful practices
- Become a change leader
- *Decrease cost of insurance related to weather disasters*
- *Increased job opportunities*
- *Energy security- reduce reliance on foreign oil production providing protection against geopolitical instability*
- *Rural development with additional income opportunities*
- *Additional jobs*

1.2 DOWNSIDES

Question: What DOWNSIDES do you see for North Dakotans as greenhouse gas emissions are reduced?

Participants were heavily concerned with potential drawbacks of transitioning due to the upfront cost and potential shift in economic model. They were hesitant to embrace the potential loss of local control and saw potential infringement on personal rights and property.

Comments:

- Higher utility costs
- Increased taxation
- Increased regulation
- Political issues
- Cost of food grade CO2
- Additional competition for resources
- Cost vs benefit concerns
- We are alone in our efforts
- Loss of local control
- Infringement on personal property rights
- None
- Change of current economic model
- Risks associated with storage of carbon
- Potential green-washing
- *Reduction of energy efficiency*
- *"There are no downsides unless Republicans want to create them"*
- *Dry gas will be harder to control*

1.3 EXISTING EFFORTS

Question: What ALREADY is being done in North Dakota to reduce greenhouse gas emissions? Who is doing it?

Attendees focused primarily on current agricultural practices in place for minimizing environmental impacts and existing resources/funding for farmers/ranchers to optimize their production.

Comments:

- Drying coal before using
- Windfarms
- Plans for a water to fertilizer plant powered by wind
- Corn and soybean biofuel production
- Modern ag practices including no-till, cover crops and rotational grazing
- Electric car charging stations
- Hydroelectric power
- Red Trail and Project Tundra sequestration
- Capture of flare gas
- Improved rail access
- Soil and Water Outcomes Fund
- Electric vehicles and charging stations
- Land preservation/conservation efforts such as ND Game and Fish, USFWS
- *Businesses are reducing fuel use*
- *Minimize food waste*

- *Increased use of personal practices such as turning off lights, recycling and using less water*
- *Environmental monitoring/compliance checks*
- *Basin Electric is working on carbon capture*

1.4 POTENTIAL STATE INCENTIVES/SUPPORT

Question: In what ways would you want to see the state INCENTIVIZE, SUPPORT or just generally HELP with greenhouse gas reductions?

Education and advocacy is needed across industries and communities, said participants. Carbon capture and sequestration are done naturally through plants and is a low-cost, low-regulation solution if further incentivized.

Comments:

- Finance the conversion of wastewater gas to usable gas
- Provide data on infrastructure costs vs operational costs
- Advocate for grazing and cover crops as a form of carbon storage
- Incentivize urban planting and maintenance of trees and the use of trees for carbon sequestration
- Provide more educational opportunities
- Research CO2 contributions from traffic
- Begin a slow transition to renewable fuels
- Ensure markets are viable and ready for transitioning
- Invest in more biofuel production plants
- Improve existing infrastructure such as rails, highways and pipelines
- Provide grants for retrofitting/integrating energy efficient tools into new and old construction
- Expand NDDEQ air quality monitoring
- Work with municipalities to create local climate action plans
- Funding for a highspeed passenger rail
- Grants for undergraduate/graduate research
- Support for regional food production and processing
- Electric buses/public transportation
- Support cities who promote walkability/bike-ability
- *Focus more on plant sequestration of carbon*
- *Raise taxes on oil extraction*
- *Mandate advanced biofuel utilization*

1.5 OTHER

Question: Is there anything else you want us to know on this topic?

- After seeing a slide with a depiction of sources of greenhouse gas emissions in North Dakota, the request was made by a participant to remove the image of a cow as it overemphasized the role of cattle in the state's emissions.
- *How do we recycle Styrofoam coolers?*

2. DISCUSSION OF EXAMPLE GHG REDUCTION STRATEGIES

To bring the conversation to a more tactical level, a series of greenhouse gas emissions reductions examples were displayed on posters during each session for participants' reactions. It was noted

that these examples were not proposals, just examples of strategies that have been implemented in other communities.

In-person participants were given red and blue sticker-dots to place next to any example on which they had an opinion. Blue was used to indicate support of an example for use in North Dakota; red indicated that they did not support the example for North Dakota. Participants were also given post-it notes to add additional examples, suggestions or comments/questions.

Online participants received a link via the chat in Zoom to a Microsoft form with the same list of examples. They were given the option to click "support", "not support" or "skip" the question. They also were able to elaborate on their responses.

All participants were cautioned that this process was meant to gauge general support or opposition to the various examples, that they were not voting.

The following "word cloud" graphic depicts how often (larger letters = more dots) that examples were selected, and to what degree they were supported (blue) or not supported (red).

SUMMARY OF REACTIONS

Note: The larger the type, the more often a strategy received a dot during this activity in Jamestown.

Blue type = support. Red type = do not support.

In addition to placing red or blue dots on sample greenhouse gas emission reduction strategies posters, participants were invited to discuss the options and compare reactions to the sample strategies.

Strategy	Verbatim Comments
General	• It's just that everybody has a different set of definitions and metrics. • For customers to be able to trust sustainability information, it needs to stand up to questions, have a way to be verified. • It makes sense to incentivize early adopters with funding, but it has to be sustainable and have longevity built in. So it needs to have science behind it to make sure it accomplishes something. • As a young person, I have to live with the future we're starting to create now. I don't want to say no to all these strategies, but I don't want to rush into something either. So I'd pick the things that are supporting human infrastructure – governance institutions and new ways of organizing people for the world we live in. Because somebody 100 years ago decided to build a railroad here. • How about more direct roads? So you don't have to drive 80 miles to go 40. • I would like to see continued and expanded air quality monitoring by the NDDEQ. • There are interesting scientific questions that North Dakota could fund research about. Asking questions that matter and building consensus around the answers. • We need to know where we stand. • We don't have a passenger rail system that's efficient between Fargo, Jamestown, Bismarck and maybe even Montana. What we do have goes up to Grand Forks and Minot. Maybe high-speed rail?
Carbon Capture	• Of the toolbox, carbon capture is the one that gives me pause just because I feel like it has the potential spiral unregulated and cause some severe harm if not checked. • Carbon capture through farming and forestry are very different. • I would create a carbon bank (aggregator/connector) for the state, trading within the state first. • Take advantage of emerging carbon markets and carbon capture technology to close the loop on-site and between sites. There's a lot of discussion to be had here. We're producing CO2 here and it can be used in another process right next door. • Carbon capture is a very broad term. It could be closed-loop or regional. Anything that travels long distance makes me very nervous and it's not like an unfounded fear either. • Do it right. Don't just put it in the ground. For example, we need food-grade CO2 for tomato production.
Walking and Biking Paths	• There's momentum in Jamestown to find alternative ways to transport yourself across town. It's more about community well-being and when it brings them closer to nature maybe they think twice about supporting something that supports nature. • Support cities for more walkability and viability. We have bits and pieces in some cities, some are doing great. And there are good programs out there if you're under populations of less than 10,000 or over 50,000. But many of our communities cannot qualify.
Renewables Permitting	• Sometimes when you streamline something, it gets done before everyone looks at it.

EVs and Charging	• What are you filling that battery with? Is it wind power, solar power, coal power? Is it really going to be reducing your greenhouse gas emissions that way?
Alternative Fuels Equipment	• You don't need to fund different equipment because you can use them both already.
Economic Development	• We can lean into our agricultural heritage to bring in outside dollars from tourism. When people visit here, they can see how we leapfrog other states. • I'm for something that's going to benefit agriculture, especially if they're doing something right. But it doesn't really scream "greenhouse gas reduction" to me. • Food-grade CO2 often is in shortage for some facilities; can't we figure out how to meet those needs with what we have in other places? • There are so many unpredictable things in agriculture – weather, fertilizer, etc. If we create markets here, we can be more sustainable and more stable. It might take investment in the short-term, but buffer against costs in spikes in the future. • Increasing CSA, farm-to-table, and other regional food opportunities does have a connection to potentially reducing emissions, but it takes a lot of people doing that. • Let's get charging stations into our downtowns, not just along the freeways.
Freight Efficiency	• If you want to solve or make a big impact on reductions in carbon and gases, focus on commodity transportation. Figure out how to better get our products to the market. • I think we've got economic development operations in most communities in North Dakota and they're doing a pretty good job. I gave it a red dot here. • One thing that could reduce carbon is getting more of our products to market by rail. That would benefit industry and everybody.
Natural Fertilizers	• If you can't define natural and get everybody to believe that, you've got a challenge. • Wastewater Facility Efficiency • Wastewater treatment plans are falling or will fall soon. And when we rebuild them, can we do it in a new way? • The wastewater treatment facility in Jamestown is right next to a gas pipeline. So if emissions could be cleaned up, they could be put right in the pipeline. • We need food-grade CO2 for water treatment plants, but we have to get it elsewhere. • It seems like we're close to capturing CO2 from the potato plant, but they're still having to flare. Work has been done to figure out how to clean it and put it directly into the nearby pipeline. We need to get past the final questions and barriers, risks.
Financing Programs	• Millions of dollars don't go a long way in building a processing plant or a crushing facility or whatever, but maybe it buys the interest on a low-interest loan.
Renewable Energy	• There are only a few places in the country that produce renewable diesel, and North Dakota should be one of them. • Big apartment buildings are heated with fuel oil. Bio heat would lead to a huge, immediate reduction in emissions. • Our peak demand is in the winter at night. Well, solar doesn't do much then.
Conservation Practices	• Crop insurance deadlines don't work with planting of cover crops. We don't have time to get a winter crop established in the ground before winter happens. • Our county has not been able to hire a GIS person and we need one. Anything we can do to connect people to the environment and to readily available information would help us to make better decisions and make them faster.

Anaerobic Digesters	• California has made them work well, but the scale here is very different. We don't have any of those really huge dairy herds. But it could be applied to the food waste business.
Low/No Carbon Fuels	• I'm hoping that hydrogen fuels technology improves so we might get it here. Perhaps North Dakota should put some research into being one of the first states to have hydrogen-fueled cars. • We need to advance the capture of methane and flaring in the western part of the state. When I ride my bike out there, I can feel the heat from every one of those flares and they're not even close to the road. You know there's tremendous amount of energy being lost.
Waste Reduction and Elimination	• Start a site where windmill blades could be recycled.

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- **Freight Efficiency** - Increasing efficiency in freight movement.

Sustainability Input Forums

Input received in Minot, ND

PREPARED FOR

NORTH Dakota Be Legendary. | Environmental Quality

DATE

December 2023

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NDDEQ's goals for the forums were two-fold: 1) hear what North Dakotans are thinking and doing related to reducing greenhouse gas emissions, and 2) fuel conversation and connection between diverse stakeholders. To this end, conversations were held in a circle and lightly facilitated around a handful of core questions, as outlined in the following sections. Each session generated at least two hours of interaction, with comments provided by participants in the form of verbal feedback, comment cards, and online polls and chats.

Hosts for the Minot forums were Ann Fritz, NDDEQ, Presenter; Allison Ahcan, ERM, Facilitator; Isabella Binger, ERM, Online Facilitator.

Attendees of these sessions, including online participants, offered an array of backgrounds. Individuals attending had experience within the public service, agricultural organizations, cattle organizations, and community sustainability. Additional attendees included interested community members with no formal associations, but affinity for Minot, the state, and quality of life. The first session of the day had no participants, so hosts took advantage of the opportunity to record the introductory presentation for future uses. A total of 21 Minot-area residents provided input.

1. CONVERSATION SUMMARIES

The overall tone of Minot's two conversations was productive and passionate, as many individuals were wary about how the state plans to implement Climate Pollution Reduction Grant (CPRG) funding. There was specific interest within each of the groups specifically related to actions in Minot, and how the city exemplifies what local measures could be supported through additional funding and support. Additional interests included harsher restrictions on polluters and making sure that responsibility in reducing greenhouse gas emissions was a statewide effort as opposed to the responsibility of specific groups. Many individuals were excited by the idea of CPRG and how it could propel innovation and economic opportunity; a common suggestion was to utilize the various universities as research hubs.

1.1 BENEFITS

Question: What BENEFITS do you see for North Dakotans as greenhouse gas emissions are reduced?

Participants commented on local, state, federal, and global benefits related to greenhouse gas emissions reductions. Specifically, they were quick to point out that decreases in emissions can not only result in quality-of-life improvements in North Dakota, but the entire Midwest as well. Other common conversation topics included less dependence on fossil fuels, introduction of new industries to the state, and increases in innovation resulting in federal funding.

Comments:

- Federal funding and support
- Less produced water and oil spills
- Better soil with land management changes (better yields)
- More equitable quality of life
- Maintain wild spaces in North Dakota and preserving badlands/prairies
- Decrease cost to combat effects of climate change
- Making all citizens of North Dakota responsible
- Better air quality
- Bringing more workers to North Dakota
- More regular growing seasons
- Less health issues
- Global stability
- Save our natural land from oil developments
- New economies around renewable energy
- Clean water
- Less dependence on oil and gas companies
- Innovation in industry
- *New job creation using clean technology*
- *Decrease in dependence on foreign oil*

1.2 DOWNSIDES

Question: What DOWNSIDES do you see for North Dakotans as greenhouse gas emissions are reduced?

This portion of the conversation heavily focused on economic challenges. Within both online and in-person conversations, the was an emphasis on how oil tax revenue will decrease if the state

moves away from fossil fuels resulting loss of workforce and how political backlash may occur due to change. Additional comments included concern about how productivity will change if more restrictions are put in place.

Comments:

- Financially damaging to the current mode of operation for the coal and gas industry (local and state revenue)
- Impact to gas sales tax revenue as vehicles move to electric
- Reduction in personal travel independence as Electric Vehicles (EVs) don't have the ability to travel long distances yet
- Controversial
- Increased expenses and regulations that cost money or decrease productivity
- Contributor calling out the other to place blame
- Educating the public
- People may move away to find opportunities
- Change is difficult
- Coal/oil towns will struggle
- Political backlash
- *Individuals will need job trainings for new industries*
- *Loss of jobs*
- *Limits or changes to farming practices*
- *Visual pollution from wind turbines and their short lifespan requires regular maintenance*

1.3 EXISTING EFFORTS

Question: What ALREADY is being done in North Dakota to reduce greenhouse gas emissions? Who is doing it?

Both in-person and online participants shared specific examples as to what is already being done in North Dakota to reduce greenhouse gas emissions, many of which were located directly in Minot. Residents were proud of the community programs and efforts such as 1000 Trees for Minot, local prairie restorations, Minot Pollinator Project, local recycling programs, and individual investments in renewable technologies. This conversation focused heavily on the local area, as many individuals voiced that state investments are usually focused on Bismarck and Fargo.

Comments:

- Increased use of cover crops/ no-till farming
- Family farms/local food production
- Prairie restorations in Minot (Ramstad, Minot Air Force Base (MAFB))
- 1000 Trees for Minot
- Carbon capture in oil/gas
- EV implementation
- Waste management
- Oil well flaring regulations
- Renewable regenerative fuels
- Rotational grazing systems
- Minot Pollinator Project
- Minot Recycling
- Commitment to be carbon neutral by 2030
- City compost bins
- Minot bike lanes
- Kiss the Ground Movie screening

- Project at Minot State University (MSU) for prairie restoration
- Research center in Mandan
- Net metering
- Carol Davis at Turtle Mountain Water Keepers
- Keller Paving solar panels on buildings
- There are state programs for energy efficiency upgrades (Rural Economic Area Partnership Program (REAP) and Low-Income Home Energy Assistance Program (LI-HEAP))
- New solar installation for research within agriculture in ND
- New local food hub potentially coming to Minot
- Standing Rock standing against Dakota Access Pipeline (DAPL)
- *Wind and solar farm developments*
- *Geothermal heating*
- *Small-scale efforts to store CO2 underground*
- *Investment into new technologies*

1.4 POTENTIAL STATE INCENTIVES/SUPPORT

Question: In what ways would you want to see the state INCENTIVIZE, SUPPORT or just generally HELP with greenhouse gas reductions?

Participants strongly emphasized that individuals would like to see harsher restrictions and enforcements to keep polluters accountable to regulations. Other topics included support for local initiatives from the state and utilizing institutions for climate research. They also requested that information and resources should be easily accessible to constituents and that barriers to receive state funding/incentives should be eased.

Comments:

- Engage with individuals, organizations, and industries
- Address issues at the local level
- Support municipal compost efforts
- Actively restore prairie
- Tougher enforcement of flaring
- Cap open frack wells
- Partner funding to electrify local bus and municipal fleets
- Create an energy efficiency county position
- Partner funding to install solar on municipal/ public entity buildings
- Increase use of regenerative fuels
- Create a knowledge base of carbon sequestration
- Utilize North Dakota State University (NDSU) and other institutions for research, especially on quantifying carbon sequestration
- Audubon Dakota, Ducks Unlimited, Pheasants Forever, Delta Waterfront, North Dakota Natural Resource Trust all have created programs to help incentivize conservation practices for agricultural interests
- Utilize federal money in local communities
- Promote no-till/low-till farming and education about sustainable farming practices
- Transparency around funding and campaign contributions
- Offer education/info about energy efficiency
- Use research-based decisions for best environmental outcomes
- Invest in renewable energy
- Keep oil companies accountable using more enforcement
- Offer state grant for churches/nonprofits for solar on roofs and energy efficiency
- Transparency in reporting of emissions from the coal plants and industry
- Incentivize solar and wind including heat pumps for homes

- Direct education from climate scientists research at universities
- Job trainings
- Food waste reduction programs
- Increase accessibility to information (multiple languages, online and in-person resources, etc.)
- Policy changes at the local and state levels
- Greener building codes
- *Create a dedicated Sustainability division housed within the NDDEQ*
- *Tax incentives for EVs and hybrid vehicles*
- *Utilization of CO2 capturing bricks in North Dakota*
- *Graphyte (Breakthrough Energy Ventures carbon-laden plant matter blocks)*
- *Change farm subsidy laws*
- *Tax incentives for recycling*

1.5 OTHER

Question: Is there anything else you want us to know on this topic?

- Both in-person and online participants expressed the idea that more individuals should be involved in this conversation.
- Better outreach to individuals instead of organizations/industries at large,
- Educational sessions for interested parties, and
- Demonstrations to show how ideas from the Sustainability Plan should be implemented.
- Establish a Green Step program like Minnesota
- More environmental education
- Dakota Legacy Initiative
- Renewable energy/sustainability work training
- Incentivize prairie land restoration
- Increase regulations and enforcement on polluters
- Put solar on roofs, schools, city buildings
- Invest in train system upgrades
- Make the connection easier for people to apply and receive grants
- Connect with more individuals throughout the CPRG process
- *Enforce clean water laws on farms*
- *Include all age groups within this conversation*
- *Emphasize local improvements rather than statewide improvements*
- *Reduce political alignments in the oil and gas industry*

2. DISCUSSION OF EXAMPLE GHG REDUCTION STRATEGIES

To bring the conversation to a more tactical level, a series of greenhouse gas emissions reductions examples were displayed on posters during each session for participants' reactions. It was noted that these examples were not proposals, just examples of strategies that have been implemented in other communities.

In-person participants were given red and blue sticker-dots to place next to any example on which they had an opinion. Blue was used to indicate support of an example for use in North Dakota; red indicated that they did not support the example for North Dakota. Participants were also given post-it notes to add additional examples, suggestions or comments/questions.

Online participants received a link via the chat in Zoom to a Microsoft form with the same list of examples. They were given the option to click "support", "not support" or "skip" the question. They also were able to elaborate on their responses.

All participants were cautioned that this process was meant to gauge general support or opposition to the various examples, that they were not voting.

The following "word cloud" graphic depicts how often (larger letters = more dots) that examples were selected, and to what degree they were supported (blue) or not supported (red).

SUMMARY OF REACTIONS

Note: The larger the type, the more often a strategy received a dot during this activity in Minot.

Blue type = support. Red type = do not support.

In addition to placing red or blue dots on sample greenhouse gas emission reduction strategies posters, participants were invited to discuss the options and compare reactions to the sample strategies.

Strategy	Verbatim Comments
General	• Go big on things that are already there on solutions that support family farms and support small towns. There is a tendency to look for new solutions and concepts. G • I hope we invest where we got our start, with agriculture. And get into different corners of the state that don't often get much attention. • Mycology is science involving mushrooms, which has the ability to break down carbons into neutral, non-toxic molecules.
Financing Programs	• I think financing programs are very important. Our state gives away millions of dollars to other industries and renewables should be included in that.
Carbon Capture	• I'd give a blue dot if carbon was stored at a a source's facility, not if it's moved across somebody else's land • It basically creates another problem that needs to be addressed, rather than just addressing the issue head-on. • People are not in favor of a CO2 pipeline, because of the risks from a release in a low-lying area.
Energy Efficiency	• Grants of low interest loans for energy efficiency and renewable energy installations.
Walking and Biking Paths	• From a road-building perspective, when paths are built with roads it adds cost, requires easements, and there are additional safety issues with crossings. Is this where you're going to get your biggest return in the context of greenhouse gas emissions?
Conservation Practices	• Are conservation practices universally understood?
Low/No Carbon Fuels	• I remember in the late nineties, when ethanol was hailed as a replacement for gasoline. That it's green and good for everybody. But now we know ethanol produces just as much of our CO2 emissions as gasoline. It's an example of how we need to address the issues head-on.
Anaerobic Digesters	• We don't have large animal feeding facilities that would justify building a digester.

3. WAYS TO ENGAGE

Sustainability Input Forums and the corresponding online survey were the first in a series of engagement opportunities led by North Dakota Department of Environmental Quality in support of long-term sustainability planning and North Dakota's collective greenhouse gas emissions reductions work.

Video recordings, reports, notices of future engagement opportunities, and additional methods to provide feedback may be found at the NDDEQ website: https://deq.nd.gov/sustainability/

For additional information, contact Jennifer Skjod, NDDEQ Public Information Officer, via email at jskjod@nd.gov

Thank you to those who shared their passions and wisdom as part of this conversation.

APPENDIX - EXAMPLE STRATEGIES

The following examples were provided as examples of greenhouse gas emission reduction strategies being implemented in U.S. communities. These examples were provided by ERM to generate discussion and reaction during North Dakota Sustainability Input Forums. Please note that these were not provided as proposals, nor were participants asked to rank or vote on them.

Energy Implementation and Development

- **Renewable Energy** - Incentives for installing renewable energy and energy storage systems on commercial properties
- **Energy Efficiency** - Incentives for installing end-use energy efficiency measures in commercial and residential buildings
- **Financing Programs** - Establish a financing program (e.g., grants or low-interest loans) for energy efficiency and renewable energy installations in new and existing buildings
- **Electric Vehicles and Charging** - Incentives to increase the share of electric vehicles (e.g., leasing and purchasing), and to expand electric vehicle charging infrastructure
- **Carbon Capture** - Programs to support or incentivize carbon capture, utilization, and storage (CCUS) at industrial and energy facilities
- **Industrial Efficiency** - Programs to support or incentivize implementation of energy efficiency measures in industry, including energy audits, strategic energy management, equipment upgrades, and waste heat utilization
- **Low/No Carbon Fuels** - Programs to support or incentivize greenhouse gas emission reductions in industrial energy use and industrial processes, including use of low/no carbon fuels, electrification, renewable energy, and process improvements
- **Low-Carbon Materials** - Programs to develop, expand, and support markets for low-embodied carbon materials and products, such as cement and steel
- **Renewables Permitting** - Streamline permitting for renewable energy projects
- **Waste Stream Reduction -** Increase the efficiency or effectiveness of waste reduction, reuse, recycling, or composting programs. Reducing the amount of materials entering landfills.
- **Wastewater Facility Efficiency** - Incentives for installing renewable energy and energy efficiency measures at wastewater treatment facilities
- **Reducing Landfill Emissions** - Incentives to reduce methane emissions from landfills and wastewater treatment facilities, including through collection for use

Agriculture

- **Anerobic Digesters** - Incentives to promote anaerobic digesters to capture methane and generate renewable energy or produce renewable fuel
- **Alternative Fuels Equipment** - Incentive programs to fund agricultural equipment technologies that use alternative fuels
- **Fertilizer Application Practices** - Incentives for technologies and techniques that reduce nitrous oxide emissions from fertilizer application such as precision agriculture practices
- **Using Natural Fertilizers –** Reinforcing soil health with the life cycle of the animal

- **Conservation Practices** - Implement programs that support best practices in agricultural conservation to help protect soil health, including cover crops, no-till, other runoff reduction techniques
- **Economic Development** - Programs for local and regional economic development partners to establish food- and agriculture-based economic development strategies, such as community-based food co-ops

Community, Public Service and Government

- **Solar Energy** - Increase access and funding for solar panels on your home or businesses in your community
- **Energy Efficiency** - Funding for increasing energy efficiency in your home or businesses in your community, including proper insulation
- **Electric Vehicles and Charging** - Increasing electric vehicle charging stations in your community
- **Sustainable Building Materials** - Utilizing sustainable building materials for your local buildings
- **Public Transportation** - Increasing the availability and access to public transportation in your community
- **Walking and Biking Paths** - Additional walking and biking paths in your community
- **Energy Storage** - Funding for battery technology to store solar energy at commercial businesses
- **Waste Reduction and Elimination Strategies** - Providing residential recycling and composting service
- **Freight Efficiency** - Increasing efficiency in freight movement.

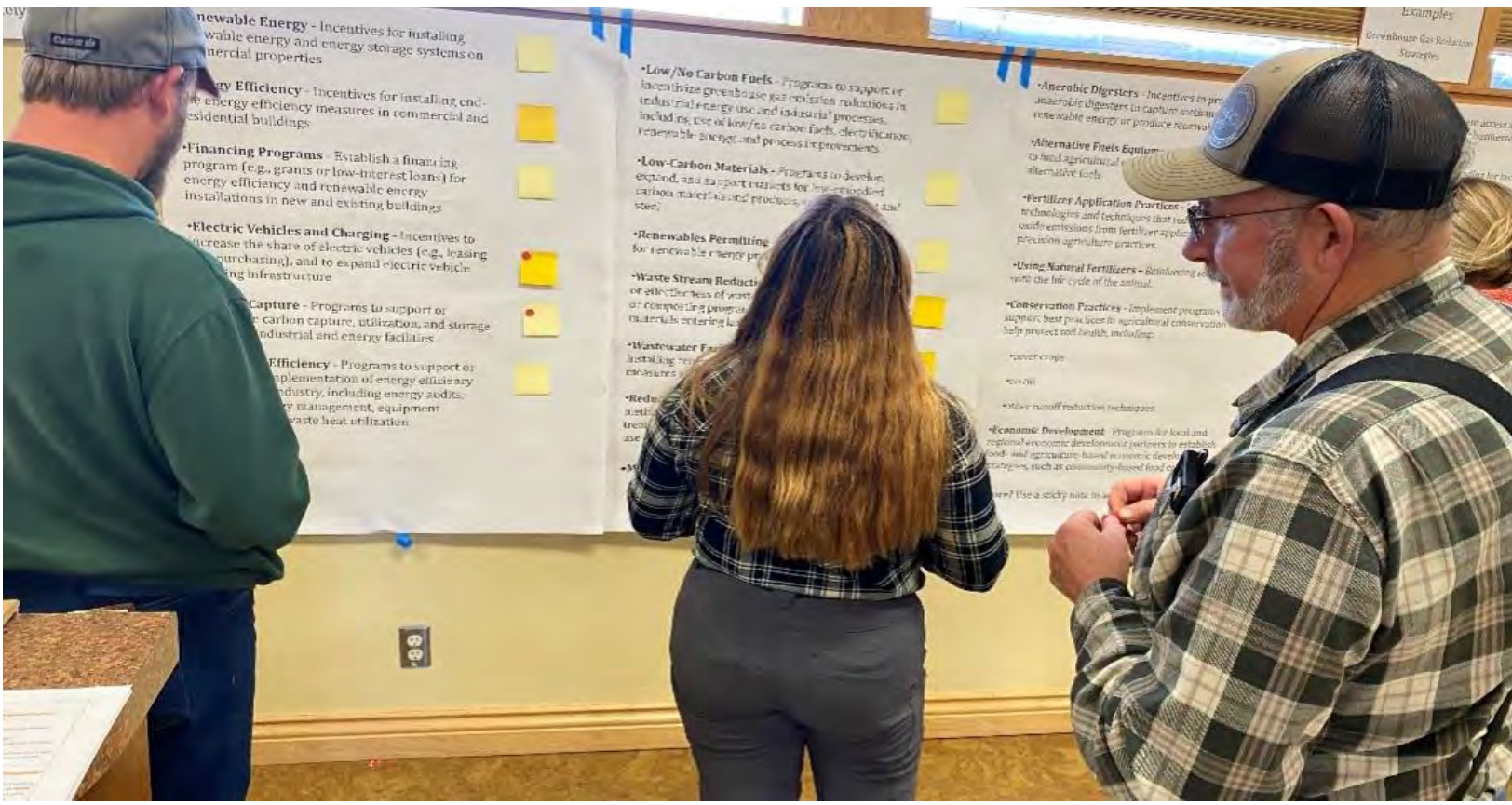
Sustainability Input Forums

Input received in Williston, ND

PREPARED FOR

North Dakota Be Legendary. | Environmental Quality

DATE
December 2023



EXECUTIVE SUMMARY

North Dakotans of all backgrounds were invited to come together to share innovative ideas, knowledge, and perceptions related to reducing greenhouse gas emissions during the state's Sustainability Input Forums held from October 31 through November 8, 2023, in eight locations around the state. In addition, more than 100 people shared their thoughts via an online survey through December 5, 2023.

Input received through this process will assist North Dakota in forming the basis for sustainability planning and actions in 2024 and for years to come. Information gathered will be used to inform the state's participation in U.S. Environmental Protection Agency's (EPA) Climate Pollution Reduction Grant (CPRG) program. North Dakota's Sustainability Input Forums are supported with a CPRG planning grant.

This report summarizes input received through conversations held in-person and online during three sessions in Williston. Subsequent input received through the online comment form are italicized and attributed to this report based on ZIP codes indicated.

CONTEXT

The North Dakota Sustainability Input Forums were open public meetings that were organized to be conversational and informal. The role of the North Dakota Department of Environmental Quality (NDDEQ) was to host and to listen, with the assistance of an independent facilitator.

NDDEQ's goals for the forums were two-fold: 1) hear what North Dakotans are thinking and doing related to reducing greenhouse gas emissions, and 2) fuel conversation and connection between diverse stakeholders. To this end, conversations were held in circle and lightly facilitated around a handful of core questions, as outlined in the following sections. Each session generated at least two hours of interaction, with comments provided by participants in the form of verbal feedback, comment cards, and online polls and chats.

The Williston sessions were hosted at the James Memorial Art Center by: Jennifer Skjod, NDDEQ, Presenter; Allison Ahcan, ERM, Discussion Facilitator; and Isabella Binger, ERM, Online Facilitator.

Attendees of Williston's sessions, including online participants, offered an array of backgrounds. Individuals attending had experience within the renewable energy industry, agriculture industry, cattle industry, public service, government, and education. All were engaged residents of the area. A total of 14 people from the Williston area provided input.

1. CONVERSATION SUMMARIES

Discussions held during the three sessions in Williston proved productive and insightful. Ever-present in the conversations were unique environmental and community challenges that came with the Bakken oil boom and sudden population growth. At the western edge of the state, Williston leaders often are left to resolve issues through home-grown leadership, and they said they place high priority on practical solutions that make sense to the community/area. There was shared interest in information-sharing throughout the Sustainability Plan development, especially related to the Climate Pollution Reduction Grant funding process. Educational initiatives that are collaborative and inclusive, involving people statewide, will expedite progress in implementing measures to reduce greenhouse gas emissions. Furthermore, it was proposed that incentives for such measures should be easily accessible and non-restrictive to individuals and organizations, rewarding both current and past adopters of sustainable practices.

Further details of discussion topics follow. Online comments from the region, but submitted subsequent to the meeting dates, have been noted in *italicized type.* Please note that bullets contain verbatim comments from Comment Cards, although similar points may be combined if mentioned more than once.

1.1 BENEFITS

Question: What BENEFITS do you see for North Dakotans as greenhouse gas emissions are reduced?

Participants noted that reducing greenhouse gas emissions will bring greater stability to the state. Improvements in technologies and processes boost agricultural and oil/gas profitability in North Dakota through increased yields and reduced input costs. This not only stabilizes the economy but also promotes healthier landscapes and mitigates global warming impacts. Additionally, collaboration across industries fosters unity and new opportunities, generating jobs and benefits for landowners.

Comments:

- Improvements in soil health lead to improved ag profitability due to better yields, better resilience, and reduced input costs
- Healthier landscapes
- Improvements in health
- A more stable environment resulting in a more stable economy
- Reduction in global warming impacts
- Collaboration across industries
- New industry opportunities bringing jobs, tax revenue, and landowner benefits
- An expansion of North Dakota's identity
- More federal funding
- Less defensive measures, more proactive approaches
- Innovation in industry
- Promotion of North Dakota as national/global player
- *Reduction in energy expenses for businesses, farms, and homeowners*
- *Many businesses have pledged to reduce greenhouse gas emissions and chose to locate their data centers where energy is produced with lower emissions*

1.2 DOWNSIDES

Question: What DOWNSIDES do you see for North Dakotans as greenhouse gas emissions are reduced?

This segment of the discussion highlighted worries about the potential trade-off between long-term benefits and short-term impacts. Specifically, the conversation addressed how restrictions and mandates, while beneficial for long-term greenhouse gas reductions, could lead to an immediate economic downturn as markets adjust to change. Concerns were also raised about the potential favoring of large corporations by these restrictions. If carbon offsets are selected as a CPRG implementation measure, there is apprehension that companies might exploit them to limit actual emission reductions at home.

Comments:

- Reduced agricultural production (i.e., crop response to higher CO_2 levels)
- Carbon offsets (i.e., North Dakota reduces emissions, but big corporations take advantage of it to offset their emissions)
- More mandates/restrictions
- Reducing GHG could cause a swing towards over regulation resulting in harm to industries that are beneficial to North Dakota
- Economic downturn
- Long-term benefits, but at the expense of a short-term downturn
- Changes in lifestyle
- Confusion around net vs total emissions
- Money funded by government
- Loss of workforce/jobs
- If cattle grazing is removed, this will destroy our native rangeland
- Long term impacts and the uncertainty that creates
- Creation of new goals, who decides and how far do we take it
- Who will regulate reduction measures
- What happens to those not pulling their weight
- *Public Opposition*
- *Upfront economic costs of transitioning towards new practices*

1.3 EXISTING EFFORTS

Question: What ALREADY is being done in North Dakota to reduce greenhouse gas emissions? Who is doing it?

Participants noted that substantial efforts are being made by North Dakotans in contributing to the reduction of greenhouse gas emissions and need to be highlighted. These efforts have not only resulted in increased production but have also contributed to additional reductions in greenhouse gases. Notably, in the agricultural sector, improvements have been made throughout the farming process, spanning from equipment to soil management, aimed at reducing emissions. This valuable information is disseminated within the community through shop talks organized by farmers across the state and local areas. Additionally, there is a growing willingness to embrace renewable energy sources in the state's energy portfolio, opening doors to new opportunities and fostering industry expansion.

Comments:

- Agriculture practices that protect soil, improve soil organic matter, and soil health
- Coal-fired generating plants have taken steps to reduce emissions
- No-till farming and cover crops
- Equipment that is being regulated to be more environmentally friendly
- Carbon capture in soil
- Conservation programs
- Introduction of Kernza grain (perennial agriculture)
- Improved grazing management by ranchers
- Seeding cropland back to grass for grazing production
- Leadership in communities to understand the task at hand and benefits
- ND investing in a team to explore CPRG
- Wind energy expansion
- Blue Flint aggregating at facilities
- Change in regulation/legislation/politician's perspectives
- *Natural Resources Conservation Service (NRCS) and Soil Conservation District (SCD) led conservation efforts*
- *Richardton Ethanol plant with CO2 storage on-site*
- *Carbon Capture and Sequestration (CCS) efforts with Project Tundra*
- *University of North Dakota research on CCS and deep geothermal electricity production*
- *Dr. Rebecca Phillips of Ecological Insights is researching natural carbon sequestration in grassland when coupled with managed cattle grazing*
- *Summit Carbon Solutions is working within North Dakota and surrounding states to capture carbon from ethanol production and sequester it in North Dakota*

1.4 POTENTIAL STATE INCENTIVES/SUPPORT

Question: In what ways would you want to see the state INCENTIVIZE, SUPPORT or just generally HELP with greenhouse gas reductions?

Both in-person and online comments show strong favor for using CRPG funding to increase education opportunities. In both the agriculture and energy sector, individuals shared examples of ways in which education and mentoring can be utilized to further industry knowledge and share best practices. Examples of this include on-farm demonstrations and educational opportunities to understand the benefits of renewable energy in North Dakota. Additionally, individuals emphasized that incentives from funding should be available to those who have already invested in the suggested strategies. Other suggestions included investing in more transmission lines and improving permitting processes for renewable energy operations.

Comments:

- Support educational events to keep producers informed on latest research findings that promote soil health and hear from other producers who have seen benefits form changes
- Support on-farm demonstration projects/programs that improve soil health and reduce emissions
- Cost share for farmers to adopt some of these practices
- Demonstration farms to display these successful practices
- Make climate data publicly available in a way that is engaging and easy to understand
- Don't limit incentives to new adopters
- Reward producers for what they are already doing
- Invest in infrastructure - transmission lines
- Smart policy to support renewables

- Streamline permitting processes
- *Provide larger grants for projects and conservation practices*
- *Prioritize sustainable and high-density development*
- *Preserve natural habitat*
- *Higher regulation of oil and gas development/operations*
- *Revise building code standards to have higher insulation standards and provide incentives to do so on existing structures*
- *Modernize construction trades' educational programs to encompass sustainable building practices*
- *Electricity codes including at minimum one charging port for electric vehicles (EVs)*
- *Create sustainability continuing education units (CEUs) for contractor licensing requirements*
- *Incentivize solar panels on roofs of businesses*
- *Outline transition from coal to natural gas, to an eventual phase out of most fossil fuels over the next 50 years*
- *Expand incentives for geothermal energy*
- *Rebuild electric energy system as a distributed system, to allow small solar farms and home/business solar installs to easily share with the grid*
- *Include greenhouse gas reduction as a criterion when selecting where state funding goes*
- *Provide resources and information on energy reduction measures*

1.5 OTHER

Question: Is there anything else you want us to know on this topic?

- As development increases due to the recent Bakken boom, there has been a new need to address community issues. Prioritizing public health has become essential due to emissions from recent oil operations, particularly emissions and flaring from oil wells
- The local hospital is facing capacity limitations in dealing with the consequences of tremendous population growth
- There have been incremental steps toward enhancing sustainable practices, including the addition of bike lanes through downtown for residents. However, there is recognition that there are still areas in need of improvement, such as strengthening recycling practices and addressing landfill emission concerns
- *Gov. Burgum has attempted to include CCS vis the Summit pipeline. This will not work as the only way to make ND carbon neutral is to reduce GHG emissions or capturing CO2 in soil and trees within the state*
- *The State of North Dakota should be implementing sustainability practices on buildings, travel, etc. Funded by state and local government*

2. DISCUSSION OF EXAMPLE GHG REDUCTION STRATEGIES

To bring the conversation to a more tactical level, a series of greenhouse gas emissions reductions examples were displayed on posters during each session for participants' reactions. It was noted that these examples were not proposals, just examples of strategies that have been implemented in other communities.

In-person participants were given red and blue sticker-dots to place next to any example on which they had an opinion. Blue was used to indicate support of an example for use in North Dakota; red indicated that they did not support the example for North Dakota. Participants were also given post-it notes to add additional examples, suggestions or comments/questions.

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SUMMARY OF REACTIONS

Note: The larger the type, the more often a strategy received a dot during this activity in Williston.

Blue type = support. Red type = do not support.

In addition to placing red or blue dots on sample greenhouse gas emission reduction strategies posters, participants were invited to discuss the options and compare reactions to the sample strategies.

Strategy	Verbatim Comments
Electric Vehicles and Charging	• Electric vehicles are an interesting concept. Does it work out here? I'm still not a hundred percent committed. We're miles and miles separated from towns and then the amount of time it takes to charge a vehicle. • EVs are very expensive. And they allow those who have them to think they don't need to do anything more. • You're going to have to convince me this is a good idea, especially given winters. • We don't have time to sit and wait for our cars to charge. Out here we're swinging hammers and we're twisting wrenches and that kind of stuff.
Renewable Energy	• I believe solar should be on people's houses and not on big farms because of land impact, blanketing of the land and habitat. • Battery storage is worth looking at, if you could do something about recycling. • We need to make things like solar panels here, not China. Let's get down and figure out where the lithium is so we're not dependent on big deals with the rest of the world. • At the same time, oil and gas drilling is making technological advances.
Carbon Capture	• This is expensive to build. And with that money you could actually just stop the emissions. • What we can do right now is to capture carbon, put it underground, and make sure that what we're doing is not going to cause too much more harm than what's already there.
Public Transportation	• We don't even have enough workforce for school buses, much less public transportation.
Walking and Biking Trails	• Will this reduce greenhouse gas emissions?
Waste Stream Reductions	• Recycling is not a money-making deal. It's very hard to attract recycling organizations in this state • Nobody wants a landfill in their backyard. On-site composting is a great thing. • I can't tell you where they recycle plastics anymore.
Conservation Practices	• There needs to be more education, including demonstrating conservation practices. • There are differences from the west to east side of the state. People from the east still are debating if no-till works. In the west, we are talking about what's next; where do we go from here? Maybe one size doesn't fit all. • Farmers really learn best when they can get out and see what others are doing. For example, soil health workshops.
Anaerobic Digesters	• I'm not sure we want to put a lot of time and effort into it because we don't have a lot of big feedlot type operations in this area. Something that might be more beneficial would be looking at backyard composting. • You have to have such a large production in order to make it work.
Energy Efficiency	• Put resources where there actual improvements. For example, insulation, which I've heard is one of the biggest, most beneficial conservation measures. • General incentives and efficiency standards are great if it's for construction. Be proactive, not reactive.

	• When we have had storm damage or sudden growth, we had out-of-state contractors fly in to fix or put up new construction. But many weren't constructed for the north and not insulated properly.
Renewables Permitting	• I'm a little concerned about climate crisis on one hand and land use on the other hand. With streamlined permitting, things can get overlooked. • There's always the risk that streamlining goes too far.
Natural Fertilizers	• On a smaller scale, that's fine. And they already do that, but still to think you are going to capture enough fertilizer to sustain a farming operation is unrealistic.
General	• We need to tell our story. • Funding and economic benefit are always the number-one thing that gets people to enter spaces that might not naturally love renewables. When we are able to demonstrate the financial impact for our communities, that can be the tipping point. • Other countries need to realize that we're serious about what we're doing over here, and they'd better get serious about what they're doing over there. We need stronger alliances to build things here.

3. WAYS TO ENGAGE

Sustainability Input Forums and the corresponding online survey were the first in a series of engagement opportunities led by North Dakota Department of Environmental Quality in support of long-term sustainability planning and North Dakota's collective greenhouse gas emissions reductions work.

Video recordings, reports, notices of future engagement opportunities, and additional methods to provide feedback may be found at the NDDEQ website: https://deq.nd.gov/sustainability/

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Thank you to those who shared their passions and wisdom as part of this conversation.

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The following examples were provided as examples of greenhouse gas emission reduction strategies being implemented in U.S. communities. These examples were provided by ERM to generate discussion and reaction during North Dakota Sustainability Input Forums. Please note that these were not provided as proposals, nor were participants asked to rank or vote on them.

Energy Implementation and Development

- **Renewable Energy** - Incentives for installing renewable energy and energy storage systems on commercial properties
- **Energy Efficiency** - Incentives for installing end-use energy efficiency measures in commercial and residential buildings
- **Financing Programs** - Establish a financing program (e.g., grants or low-interest loans) for energy efficiency and renewable energy installations in new and existing buildings
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Agriculture

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- **Freight Efficiency** - Increasing efficiency in freight movement.

APPENDIX C SUSTAINABILITY INPUT FORUMS – ROUND TWO SUMMARY REPORT

Sustainability Input Forums

Round 2 Summary Report

PREPARED FOR

NORTH Dakota | Environmental Quality
Be Legendary.

DATE
February 2024

CONTENTS

LIST OF TABLES

North Dakota Department of Environmental Quality (NDDEQ) is leading the state's planning process to meet North Dakota's goals of creating vibrant economies and finding innovative ways to reduce greenhouse gas (GHG) emissions into the atmosphere. Input received through an extensive stakeholder engagement process will assist North Dakota in forming the basis for sustainability planning and actions in 2024 and for years to come, including the state's participation in U.S. Environmental Protection Agency's (EPA) Climate Pollution Reduction Grant (CPRG) program.

This report summarizes processes and learnings from the Round Two Online Sustainability Input Forums that were comprised of three online meetings held from January 9 to January 11, 2024, and a corresponding online survey was available to the public online from January 9 to January 19, 2024.

1. BACKGROUND

North Dakota was awarded a planning grant through EPA's Climate Pollution Reduction Grant (CPRG) program to develop a plan that identifies innovative strategies to build a sustainable future and transform energy economies in the state. As part of this planning grant, NDDEQ is collaborating with North Dakotans to ensure the state's plan reflects communities' needs and is supportive of local planning efforts. The CPRG program requires NDDEQ to submit a Priority Climate Action Plan (PCAP), a short-term plan with implementation-ready strategies to reduce GHG emissions, by March 1, 2024. Following the PCAP, NDDEQ will develop a Comprehensive Climate Action Plan (CCAP), a long-term plan with a more comprehensive set of strategies to reduce GHG emissions, due to EPA by fall 2025. To inform this planning process, NDDEQ is focused on collecting North Dakotans' ideas to develop the state's PCAP and capturing long-term planning ideas to inform NDDEQ's future CCAP planning process.

NDDEQ gathered North Dakotans' ideas through a variety of engagements:

- Round One Sustainability Input Forums – Three forums in each of eight communities throughout the state, offered simultaneously in-person and online (via ZOOM) between October 30 and November 8, 2023. Video recordings and site-specific reports from the forums were posted to NDDEQ's website (www.deq.nd.gov/sustainability).
- Online survey (Round One) – An online survey paralleled questions asked during Round One in-person forums and was made available to the public from October 30 to December 1, 2023. The survey was completed by 121 participants, two of whom were from outside of North Dakota.
- Round Two Online Sustainability Input Forums – Three forums were held between January 9 and January 11, 2024; these forums offered further opportunities for North Dakota stakeholders to inform the state's PCAP as specific implementation-ready GHG reduction strategies were being considered and refined.
- Online survey (Round Two) – An online survey paralleled questions asked during Round Two Online Sustainability Input Forums and was made available online to the public from January 9 to January 19, 2024. The survey was completed by three participants.

In addition to engagement conducted through the Round One and Round Two Sustainability Input Forums, NDDEQ is performing the following outreach:

- Consultation and engagement with the state's five tribal nations was conducted by NDDEQ through the North Dakota Indian Affairs Council regular meeting on November 20, 2023. Three of North Dakota's tribes hold independent CPRG planning grants from EPA, and all were invited to provide input and comments as part of the state's planning process.
- Options for direct stakeholder contact with NDDEQ staff, including voicemail and email.
- Engagement with state and local governments and key sectors (e.g., energy and agriculture) occurred through coordination meetings and one-on-one conversations to gather ideas, collaborate, and inform planning processes.

Following the completion of the state's PCAP, NDDEQ will begin the second phase of planning to inform the development of the CCAP. As of the release of this report, the specific process and timeline for CCAP planning has not been determined.

2. APPROACH

NDDEQ is focused on building a plan that reflects North Dakotans' needs and is supportive of local planning efforts. All online forums were structured to engage North Dakotans from all backgrounds across the state in meaningful conversation. Round Two Online Sustainability Input Forums focused on further narrowing GHG strategies identified in Round One to consider strategies that can meet EPA's grant criteria of "implementation-ready" and strategies with high degrees of public support. The Round Two Online Sustainability Input Forums focused on the following questions:

- Do you have experience implementing these strategies? If yes, please explain.
- What challenges do you see with implementing any of these strategies? Challenges identified early can help NDDEQ determine if the strategy requires additional resources.
- What barriers have you experienced and/or do you expect with implementing any of these strategies?
- Are there specific local or statewide programs related to these strategies that you have participated in? If yes, please explain.

Facilitators asked these four questions while displaying a list of GHG reduction strategies for the following sectors: Agriculture, Energy, Waste, and Transportation. See Appendix A for a complete list of the implementation-ready GHG reduction strategies displayed for each sector during the discussion. Responses and common themes are detailed in Section 3 Results. Participants offered their experiences with participating in various programs run by state, federal, and local agencies as well as interest groups. These program experiences provided NDDEQ with an understanding of what has been successful and can help NDDEQ focus on areas for improvement and value-added offerings when developing strategies for the PCAP.

Each Round Two Online Sustainability Input Forum was offered live via ZOOM, recorded, and posted on the NDDEQ website.[1] To accommodate diverse stakeholders, the Round Two Online

[1] www.deq.nd.gov/sustainability

Sustainability Input forums were selected to occur during different times of the day to ensure that stakeholders had the flexibility to participate depending on their schedules. The forums were held:

- **January 9, 2024** – 6:30 pm – 8:30 pm CST
- **January 10, 2024** – 11:00 am – 1:00 pm CST
- **January 11, 2024** – 6:30 pm – 8:30 pm CST

A corresponding survey was posted online January 9 through January 19, 2024, for those who were not able to participate in the ZOOM events.

2.1 CONVERSATION DESIGN

NDDEQ chose to offer this second round of input forums online, as travel throughout the state in January is highly unpredictable. Each forum included two main elements:

- A refresher on EPA's CPRG program, EPA's timeline, the importance of meaningful engagement, and a review of feedback received and how it was incorporated into the PCAP development process, and
- Participant feedback on proposed GHG reduction strategies using an interactive, cloud-based tool called Mentimeter.[2] This tool enabled participants to answer questions, with responses showing on-screen as short answers or word clouds. Facilitators invited conversation via the ZOOM chat function or by volunteering to come off of mute.

GHG strategies presented to participants for discussion were organized into four sectors based on feedback given during the Round One Sustainability Input Forums. Using Mentimeter, participants voted on which order these sectors would be discussed.

As stated in the Round One Sustainability Input Forums, the Round Two Online Sustainability Input Forums were opportunities to exchange perspectives and ideas. As with all such state meetings, guidelines were established for civil engagement. Registration for the Round Two Online Sustainability Input Forums was required, including name, email, and ZIP code. Participants were asked to share their ZIP codes when registering to determine which participants may be located in low-income and disadvantaged communities (LIDAC). Potential LIDAC residents were identified statewide utilizing the Environmental Justice Screening and Mapping Tool (EJScreen)[3] and the Climate and Economic Justice Screening Tool (CEJST).[4] Those communities were cross-referenced by North Dakotan ZIP codes. Participants were welcome to identify themselves or to remain anonymous during the forums.

[2] Mentimeter, available online: www.mentimeter.com
[3] U.S. EPA, EJScreen: Environmental Justice Screening and Mapping Tool, available online: https://www.epa.gov/ejscreen
[4] Council on Environmental Quality, Climate and Economic Justice Screening Tool, available online: https://screeningtool.geoplatform.gov/en/#8.68/7.0256/-126.0798

3. RESULTS

3.1 PARTICIPATION

Extensive outreach was conducted to ensure a well-rounded and diverse group of North Dakotans participated in the Round Two Online Sustainability Input Forums. NDDEQ issued a news release, distributed email announcements to stakeholders on their listserv, shared event invitations through social media, and updated the North Dakota Sustainability website with meeting details. Multiple local news outlets shared the announcements.[5, 6, 7]

Forty-four people participated in the Round Two Online Sustainability Input Forums, with as many as 30 participating in one session. In addition, NDDEQ received three responses to the corresponding online survey. Nineteen participants said they had previously participated in a Round One Sustainability Input Forum held between October 30 and November 8, 2023.

Nine percent of participants were from ZIP codes described by the EJScreen and CEJST tools as a likely LIDAC area. Due to Mentimeter's anonymous nature, specific responses cannot be linked to a LIDAC-identified ZIP code, and none of the three participants who filled out the online survey were from a LIDAC-identified ZIP code.

Although the Round Two Online Sustainability Input Forums were tailored to North Dakotans, they were accessible to anyone who registered. Eight participants were from ZIP codes outside of North Dakota.

3.2 QUANTITY AND QUALITY OF DATA

Each forum was designed to both provide information and solicit feedback from participants meaningfully. The forums were structured to ensure feedback could be incorporated into the PCAP development process.

Feedback suggested that participants appreciated the engagement and the opportunity to create impact and meet fellow stakeholders. The quality of input received was high and participants engaged in robust feedback around each key question. Both common themes and unique, high-value perspectives are evident in the data gathered.

3.3 COMMON THEMES

Across all forum sessions, three overarching needs were identified related to implementing GHG reduction strategies across each sector:

- more education,

[5] Minot Daily News. "Second round of sustainability forums scheduled." 21 December 2023. https://www.minotdailynews.com/news/local-news/2023/12/second-round-of-sustainability-forums-scheduled/

[6] The Bismarck Tribune. "North Dakota DEQ to host online listening sessions on reducing pollution." 8 January 2024. https://bismarcktribune.com/news/state-regional/government-politics/north-dakota-deq-to-host-online-listening-sessions-on-reducing-pollution/article_6c547724-9a05-11ee-bbbf-33e6062ecc57.html

[7] The Jamestown Sun. "North Dakota Department of Environmental Quality seeking public input in reducing carbon emissions." 19 December 2023. https://www.jamestownsun.com/news/north-dakota/north-dakota-department-of-environmental-quality-seeking-public-input-on-reducing-carbon-emissions

- funding opportunities, and
- access.

Participants noted the need for more education both on climate change and the opportunities to participate in programs to alleviate the effects of a changing climate. Education opportunities included raising public awareness and increasing education and outreach to legislators. Participants noted the need for more robust educational materials on current programs that address climate issues, how to access these programs, and how to successfully meet funding and programmatic requirements. Participants noted that understanding how to find and effectively participate in programs can lead to success.

Those with prior experience participating in local or statewide programs related to the GHG reduction strategies discussed the difficulty in meeting programmatic requirements and that funding for technical support is important. Participants mentioned that higher funding levels for programs make them more enticing. By increasing price offsets and raising opportunities for new technologies, new ideas can enter the marketplace. For capital projects, many participants also mentioned the need to value ongoing maintenance and repair of infrastructure beyond the initial investment.

Access related to education, programs, and funding was commonly mentioned across all forum sessions. To increase access, participants described barriers that would need to be addressed, such as levels of paperwork required to participate in government programs. Participants noted that education increases access – knowing about the programs, how to apply and implement them, and appropriate funding levels encourage participation and ultimately lead to success.

The following common themes emerged across the four questions asked during each forum session. Facilitators engaged participants while displaying a list of implementation-ready GHG reduction strategies for the following sectors: Agriculture, Energy, Waste, and Transportation. See Appendix A for a complete list of the implementation-ready GHG reduction strategies displayed for each sector during the discussion. See Appendix B for a full list of responses to each question.

3.3.1 EXPERIENCE IMPLEMENTING GHG REDUCTION STRATEGIES

Participants had mixed experiences with implementing strategies across the four sectors discussed: Agriculture, Energy, Waste, and Transportation. While many participants had not implemented strategies in a formal manner, they did have experiences utilizing services and benefits of projects that relate to the GHG reduction strategies. For example, many participants had used a walking or bike path but did not participate in its creation. Individual experiences in implementing strategies were limited across all sectors. Those who had implemented strategies had both personal and professional experience. Many participants embraced climate mitigation actions in their personal lives.

3.3.2 CHALLENGES WITH IMPLEMENTING GHG REDUCTION STRATEGIES

When presented with a set of implementation-ready strategies tied to each of the sectors, participants identified funding as one of the biggest challenges they experienced when implementing the strategies. For many, it is difficult to begin implementation due to a lack of seed money to cover upfront costs. Participants said that local, state, or federal resources can

help to reduce this barrier. Additionally, several participants highlighted that it is difficult to garner public support or change the public's views when it comes to implementing some of the GHG reduction strategies. Lack of public support can lead to a decrease in available program resources.

3.3.3 BARRIERS EXPECTED WHEN IMPLEMENTING GHG REDUCTION STRATEGIES

Participants were given an opportunity to consider expected barriers that would prevent them from implementing the strategies tied to each of the sectors. A majority of participants said that funding and cost were the biggest barriers they perceived or experienced when considering implementing the proposed implementation-ready GHG reduction strategies. Many believe there is not enough funding available, and some had negative interactions with receiving funds (e.g., red tape, excessive paperwork). In addition to funding, participants noted that a lack of education about implementation hinders progress. Concerns ranged from public awareness, lack of understanding of how to receive funding, or a lack of workforce education. Participants felt that due to this lack of education, the public's view on many of these strategies would be a barrier to implementation.

3.3.4 EXPERIENCE WITH LOCAL OR STATEWIDE PROGRAMS

Participants named multiple ways they have interacted with local, state, and federal programs and agencies to implement some of the proposed GHG reduction strategies. Engagements most often named were:

- Badlands Conservation Alliance
- Bismarck Parks and Recreation
- Local Recycling
- North Dakota Commerce Department Programs
- North Dakota Game and Fish – Private Land Open To Sportsmen (PLOTS)
- North Dakota Natural Resources Trust – Carbon Monitoring Study
- North Dakota Parks and Recreation Programs
- North Dakota State University Extension
- Outdoor Heritage Fund Programs
- Pheasants Forever Programs
- Department of Energy – Various grant programs
- Department of Transportation – Safe Routes to School (SRTS)
- Federal Highway Administration
- U.S. Department of Agriculture – Rural Energy for America Program (REAP), Conservation Reserve Program (CRP), Conservation Stewardship Program (CSP), Environmental Quality Incentives Program (EQIP)

3.4 SECTOR-SPECIFIC CONVERSATIONS

Each forum session focused on a set of implementation-ready GHG reduction strategies through the lens of economic sectors, including Agriculture, Energy, Waste, and Transportation. See Appendix A for a complete list of the implementation-ready GHG reduction strategies displayed for each sector during the discussion. All forums addressed each of the four sectors to maximize participant feedback.

3.4.1 AGRICULTURE

In the Agriculture sector discussions, participants made it clear that the biggest hurdle to implementing the GHG reduction strategies detailed in Figure 1 is education, especially around conservation practices like no-till and cover crops and their benefits. Additionally, participants mentioned that the use and application of natural fertilizers is a difficult strategy to garner public support for. Many mentioned that because of the odor associated with natural fertilizers, much of the public tends to have a negative reaction to their usage. One commenter said, "Urban encroachment on farming land – the people in the houses surrounding the fields will say 'it stinks.'" Public view and support are important considerations when implementing these strategies.

Participants identified that access to these implementation-ready strategies can come in many forms, such as funding, education, and real-world implementation. While some participants have found it difficult to implement these strategies, a few found success. One commenter said, "My family stopped using petroleum-based farming chemicals and got the land in CRP [Conservation Reserve Program] to allow it to heal, planting native grasslands."

FIGURE 1: STRATEGIES DISCUSSED FOR THE AGRICULTURE SECTOR

3.4.2 ENERGY

For the Energy sector discussion, many participants said they had previously interacted with the implementation-ready strategies described in Figure 2. However, more than 25 commenters mentioned that the cost of implementation is the biggest barrier. Lack of funding through federal- and state-run grant programs and tax credits impedes faster adoption of these strategies. Many commenters noted that the relatively low cost of North Dakota electricity does not create enough of an incentive for residents to invest in these strategies.

Additionally, commenters noted that the public's perception of these strategies is a difficult barrier to overcome. Many participants stated that there is resistance when it comes to change and that implementing renewable energy strategies is challenging to get off the ground when it's a divisive topic. Lastly, education and labor are two intersectional themes that many commenters felt were difficult barriers to cross. Many find that the public struggles to know where and when they can implement these strategies in their own homes. Commenters expressed the need for a more robust, educated workforce that can implement and maintain some of these strategies.

FIGURE 2: STRATEGIES DISCUSSED FOR THE ENERGY SECTOR

3.4.3 WASTE

For the Waste sector discussion, waste stream reduction (e.g., recycling and composting) was the top strategy that participants said they had experience implementing out of the list of strategies discussed in Figure 3. Participants identified that the toughest barriers to implementing these kinds of strategies are a lack of education, funding, and access. Many residents do not know how or where to recycle or compost, while others struggle to have these services provided to them by their local community. Others noted that the location of recycling or composting facilities can be inaccessible. One commenter mentioned that they "currently have to drive 100 miles to recycle" because their local community does not offer this service.

Some participants mentioned the need to increase green building development throughout the state but highlighted the challenges of acquiring materials needed for sustainable buildings, both

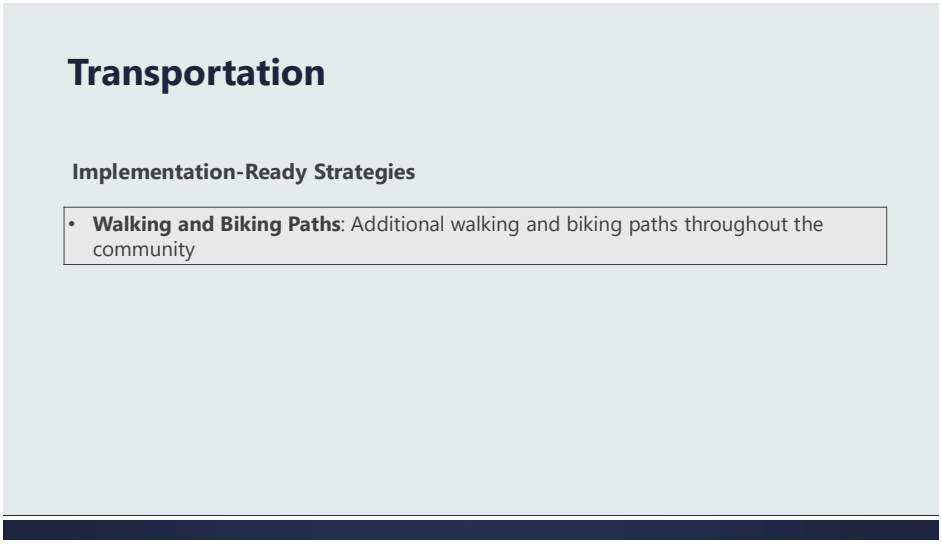
because of financial restraints and lack of infrastructure. One participant described their engagement with using urban wood products and expressed that this is a good resource to lower the emissions associated with building construction.

FIGURE 3: STRATEGIES DISCUSSED FOR THE WASTE SECTOR

3.4.4 TRANSPORTATION

For the Transportation sector discussion, many participants mentioned that funding for the implementation-ready strategy identified in Figure 4 is the biggest hurdle they expect to encounter. Walking and biking paths require up-front funding to install and dedicated annual local/state allocations to maintain. Additionally, this strategy can be difficult to implement and maintain because of the current car-centric society. Participants offered ideas to ensure bike and walking paths are successful investments, such as linking routes to priority locations such as office buildings, shopping centers, and schools. Some participants expressed concerns about safety and the right-of-way (ROW) challenges that they face.

FIGURE 4: STRATEGY DISCUSSED FOR THE TRANSPORTATION SECTOR



4. OPPORTUNITIES

Throughout the Round Two Online Sustainability Input Forums, North Dakotans voiced their support, concerns, and ideas. For each sector, participants suggested achievable wins that can encourage engagement, promote innovation, and bring North Dakota closer to a carbon-neutral state, as summarized below:

Agriculture

- Increasing access to natural fertilizers using federal programs and coupling with a state agricultural program could move this strategy forward.
- Creating and promoting AgTech incubators to encourage advances in sustainable fertilizer technology.
- Leverage incentives for no-till and relay/double cropping where it is geographically appropriate.

Energy

- Education to inform North Dakotans about the benefits of low GHG emission energy options and to dispel myths will need to be done to implement shovel-ready strategies. Encourage and invest in workforce development programs centered on renewable energy and energy-efficient jobs such as solar and wind installation, green building techniques, and design to increase employment opportunities in this sector.
- Increase access to sustainable building materials.
- Expand energy efficiency incentives.

Waste

- Increase access to recycling facilities throughout North Dakota.
- Encourage composting to reduce GHG emissions associated with food waste from landfills.

- Encourage and invest in construction material recycling.

Transportation

- Increase investments into safe walking/biking path maintenance.
- Improve the design and placement of paths to make it easier for residents to use them for work and shopping.
- Separate paths/routes from roads used by cars to increase safety.

5. ADDITIONAL STRATEGIES

Many participants in the Round Two Online Sustainability Input Forums had additional ideas and thoughts about GHG reduction strategies that were not presented across the four sectors. Additional strategies were encouraged during the forums to make sure all North Dakotans had the opportunity to contribute to the planning process. Below is a table of those additional opportunities identified by participants across all forum sessions. Minor changes were made to entries for spelling corrections and reading comprehension.

TABLE 1. ADDITIONAL STRATEGIES

Response
Biodiesel and renewable diesel are ready today. Need support for distribution system.
Package of neighborhood renewal options: bike paths, energy systems, upgrades, etc.
Planting more trees — aging shelter belts are not being replaced.
Incentivize energy audits for all new construction.
Incentivize net-zero buildings. and tax polluting constructions by their GHGs.
Make bus routes a higher priority and provide startup funding for public transportation.
Create incentives for community owned and municipality buildings/schools etc. distributed renewable generation. Geothermal or solar.
Support bus routes during bad weather.
Stop building state buildings or public buildings that aren't net-zero.
Pass a law that all future buildings need to be net-zero.
Reduce methane emissions from oil and gas drilling.
Capping methane flaring statewide, restoring prairies through effective range management.
Make the state fleet all-electric.
4-day workweek for all state employees (less work days = less emissions).
Create an Office of Energy Efficiency in DEQ.
Take care of abandoned or orphaned wells in oil/gas fields. It seems there is enough funding for covering and surfacing these. Complete the work.
Encourage better soil conservation measures.

Response
New EPA rules for oil and natural gas operations will ban routine flaring of natural gas. Look into the bottlenecks for ND and look for solutions. Smaller well owners will need the state's assistance.
Expand the Office of Environmental Justice in DEQ.
Create a bike/trails program mirrored off of MN bike trails program for statewide trails.
Encourage micro grid systems.
Minor gas leaks due to older pipes, improper pipe tightening etc. are often overlooked. It is found that such leaks are substantial in older US cities. It is worth look into methane leak mapping.
Diversify energy production to more renewable sources.
I would like North Dakota to stop the endless promotion of the oil and gas industry. I would like North Dakota to put meaningful enforcement efforts in place to eliminate methane emissions and reduce waste from flaring. I would like the state to tax methane emissions and use the tax revenue to support Electric power projects, built on solar and wind. I would like North Dakota to invest in energy audits and upgrades for people's homes to improve the efficiency of their heating and cooling systems, roofs, and windows. I would like to see support for more community gardens, food preservation options, and home gardening. Wouldn't it be cool if you could take your tomatoes to a community canning place and everybody could just can their tomatoes there together safely? Instead of everybody having to try to purchase a pressure cooker device and learn how to do it? Thank you for taking this feedback.
With the TRPL slated to open July 4th, 2026 and the increase traffic in our lone national park, TRNP, the state needs to better plan and protect for the environment around the Badlands! If not now, when? Could send a strong message to the nation that we take our conservation responsibilities seriously and are attempting to uphold the legacy of Theodore Roosevelt in action.

APPENDIX A GHG REDUCTION STRATEGIES

Overview of GHG reduction strategies identified during the Round One Sustainability Input Forums.

TABLE 2. IMPLEMENTATION-READY GHG STRATEGIES WITH **HIGH** PUBLIC SUPPORT

Agriculture	**Conservation Practices**: Implement programs that support best practices in agricultural conservation to help protect soil health, including cover crops, no till, other runoff reduction techniques. **Fertilizer Application Practices**: Incentives for technologies and techniques that reduce nitrous oxide emissions from fertilizer application such as precision agriculture practices.
Energy	**Energy Efficiency**: Incentives for installing end-use energy efficiency measures in commercial and residential buildings.
Waste	**Waste Stream Reduction**: Increase the efficiency or effectiveness of waste reduction, reuse, recycling, or composting programs. Reducing the amount of materials entering landfills.

TABLE 3. IMPLEMENTATION-READY STRATEGIES WITH **MODERATE** PUBLIC SUPPORT

Agriculture	**Using Natural Fertilizers**: Reinforcing soil health with the life cycle of the animal.
Energy	**Energy Storage**: Funding for battery technology to store solar energy at commercial businesses. **Financing Programs**: Establish a financing program (e.g., grants or low-interest loans) for energy efficiency and renewable energy installations in new and existing buildings. **Renewable Energy**: Incentives for installing renewable energy systems on commercial properties.
Industry	**Industrial Efficiency**: Programs to support or incentivize implementation of energy efficiency measures in industry, including energy audits, strategic energy management, equipment upgrades, and waste heat utilization.
Transportation	**Walking and Biking Paths**: Additional walking and biking paths throughout the community.
Waste	**Sustainable Building Materials**: Utilizing sustainable building materials for local buildings.

TABLE 4. LONG-TERM GHG STRATEGIES TO CONSIDER: **LOCATION-SPECIFIC** PUBLIC SUPPORT

Agriculture	**Anerobic Digesters**: Incentives to promote anaerobic digesters to capture methane and generate renewable energy or produce renewable fuel. **Alternative Fuels Equipment**: Incentive programs to fund agricultural equipment technologies that use alternative fuels. **Economic Development**: Programs for local and regional economic development partners to establish food- and agriculture-based economic development strategies, such as community-based food co-ops.
Industry	**Low- or No-Carbon Fuels**: Programs to support or incentivize greenhouse gas emission reductions in industrial energy use and industrial processes, including use of low/no carbon fuels, electrification, renewable energy, and process improvements. **Low-Carbon Materials**: Programs to develop, expand, and support markets for low-embodied carbon materials and products, such as cement and steel.
Transportation	**Freight Efficiency**: Increasing efficiency in freight movement. **Public Transportation**: Increasing the availability and access to public transportation in your community.
Waste	**Reducing Landfill Emissions**: Incentives to reduce methane emissions from landfills and wastewater treatment facilities, including through collection for use. **Wastewater Facility Efficiency**: Incentives for installing renewable energy and energy efficiency measures at wastewater treatment facilities.

TABLE 5. LONG-TERM GHG STRATEGIES TO CONSIDER: **VARYING** PUBLIC SUPPORT

Energy	**Renewable Permitting**: Streamline permitting for renewable energy projects.
Industry	**Carbon Capture**: Programs to support or incentivize carbon capture, utilization, and storage (CCUS) at industrial and energy facilities.
Transportation	**Electric Vehicles and Charging**: Incentives to increase the share of electric vehicles (e.g., leasing and purchasing), and to expand electric vehicle charging infrastructure.

APPENDIX B MENTIMETER RESPONSES

Mentimeter participant responses across all three of the Round Two Online Sustainability Input Forums. Responses are organized according to sector. Minor changes made to entries for spelling corrections and reading comprehension.

AGRICULTURE

Do you have experience implementing these strategies? If yes, please explain.	What challenges do you see with implementing any of these strategies? Please explain.	What barriers have you experienced and/or do you expect with implementing any of these strategies?	Are there specific local or state-wide programs related to these strategies that you have participated in? If so, please explain your experience.
• No • Have some experience in organic gardening/sustainable agriculture. cost: slower and lower income. benefits: better soil health and resiliency. Currently a backyard gardener. • No direct experience, but we promote conservation practices in our local and tribal mitigation plans. • My family stopped using petroleum-chemical farming chemicals and got the land in CRP to allow it to heal, planting native grasslands. • Many of these conservation practices have been around for years. They are voluntary and take some time, without incentives, to have wide adaptation. • No till is great. A lot of people don't like it, but you waste a lot less fuel which equals less emissions. • No • Stopped using monocultural farming practices and diversified. There is no definition for "natural"	• Urban encroachment on farming land - the people in the houses surrounding the fields will say "it stinks" • Not enough guys to spread manure for hire to make natural fertilizer widespread. • Money runs out for the conservation practices before they can be used as widely as wished • Wish I had a greenhouse and could operate it efficiently in the winter! • There are good resources for education and outreach, it's just finding the incentives to make it worthwhile. • Worked and talked with many farmers on this. Helped alert them of new policy when implemented. • Co-founded the Red River Market and wrote about urban agriculture issues for the food policy council • Provide education and support No-till and crop rotations • No • Interned with the sustainable farming association of MN • Regulated the ND crop production industry for over a decade.	• Education • Outreach • Red tape • Lack of technical experts • Waste • Technical support • Status quo • One size doesn't fit all • Industry-influence-ag-education • Non-fundable practices • laziness • Red tape • Expertise • pushback • Paperwork • unrealistic • Resistance to change • Qualifications • costs • Paperwork • 5 year no pesticide clause • Planning • Education • Unintended consequences • Education • Profit driven thinking • Peer-to-peer experience • Cost • Education • Cost and convenience • Willingness to change • Technical assistance • Cost • Education • Willingness to change • Cost	• 200 character's • Attending NDSU webinars promoting conservation practices. • CRP has enabled our family to clean up the harmful chemical and monocultural farming practices - and allow the earth to heal and cleanse and topsoil to rebuild. • NDSU on farm study • Conservation practices can be local, state and national. They can be very complex and not necessarily programs that work well together on a farm • The nexus would take a book • CRP: agree • CSP • EQIP • Farm service programs • PLOTS program good for conservation and good for hunters • Supplementing federal programs with state

Do you have experience implementing these strategies? If yes, please explain.	What challenges do you see with implementing any of these strategies? Please explain.	What barriers have you experienced and/or do you expect with implementing any of these strategies?	Are there specific local or state-wide programs related to these strategies that you have participated in? If so, please explain your experience.
• Worked and talked with many farmers on this. Helped alert them of new policy when implemented. • Co-founded the Red River Market and wrote about urban agriculture issues for the food policy council • Provide education and support No-till and crop rotations • No • Interned with the sustainable farming association of MN Regulated the ND crop production industry for over a decade. • No • Yes • Experience with trees. Lots of planting! • Yes. Experience with conservation practices. Primarily focused on no-till, cover crops, etc. • Food Sovereignty initiatives, traditional food garden's Voluntary, incentive-based conservation practices can be attractive. Adoption is often uneven due to differences in the suitability of practices in different regions. One size doesn't fit all. • Yes, I work for a conservation service. • Yes. I use natural compost on my vegetable garden. we do not use any fertilizer or pesticides. I am also planting clover to replace the grass in my lawn.	• Again, one size doesn't fit all. Incentives are often inadequate for many producers. Technical assistance can often be a challenge. • Costs. Benefits are not seen quickly and take time • Trees face natural predators—deer! • "Education • Cost barrier" • Cost and demand • Cultural change to normal operations. • None it is cheaper and easier. • "The state of ND with a budget surplus could better support the local food movement to feed our children in schools, and elders in nursing homes as a mechanism to promote sustainability and the importance of connecting ND residents with their food sources. We clearly felt the beef shortages during the Covid-Pandemic of 2020. The state could really address the various needs of ranchers, grazing coalitions, and conservation partners to advance numerous strategies that could aid not just ranchers, grazing associations and farmers, but the health of the state and our economy. We need to better balance the agriculture industry with the energy, and the growing tourism industries. • To many conservation organizations and land owners are trying to	• Cost • Quality control • Technical assistance • Short-term benefits • Can be based on their equipment. • Any environmental or conservation organization faces challenges due to political talking points and painting these organizations as 'radical,' or 'left-wing liberals.' Our politicians and media have segregated the general public into adversaries instead of collaborators working for the greater good. Will take a great deal of money, work, vision and millions of conversations to shift this paradigm.	matching funds could be ideal • Put funding into education • NDSU Extension • NRCS • Soil conservation districts. Tree planting specifically. Some cover crops. • NDSU Extension • NDSU Extension does ongoing education for ag producers re: soil health and current best practices • "NRCS - EQIP, CSP • FSA - CRP" • Soil Conservation Districts • Meadowlark Initiative (state) • Pheasants Forever • Outdoor Heritage Fund. A lot of locally led projects • Not that I have participated in. • The NDNRT current carbon monitoring study in McKenzie, ND is a great example. Still, greater funding is needed to showcase best practices and help educate the entire agriculture industry, ranchers, farmers and politicians. If we don't act soon, our grasslands biome will be decimated and we will fall victim to our own climate disaster that was human created and

Do you have experience implementing these strategies? If yes, please explain.	What challenges do you see with implementing any of these strategies? Please explain.	What barriers have you experienced and/or do you expect with implementing any of these strategies?	Are there specific local or state-wide programs related to these strategies that you have participated in? If so, please explain your experience.
The Badlands Conservation Alliance is working to partner with like-minded organizations, ranchers and farmers to showcase best practices such as rotational grazing which could better protect grassland health, promote soil health, and illuminate the importance of preserving our dwindling grasslands biome via increased carbon capture monitoring. NDNRT is one example studying this work and BCA would hope grant money could further promote grassland health and new best practices such as virtual fencing. BCA would like to encourage greater proactive partnerships that promote ranching, grazing and market grass fed beef that can keep generational ranchers on the land and preserve a way of life for future generations. BCA is 350+ member driven organization that is committed to advancing sustainability by sharing best practices and reframing the environmental, conservation movement through new partnerships	survive the important collaborations are being missed due to old bias, beliefs and difficulties recognizing 'change' could be beneficial."		entirely preventable.

ENERGY

Do you have experience implementing these strategies? If yes, please explain.	What challenges do you see with implementing any of these strategies? Please explain.	What barriers have you experienced and/or do you expect with implementing any of these strategies?	Are there specific local or state-wide programs related to these strategies that you have participated in? If so, please explain your experience.
• No. • Realized savings with led lights • Yes I worked for a G&T utility for 30 years • Over the years, participated on the household level. Takes a lot of individual action to move the needle. • Yes. Installed energy efficiency practices, energy storage, solar thermal, solar photovoltaic...and performed energy audits. • Rooftop solar panel for 5 years • Only a personal level by installing an energy efficient furnace, but no programmatic experience. • Done Agrivoltaics. Solar and Ag • Installed solar with battery backup • No • Yes, I am cofounder of an energy technology company developing solar PV, solar thermal, and energy auditing/conservation services in North Dakota. • Yes, installed both DG and battery back up. works well • Some, I've worked with policy experts in the private and government sectors. I've also looked at other countries policies and ideas. • Yes, there is interest in solar PV, solar thermal,	• Battery storage needs the next brilliant version • Actual benefit-cost is often obscured... i.e., incentive hide costs • Utility policies are the major block to installing solar and making the return on investment fair. • Financing programs written for too narrow of audience/users • Labor shortages • Many coops do not compensate for self solar generation. • Renewable energy seems to have a good news/bad news persona • The financial incentives seem to outweigh implementation of the strategy. More financial incentives are needed. • The costs may outweigh the benefits. • Strategic energy plans • Lack of local providers and installers • Cost and trained workers • Electricity in ND is cheap. Cost/benefit ratio often doesn't pencil out. • Some energy co-ops and companies are not interested in promoting energy efficiency • Low cost of electricity • Lack of net metering policy • Community Energy Studies of Natural Resources. Policy and procedures to build smarter and more energy efficient • Hard to find solar installers —the wait can be long	• Entry cost for homeowners • Price • Price • Funding • Price • Price • Cost benefit issues • Acceptance • Limited resources • Solar hidden costs • Reluctance • Awareness • Cost • Awareness • Push back from industries • Behavior • habits • Education • Resistance from politician • Unrealistic targets • policies • Pushback from industry • Rural cooperatives • Not prioritizing • misinformation • Technological barriers • Lack of skilled workers • Cost • Cost • Change • Lack of installers • Serviceability • Knowledge • Politics • Curriculum development • Politics • Workforce • workforce • Lack of interest • Cost • Winter • Change • Energy studies • Infrastructure	• Tax credits only • Don't know?! • On the wholesale level - tax credits • Tax credits • REAP program has been good...However, that's the USDA. • We switched all of our lights in our city buildings to energy efficient through grants • Accelerated depreciation • DOE Grants • Incentives for energy efficiency offered through my electric coop; seemed like the entry bar was high and weren't able to participate • Tax credits • Many renewable programs that are suggested get killed in the legislature. • Yes, the ND Commerce Department has a State Energy Program that provides grants up to $50,000 for renewable energy projects. Sadly, the program has been historically understaffed and under publicized. • Volunteered with GreenStep Cities MN to help Moorhead get their program started

Do you have experience implementing these strategies? If yes, please explain.	What challenges do you see with implementing any of these strategies? Please explain.	What barriers have you experienced and/or do you expect with implementing any of these strategies?	Are there specific local or state-wide programs related to these strategies that you have participated in? If so, please explain your experience.
energy conservation/efficiency, and battery storage, especially in commercial settings. • Some with USDA's REAP program. Focus on renewable energy installations and energy efficiency. • Yes, implementing renewable energy at a TCJ, Wind, Geo, Solar • Yes - energy efficiency. It was very difficult to front the cost of the technology and hard to prove ROI • Tribal College University • ROI- some state commerce grants are available, onerous process to apply • Unfortunately, no • With a recent change in leadership, BCA is now better positioned to advocate for greater collaborations to break down past barriers to partnerships and motivated to do the work with all willing partners to promote all strategies for energy efficiency, energy storage, renewable energy and greater industrial efficiency.	• Contractors appear hesitant to work with heat pulps • I think these are good ideas, and I would like to see them use more widely in North Dakota. • I don't feel the state of ND has fully supported renewable energy or new green technologies. We may be too committed to developing our vast oil & gas reserves instead of promoting a more harmonious approach. The state could certainly fund training new employees that could work in the growing 'green economy.' The state could certainly provide greater incentives for home owners, landowners or businesses to go more 'green.'	• People feeling like electric doesn't work well in the cold and oil being a big money industry in the state. • I have looked into getting solar panels on my roof, but cannot find a local installer to provide me with a quote. Missed business opportunity for some North Dakotan out there! • See above comment.	• Started a farmers market • Wrote issue briefs for a food policy council • Community Action Partners -home weatherization • Geothermal tax credits • DOE grants and initiatives are successful for commercial building's • USDA REAP • Local co-ops - rebates for energy efficient electric appliances • USDA energy Sovereignty programs are a good source for smaller infrastructure upgrades • Local support networks that include energy efficiency into support plans • No • We would like to learn more of the menu of options and who in each industry with ND can highlight their best practices for the various categories listed above. We would enjoy an opportunity to sit down to better understand the work and have avenues to promote those leading the way.

WASTE

Do you have experience implementing these strategies? If yes, please explain.	What challenges do you see with implementing any of these strategies? Please explain.	What barriers have you experienced and/or do you expect with implementing any of these strategies?	Are there specific local or state-wide programs related to these strategies that you have participated in? If so, please explain your experience.
• North Dakota could use an urban wood network • Recycling, needs personal commitment • Been helping design net-zero buildings. Ultra efficient. Solar Thermal and Photovoltaic powered with battery backup and high R-values • Waste reduction. switched garbage collection services because they offered curbside recycling. • Long time Reduce-Reuse-Recycle fan! • Recycling • Waste reduction: COMPOST! and backyard hens basically eliminate household food waste. • Recycling is very challenging for rural areas • Reducing urban wood waste by milling into wood for local buildings. Access to mills in ND is limited to decorative milling • ND should have incentivize builders to build better insulated, LEED, net-zero, or more energy efficient buildings on the front end. HVAC too. They would do it if there were incentives. • Check ND Forest Service Climate Action Plan for Urban Wood • Methane is way worse than carbon dioxide. EPA and DEQ make it hard to use alternate waste stream activities	• EPA and DEQ make better options hard to attain • Some cities don't allow backyard hens. • Again, challenging for rural ND homeowners, business owners to recycle • Access to sustainable building materials could be problematic. • Builder education and lack of new design options • ND lacks energy auditors...and lacks builders and consumers who can calculate and see the long-term costs of building with low efficiency HVAC and poor insulation. 50% of pollution is for heat in ND. • Distance between a and b for anything in ND in regards to solution to problem distance • Tax credits run up against the budget • We are building unsustainable buildings. That's the norm here. • urban centralization vs. decentralize • Currently have to drive 100 miles to recycle • city commissioners' resistance for new program. • Infrastructure • We could make hemp boxes but we don't have enough hemp to make a dent for example. • The typical pro-business way to nudge behavior is using financial incentives, but	• Price • Better design needed • Red tape • Misinformation • Change designs • distance • Misinformation • Design • Distance • Momentum • Not truly all of above ND • Public buy in • Subsidize fossil fuels • Education on implementing • Red tape • Lack of recycling facility • Distance • Lack support for renewables • Proper participation • Education on implementing • Inertia • Distance • Public buy in • Red tape • Education • Design • unwillingness to invest • corporate lobbying • No recycling facility • Public awareness • EPA • DEQ • New designs needed • Awareness • Pushback • Education • Lack of materials • Cost to start program • No infrastructure • Chicken and egg scenario • Downtime to implement • Skepticism	• Curb side recycling can work if simple enough • City compost facility - it works • Not much support for these strategies in ND. We have had to seek federal programs. Sadly • City provides household compost containers for residents - and education about proper use • Not directly participated in but there are new standards for urban wood and recycled wood use in construction and whole organizations for this now. • Curb side recycling does carry a nominal extra cost on monthly bills. • But extra costs for recycling / composting can eventually reduce the need for landfill expansion - save money in long run • Bismarck recycling • Fargo and Casselton have recycling • Minot has curbside recycling • Bismarck City compositing of grass clippings and leaves

Do you have experience implementing these strategies? If yes, please explain.	What challenges do you see with implementing any of these strategies? Please explain.	What barriers have you experienced and/or do you expect with implementing any of these strategies?	Are there specific local or state-wide programs related to these strategies that you have participated in? If so, please explain your experience.
• Methane is way worse than carbon dioxide. EPA and DEQ make it hard to use alternate waste stream activities • Urban sprawl neighborhoods are often terribly high consumers of energy. Should change this trend. Need green buildings. And incentives • Minimal. • Compost! • City of Fargo used to supply compost bins to residents. Unsure if they still do • Recycling and composting on an individual level. I put out the recycling every 2 weeks, not sure what happens to it after that, I'd be more incentivized if I saw the end process (recycling). • No. • Yes - compost, recycling, and local waste reduction efforts • Recycling • Recycling • No • Composting • Yes. I participate in curbside recycling, and I compost my food waste. I have also replaced all of the toilets in the house with low flow dual flush toilets, and I've added a bidet to reduce paper waste. We reuse items that we can for a construction project or household needs. I save my egg cartons and give them back to	regulatory intervention is needed to change behavior when it comes to waste products. • Cost and education • Some parts of ND do not have recycling facilities • Lack of recycling options in various parts of state • Products are overpackaged which is not something I have much control over but I do intend to start purchasing products that can be refilled from a new store in town that sells bulk cleaning products and what not. • The state could lead by creating its own MIRF facility that all municipalities could utilize. This would decrease shipping costs out of state and the state could take the lead by creating the facility. North Dakota has a state mill, as state bank, why not a state MIRF?	• Cost • Few recyclers in rural ND • Distance to recycle • End product use • Skepticism • Little incentive • Political will • Contractors unwilling • Hearing 1st hand that most of the recycling goes to the land fill makes it feel futile. • There is not a good building materials reuse store available near my home. • As a former City Council member in Minot, I have had plenty of insight working on landfill expansion and discussing the increased monetary/tax implications for residents by starting a recycling program. The state could lead the way and use our educational institutions to educate, promote and succeed by creating a state created MIRF. Too often the state politicians preach local control, but in fact act against local control by caving to special interest and industries connected to individual law makers. One reason residents are skeptical of law makers, government.	• Starts Composting Minot • Nonprofits collect aluminum cans for programs • I participate in the citywide curbside recycling program. • See above.

Do you have experience implementing these strategies? If yes, please explain.	What challenges do you see with implementing any of these strategies? Please explain.	What barriers have you experienced and/or do you expect with implementing any of these strategies?	Are there specific local or state-wide programs related to these strategies that you have participated in? If so, please explain your experience.
local egg producers so that they can refill them. • BCA participates to the best of our abilities on the strategies listed above. As a conservation organization, we would like to see greater emphasis placed on waste stream reduction and sustainable building materials in the Badlands of western ND.			

TRANSPORTATION

Do you have experience implementing these strategies? If yes, please explain.	What challenges do you see with implementing any of these strategies? Please explain.	What barriers have you experienced and/or do you expect with implementing any of these strategies?	Are there specific local or state-wide programs related to these strategies that you have participated in? If so, please explain your experience.
• Nope. But I've used them! • Walking and biking paths can be tricky. ROW acquisition, safety, etc. • Love using the paths but don't even think of them as GHG reduction strategies. • Enjoy walking • No experience with implementing, but Bismarck wins awards for its walking paths, which are heavily used. • What is the GHG reduction per mile of path? • Low impact paths cost a lot more • Many times there are greenways accompany	• Won't be enough to make a big reduction in GHG emissions • Cost per mile • Maintenance • Habits. Weather. • Culture Change needed • Is this a substantial place to create GHG reductions? • Bus routes might be more impactful than walking • Getting people to use them to replace cars • Paths are recreation not to work locations • Bikes. It worked for the Netherlands. • Population decreases in rural communities impacts tax bases and walking and bike paths	• Access • Maintenance • Maintenance • Weather • Design • Safety • Maintenance • weather • Safety • Safety • Weather • Access • maintenance • ROW acquisition • Convenience • Design • Weather • Utility • ROW acquisition • Safety • Weather • ROW • Design	• SRTS • Safe routes to schools • Sometimes federal highway programs include bike and walking paths, really hard to qualify for funding • No direct participation. • Game & Fish / Trails programs • Game & Fish trails is through FHWA • ND and Bismarck Parks and Recreation programs • Many of the city recreational trails

Do you have experience implementing these strategies? If yes, please explain.	What challenges do you see with implementing any of these strategies? Please explain.	What barriers have you experienced and/or do you expect with implementing any of these strategies?	Are there specific local or state-wide programs related to these strategies that you have participated in? If so, please explain your experience.
path planning. These can be planted with native grasses, etc. • Gravel is more dangerous than cars in rural areas • Hard concrete vs rubberized etc. • Have used and enjoyed where and when available. Have found limited access in my current community, as in not well designed. • Yes • Hazard Mitigation Assistance funds have been used for greenways where flooding has occurred. These greenways often have walking and bike paths. • Walkable communities are in short supply in ND • My hometown is trying to implement a shared use path • RTP projects • Walking is great for mental and physical health, especially when situated within green areas. • Yes- local planning commission and Walker/biker • Built outdoor training courses during covid • Plowing/clearing is an issue during winter months • Bike and walk friendly communities attract workers and improve quality of life. • Love them —especially for recreational purposes	likely become a low priority as a result. • I would totally ride bike to work every day rather than drive if it were safer to do so. • Our population concentration is low for these projects • Denmark & Netherlands punish car drivers and reward bikers - the result is people prefer to bike • would sacrifice some backyard for better access • It's too cold • Safety of design for the user from both the path, interaction with the roads, and interaction with other users • Cost • Cities are geared towards traffic flow and moving cars in and out of commercial enterprises. • Input from the public • Pushback from drivers • Making sure paths are located in areas where they will get enough use • Special assessments cost money because they don't cover the full cost of the project. • Finding correct location • Lack of space to put in walking paths. • Not prioritized by the city • Density - somewhere to walk/bike to • Cost of upkeep and maintenance • They are often built along highways and other polluted areas :(	• Participation • Participation • ROW • Convenience • Access • Funding • Funding • Weather • Specials • Cars • Lack of funding • Lack of funding • Car centric communities • Poor city planning • Poor city planning • Low impact on gas emission • Timetables to build • Maintenance • Cars • Urban sprawl • Maintenance • Funding • Driver vs Bike Lanes • People who don't them done • ATV's, dirt bikes [emoji thumbs down] • Lack of connectivity • Many cold months reduce year-round use. • Unfortunately, there are no bike or walking paths that I can take to church or the grocery store so I ride in the street and there is very limited bike parking. Also there's no safe bike trail or even road or sidewalk to go to the mall and there's nowhere to park your bike at the mall. • Environmental organizations such as the Badlands Conservation Alliance	are funded through Federal Highway dollars. • To supplement and expand - yes • National guard training program. • ND Park and Rec Recreation Trails Program provides 80% funds for recreational trails. • Trails day • Safe Routes to School (funding partner for sidewalks) • Local parks board • DOT at times • Local bike retailers • AARP • I like to walk on the hiking trails that are available in the city • The Outdoor Heritage Fund has huge potential. BCA attends numerous meetings and hopes to make greater in-roads with organizations like the Badlands Advisory Group of the Little Missouri Scenic River Commission. Unfortunately, the state of ND has only recently recognized the importance of tourism and the

Do you have experience implementing these strategies? If yes, please explain.	What challenges do you see with implementing any of these strategies? Please explain.	What barriers have you experienced and/or do you expect with implementing any of these strategies?	Are there specific local or state-wide programs related to these strategies that you have participated in? If so, please explain your experience.
• Yes, I like to walk and bike to church and to the grocery store and downtown. • The Badlands Conservation Alliance is a Voice for Wild North Dakota Places. We are currently collaborating with the Maah Daah Hey Trail Association to address trail repair needs and advocate for greater land protections of the Badlands of western ND that could aid the tourism industry and promote a conservation legacy Theodore Roosevelt would be proud of through our work.	• Winter can be tough for maintenance • Safety along roads- "stroller test" • Not well lit at night • Not cleared often enough in winter • Cost and extra right of way required • Winter • We have a beautiful nature trail being threatened along the Missouri in the interest of a boat dock • The cities are car centric and not pedestrian or bike friendly. • The state of ND needs greater harmony between industries and collaboration amongst industries. The stress and strain from Oil & Gas development could greatly impact the tourism economy around our lone national park, TRNP and the Badlands of western ND.	and other conservation organizations are considered 'radical' or 'liberal extremists.' As a result, conversations are not had, work not approached collaboratively and division grows due to politicians and media outlets.	potential value our rivers play.

ADDITIONAL IMPLEMENTATION-READY STRATEGIES

Are there additional implementation-ready strategies you would like the state to consider?

- Incentivize energy audits for all new construction.
- Biodiesel and renewable diesel are ready today. Need support for distribution system.
- Allow alternative waste stream strategies but also make them easy and provide funding or technical support
- incentivize net-zero buildings. and tax polluting constructions by their GHGs
- package of neighborhood renewal options: bike paths, energy systems, upgrades, etc.
- Make bus routes a higher priority and provide startup funding for public transportation
- Provide funding for contractors/builders to increase R-values, insulation walls, roof, windows and HVAC units.
- Expand energy efficient incentives
- Create incentives for community owned and municipality buildings/schools etc. distributed renewable generation. geo or solar
- ...and support bus routes during bad weather!
- Greenway initiatives
- Stop building state buildings or public buildings that aren't net zero.

Are there additional implementation-ready strategies you would like the state to consider?

- North Dakota energy efficient incentives
- Make a law that all future buildings need to be net zero. It's not hard to do. We've done it.
- Reduce methane emissions from oil and gas drilling
- Capping methane flaring statewide, restoring prairies through effective range management.
- Taking the state government's emissions to zero by building green and installing renewable energy at all state-owned properties, while moving away from fossil fuel sources of heat and electricity.
- Making the state fleet all-electric
- 4 day workweek for all state employees (less work days = less emissions)
- Office of Energy Efficiency (in DEQ)
- Office of Energy Efficiency (in DEQ)
- Office of Energy Efficiency (in DEQ)
- Take care of abandoned or orphaned wells in oil/gas fields. It seems there is enough funding for covering and surfacing these. Complete the work
- Planting more trees —aging shelter belts are not being replaced
- Planting more trees —aging shelter belts are not being replaced
- Better soil conservation measures
- New EPA rules for oil and natural gas operations will ban routine flaring of natural gas. Look into the bottlenecks for ND and look for solutions. Smaller well owners will need the state's assistant
- Office of Environmental Justice (DEQ)
- I wish there was a department in ND like MN bike trails program for statewide trails
- Training workforce for more green jobs
- Micro grid systems
- Minor gas leaks due to older pipes, improper pipe tightening etc. are often overlooked. It is found that such leaks are substantial in older US cities. It is worth look into methane leak mapping
- Diversify energy production to more renewable sources.
- I would like North Dakota to stop the endless promotion of the oil and gas industry. I would like North Dakota to put meaningful enforcement efforts in place to eliminate methane emissions and reduce waste from flaring. I would like the state to tax methane emissions and use the tax revenue to support Electric power projects, built on solar and wind. I would like North Dakota to invest in energy audits and upgrades for peoples' homes to improve the efficiency of their heating and cooling systems, roofs, and windows. I would like to see support for more community gardens, food preservation options, and home gardening. Wouldn't it be cool if you could take your tomatoes to a community canning place and everybody could just can their tomatoes there together safely? Instead of everybody having to try to purchase a pressure cooker device and learn how to do it? Thank you for taking this feedback.
- With the TRPL slated to open July 4th, 2026 and the increase traffic in our lone national park, TRNP, the state needs to better plan and protect for the environment around the Badlands! If not now, when? Could send a strong message to the nation that we take our conservation responsibilities seriously and are attempting to uphold the legacy of Theodore Roosevelt in action

APPENDIX C COMMUNICATION

NDDEQ posted the Sustainability input forums on their sustainability website, located at www.deq.nd.gov/sustainability. NDDEQ also posted announcements on their Facebook page. NDDEQ emailed 485 stakeholders from their listserv the Sustainability Input Forums information. A follow-up email was sent to the 76 registrants who did not participate in the Round Two Online Sustainability Input Forums, encouraging them to provide feedback via the online survey. See Figures 5-7.

FIGURE 5: NORTH DAKOTA SUSTAINABILITY WEBSITE POSTING

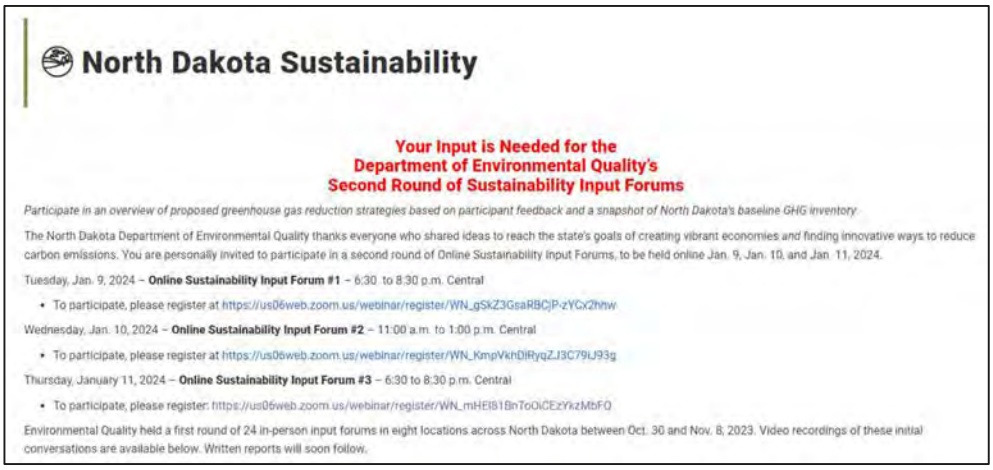


FIGURE 6: NDDEQ FACEBOOK POST

FIGURE 7: NDDEQ EMAIL INVITATION

Your Input is Needed for the Department of Environmental Quality's Second Round of Sustainability Input Forums

Participate for an overview of proposed greenhouse gas reduction strategies based on participant feedback and a snapshot of North Dakota's baseline GHG inventory.

The North Dakota Department of Environmental Quality thanks everyone who shared ideas to reach the state's goals of creating vibrant economies *and* finding innovative ways to reduce carbon emissions. You are personally invited to participate in a second round of Online Sustainability Input Forums, to be held online Jan. 9, Jan. 10, and Jan. 11, 2024.

Tuesday, Jan. 9, 2024 – **Online Sustainability Input Forum #1** – 6:30 to 8:30 p.m. Central

- To participate, please register at https://us06web.zoom.us/webinar/register/WN_gSkZ3GsaRBCjP-zYCx2hhw

Wednesday, Jan. 10, 2024 – **Online Sustainability Input Forum #2** – 11:00 a.m. to 1:00 p.m. Central

- To participate, please register at https://us06web.zoom.us/webinar/register/WN_KmpVkhDiRyqZJ3C79iJ93g

Thursday, January 11, 2024 – **Online Sustainability Input Forum #3** – 6:30 to 8:30 p.m. Central

- To participate, please register: https://us06web.zoom.us/webinar/register/WN_mHEl81BnToOiCEzYkzMbFQ

Environmental Quality held a first round of 24 in-person input forums in eight locations across North Dakota between Oct. 30 and Nov. 8, 2023. Video recordings of these initial conversations are available on the Environmental Quality's website at www.deq.nd.gov/sustainability. Written reports will soon follow.

The Online Sustainability Input Forums in January will share the feedback aggregated from our first round and are an opportunity for North Dakotans to provide input on the proposed reduction strategies.

These efforts are supported through a planning grant from the U.S. Environmental Protection Agency and its Climate Pollution Reduction Grants program. Feedback from the Sustainability Input Forums will inform North Dakota's initial action plan and corresponding grant request, due to EPA by Spring 2024. Ideas, perspectives, research, and planning from this process will also inform the state's longer-term sustainability planning and work to reduce greenhouse gas emissions.

APPENDIX D GHG REDUCTION STRATEGIES OVERVIEW

GHG REDUCTION STRATEGIES OVERVIEW

The following Tables 2-5 contain an overview of GHG reduction strategies discussed during the Round One Sustainability Input Forums, with categorization developed after Round One input forums.

Table 2. Implementation-Ready GHG Strategies with High Public Support

Agriculture	**Conservation Practices**: Implement programs that support best practices in agricultural conservation to help protect soil health, including cover crops, no till, other runoff reduction techniques. **Fertilizer Application Practices**: Incentives for technologies and techniques that reduce nitrous oxide emissions from fertilizer application such as precision agriculture practices.
Energy	**Energy Efficiency**: Incentives for installing end-use energy efficiency measures in commercial and residential buildings.
Waste	**Waste Stream Reduction**: Increase the efficiency or effectiveness of waste reduction, reuse, recycling or composting programs. Reducing the amount of materials entering landfills.

Table 3. Implementation-Ready Strategies with Moderate Public Support

Agriculture	**Using Natural Fertilizers**: Reinforcing soil health with the life cycle of the animal.
Energy	**Energy Storage**: Funding for battery technology to store solar energy at commercial businesses. **Financing Programs**: Establish a financing program (e.g., grants or low-interest loans) for energy efficiency and renewable energy installations in new and existing buildings. **Renewable Energy**: Incentives for installing renewable energy systems on commercial properties.
Industry	**Industrial Efficiency**: Programs to support or incentivize implementation of energy efficiency measures in industry, including energy audits, strategic energy management, equipment upgrades and waste heat utilization.
Transportation	**Walking and Biking Paths**: Additional walking and biking paths throughout the community.
Waste	**Sustainable Building Materials**: Utilizing sustainable building materials for local buildings.

Table 4. Long-term GHG strategies to Consider with Location-specific Public Support

Agriculture	**Anerobic Digesters**: Incentives to promote anaerobic digesters to capture methane and generate renewable energy or produce renewable fuel. **Alternative Fuels Equipment**: Incentive programs to fund agricultural equipment technologies that use alternative fuels. **Economic Development**: Programs for local and regional economic development partners to establish food- and agriculture-based economic development strategies, such as community-based food co-ops.
Industry	**Low- or No-Carbon Fuels**: Programs to support or incentivize greenhouse gas emission reductions in industrial energy use and industrial processes, including use of low/no carbon fuels, electrification, renewable energy and process improvements. **Low-Carbon Materials**: Programs to develop, expand, and support markets for low-embodied carbon materials and products, such as cement and steel.
Transportation	**Freight Efficiency**: Increasing efficiency in freight movement. **Public Transportation**: Increasing the availability and access to public transportation in your community.
Waste	**Reducing Landfill Emissions**: Incentives to reduce methane emissions from landfills and wastewater treatment facilities, including through collection for use. **Wastewater Facility Efficiency**: Incentives for installing renewable energy and energy efficiency measures at wastewater treatment facilities.

Table 5. Long-term GHG strategies to Consider with Varying Public Support

Energy	**Renewable Permitting**: Streamline permitting for renewable energy projects.
Industry	**Carbon Capture**: Programs to support or incentivize carbon capture, utilization, and storage (CCUS) at industrial and energy facilities.
Transportation	**Electric Vehicles and Charging**: Incentives to increase the share of electric vehicles (e.g., leasing and purchasing), and to expand electric vehicle charging infrastructure.

APPENDIX E NORTH DAKOTA QUALITY ASSURANCE PROJECT PLAN

Climate Pollution Reduction Grants Program:

North Dakota Quality Assurance Project Plan

United States Environmental Protection Agency

Office of Air and Radiation

Jan. 31, 2024

1. Title and Approval Page

Quality Assurance Project Plan for
Environmental Information Submitted to State Policymakers in GHG Inventory and Options Identification Phase of the
Climate Pollution Reduction Grant

Prepared by:
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Prepared for:
US EPA Region 8
Air and Radiation Division
1595 Wynkoop St.
Denver, CO 80202

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APPROVALS:

Project Manager: Jennifer Skjod _____ Date: 2/1/24

Quality Assurance Manager: Chuck Hyatt _____ Date: 2/1/24

Project Quality Assurance Manager: ~~Pete Wax~~ _____ Date: 2/1/24

1.1

QAPP Revision History

Revision No.	Description	Author	Date
0	Original Version	Jennifer Skjod	01/22/2024

QAPP Review Table

Date	Crosswalk	Annual	Name	Signature
1/22/2023	X		Peter Wax	

1.2 Table of Contents[1]

[1] For grantees who are not familiar with using MS Word's TOC functions, please review the video at https://www.youtube.com/watch?v=0cN-JX6HP7c. Accessed on 6/23/2023.

List of Tables

List of Exhibits

Abbreviations

CAA	Clean Air Act
CFR	Code of Federal Regulations
CCAP	Comprehensive Climate Action Plan
CPRG	Climate Pollution Reduction Grant
EERC	Energy & Environmental Research Center
EPA	U.S. Environmental Protection Agency
ERM	Environmental Resource Management
GHG	Greenhouse Gas
GHGRP	Greenhouse Gas Reporting Program (40 CFR Part 98)
ICR	Information Collection Request
NDDEQ	North Dakota Department of Environmental Quality
OAR	EPA Office of Air and Radiation
PM	Project Manager
PO	EPA Project Officer for Grant
POP	Period of Performance
POR	EPA Project Officer's Representative

PQAM	Project Quality Assurance Manager
PCAP	Priority Climate Action Plan
PQA	Project Quality Assurance
PWP	Project Work Plan
QA	Quality Assurance
QAM	Quality Assurance Manager
PQAM	Project Quality Assurance Manager
QAM	Quality Assurance Manager
QAPP	Quality Assurance Project Plan
QC	Quality Control
QCM	Quality Control Manager
SIT	State Inventory Tool (provided by the EPA)
TL	Task Leader

1.3. Distribution List

This section presents the primary staff who will be working on the project. This section presents specific staff members who will be identifying existing[2] data resources for evaluation and potential use under the project. This section also includes all other staff who will be serving in project-specific roles for implementing the Quality Assurance Project Plan. The listing in **Table 1.1** includes staff responsible for implementing independent internal quality management steps and staff serving in external oversight roles.

This QAPP and, as applicable, all major deliverables relying on existing data will be distributed to the staff presented in **Table 1.1.** Additionally, this QAPP will be provided to any unlisted staff who are assigned to perform work under this project. A secured copy of this QAPP will be maintained in the project files on the NDDEQ Intranet on the following page: *https://intranet.doh.nd.gov/login/site_login.cfm?redirect=1&page=Apps%5Cview_items&MenuID=2000155&CategoryID=5.*

Table 1.1 QAPP Distribution List

Name	**Organization**	**Role**
Jennifer Wintersteen	US EPA, Region 8	EPA Project Officer (PO)
David Glatt	NDDEQ	Grantee Sr. Approver, Director
Jennifer Skjod	NDDEQ	Grantee Project Manager, Public Information Officer
Brian Kalk	EERC	Grantee Task 1 Leader, Chief
John Oleksik	EERC	Grantee Task 2 Leader, Senior
Chuck Hyatt	NDDEQ	Grantee Quality Assurance Manager
Pete Wax	NDDEQ	Grantee Project Quality Assurance Manager
Rebekah Pfaff	NDDEQ	Environmental Scientist
Ann Fritz	NDDEQ	Environmental Justice/Nondiscrimination Coordinator

[2] The term “existing data” is defined by the EPA’s *Environmental Information Quality Policy* (CIO 2105.3) as “… data that have been collected, derived, stored, or reported in the past or by other parties (for a different purpose and/or using different methods and quality criteria). Sometimes referred to as data from other sources.” The term “secondary data” may also be used to describe “existing data” in historical EPA quality-related documents.

1.4. Project/Task Organization

The primary personnel responsible for implementation of this project are the NDDEQ Project Manager (PM), Quality Assurance Manager (QAM), Project Quality Assurance Manager (PQAM), and Task Leaders (TLs). Their duties are outlined briefly in this section. The project QAM is independent of the unit generating the data.

Jennifer Skjod is the NDDEQ PM and will provide senior-level oversight as needed. The PM is responsible for NDDEQ's technical and financial performance as well as maintaining communications with the EPA to ensure mutual understanding of grant requirements, EPA expectations, and conformity with EPA quality procedures; managing oversight and conduct of project activities including allocation of resources to specific tasks; ensuring that quality procedures are incorporated into all aspects of the project; developing, conducting, and/or overseeing QA plans as necessary; ensuring that any corrective actions are implemented; operating project activities within the documented and approved Quality Assurance Project Plan; and ensuring that all products delivered to the EPA are of specified type, quantity, and quality.

The NDDEQ PM will assign a TL for each technical task with instructions to complete a baseline emissions inventory for the sector(s) under the task and to develop sector-specific options for potential emissions reduction projects including estimates of the potential reductions under each option and estimates of uncertainties for each reduction option. **Table 1.1** presents the TLs for each technical task who will be responsible for day-to-day task-level activities, including planning, reporting, and controlling of technical and financial resources allocated to the task by the PM. Accordingly, each TL is primarily responsible for implementing the Quality Program and this Quality Assurance Project Plan on task-level assignments.

Task-level management system. For each of the major deliverables under each task, the assigned TL will review all QA-related plans and reports and is responsible for transmitting them to the PQA Manager and the QA Manager for review and approval. Each TL is responsible for ensuring that quality procedures are implemented at the task level and for maintaining the official, approved, task-level QAPP content. Each TL will discuss any concerns about quality or any proposed revisions to task-level QAPP content with the PQA Manager to identify, resolve, or preclude problems or to amend task-level plans, if necessary. In addition, each TL will work with the NDDEQ PM and the QA Manager to identify and implement quality improvements. The NDDEQ PM is responsible for ensuring the consistency of similar or related QA measures across tasks, and the TLs are responsible for overseeing task-level work performed by technical staff and providing assurance that all required QA/QC procedures are being implemented.

Project-level management system. Tasks are expected to proceed concurrently, in parallel. The PM will maintain close communications with each TLs and ensure any difficulties encountered or proposed changes at the task level are reviewed for implications on other similar or related tasks. The PM is also responsible for communicating progress or difficulties encountered (across all tasks) to the EPA PO, who provides EPA's primary oversight function for this project at EPA OAR/ Region 8 and is responsible for review and approval of this QAPP and any future revisions. The PM (with support from TLs and assigned NDDEQ technical staff) will be responsible for consulting with the EPA PO, on planning, scheduling, and implementing the QA/QC for all project deliverables and obtaining required EPA approvals.

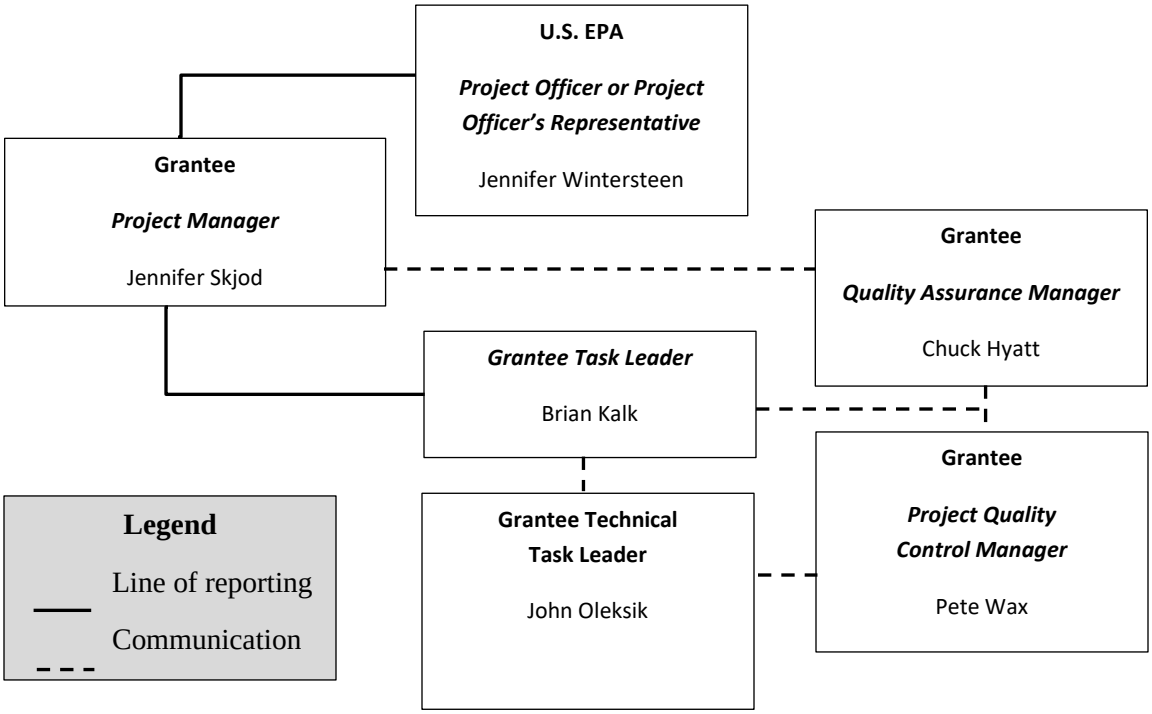
The QA Manager, Chuck Hyatt, is responsible for overseeing the program quality system, monitoring, and facilitating QA activities on tasks, and generally helping the NDDEQ PM and TLs understand and comply with EPA QA requirements. He is employed by NDDEQ's Office of the Director, in a separate program from NDDEQ's CPRG Team. For each task under this project, he is supported by

the PQAM, who will assist in the implementation of the quality system. At the request of the NDDEQ PM, Mr. Hyatt is responsible for conducting periodic independent audits of this project's QA program, Mr. Hyatt will produce written documentation of the audit results and recommendations. He will work closely with the PM and PQA Manager to improve any deficiencies noted during these audits.

The PQAM, Mr. Pete Wax, is responsible for assisting the PM and TLs in planning, documenting, and implementing the QA requirements for this project. Working with the PM, and in consultation with the QA Manager, he will ensure that process- and project-specific QA documents are developed; that required or recommended protocols are followed; that data are reduced, validated, and reported according to specific criteria; and that QC assessments are performed. The PQAM will report to the PM and the QAM, as needed, on quality issues. If there is no PQAM on the project, the QAM will assume the responsibilities of the PQAM.

Additionally, QC functions will be carried out by other technical staff and monitored by the PM, who will work with the QA Manager and PQA Manager to oversee this plan and implement quality improvements. Other technical staff will include people with expertise in industrial processes and air pollution engineering, technical reviewers, database specialists, quality auditors, and technical editors. The PM will ensure that technical staff do not review work in a QA capacity for which they were a primary or contributing author. **Exhibit 1.1** presents the organizational chart.

Exhibit 1.1 Project Organization[3]



[3] Under CIO 2105-S-02.0, section 3, the organization chart must also identify any contractor relationships relevant to environmental information operations.

1.5. Problem Definition / Background

Under this project, the NDDEQ will identify, evaluate, and utilize existing data resources[4] to develop a statewide inventory of the major sources of greenhouse gas (GHG) emissions within North Dakota and use that inventory data to develop a climate action plan. This QAPP focuses on the handling of environmental information under sector-specific tasks by technical staff charged with completing the following subtasks in a future planning project implemented in accordance with this QAPP:

1. Develop a comprehensive GHG inventory for the largest sources within each sector,
2. Develop options for reducing emissions within each sector,
3. Develop estimates or ranges of estimates for the reductions achievable under each option,
4. Develop uncertainty analyses for the emissions reduction estimate(s) or ranges under each option, and
5. Present the inventory, options listing, and associated analyses in a technical report for consideration by state policymakers with the authority to approve the deliverables under the CPRG planning grants.

The GHG inventory may utilize the EPA's State Inventory Tool (SIT),[5] state-level GHG inventories prepared by the EPA,[6] and data reported to the EPA's Greenhouse Gas Reporting Program (GHGRP)[7] together with any independent, sector-specific estimates prepared by the state. Any state estimates will be compared to corresponding federal estimates for validation. Significant differences will be evaluated and discussed in the inventory report with the underlying data and methodology used for the independent state estimates. The statewide inventory will include the following sectors and gases:

Sectors	***Greenhouse Gases (across all sectors)***
1. Agriculture/Natural and Working Lands 2. Oil and Natural Gas 3. Electricity Power Generation 4. Industry 5. Commercial and Residential Buildings, Waste 6. Transportation	CO_2 Equivalents: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O)

1.5.1. Rationale for Selection of Sectors

Table 1.2 contains the rational for selection of the GHG Inventory. 2018 data from U.S. EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks by State: 1990-2021[8] was used to discuss the relative magnitude of emissions from each of the sectors selected.

[4] EPA, *Environmental Information Quality Policy*, CIO 2105.3, 03/07/2023 (p. 8) provides common examples of environmental information used to support the EPA's mission at https://www.epa.gov/system/files/documents/2023-04/environmental_information_quality_policy.pdf.
[5] https://www.epa.gov/statelocalenergy/state-inventory-and-projection-tool
[6] https://www.epa.gov/ghgemissions/state-ghg-emissions-and-removals
[7] https://www.epa.gov/ghgreporting/data-sets
[8] https://cfpub.epa.gov/ghgdata/inventoryexplorer/#allsectors/allsectors/allgas/econsect/all

Table 1.2 Rationale for Sector Selection

Sectors Included in Inventory	**Rationale for Including in GHG Inventory**
Agriculture and Natural and working lands[9]	Agriculture accounted for 22% of emissions for the year 2018. With the state of North Dakota being largely rural, most land is in a natural state or utilized in agriculture. Nearly 40 million of the 45 million acres in North Dakota are utilized for farming.[10] The sector is widespread geographically across the state.
Oil and Natural Gas	North Dakota produced an average of 1.2 MMbbl/day of oil in October 2023. In 2022 it accounted for 8.9% of all production in the U.S. Production is geographically located in the west and northwest counties of the state, with 4 counties considered the core. Methane's potency as a GHG makes has put it under scrutiny nationwide. Flaring and methane emission reduction have been priorities for the state.
Electric power generation	The electric power sector accounted for 32% of total North Dakota greenhouse gas emissions in 2018. North Dakota has coal-generated power plants that contribute significantly to these emissions. North Dakota is a net exporter of electric power with the majority produced being sent out of state via the regional electric grid.[11]
Industry	Industrial activities were the largest source of emissions (34%) of North Dakota greenhouse gas emissions in 2018. Industry in North Dakota is dominated by fertilizer production, food processing, and manufacturing.
Commercial and Residential Building, Waste	In 2018, the commercial and residential sectors collectively accounted for 3% of total North Dakota greenhouse gas emissions. Although these sectors do not make up a large portion of North Dakota's overall emissions, it is important to include in the state's inventory due to changes in high and low degree days that will alter the need for heating and cooling for customers across the state. Additionally, these sectors have indirect emissions associated with being end users of generated electrical power. This sector also includes landfills, composting, and anaerobic digestion. Landfills were the third largest source of anthropogenic methane emissions in 2021, and landfills accounted for 1.9% of total U.S. greenhouse gas emissions. Wastewater treatment, both domestic and industrial, was the third largest anthropogenic source of N_2O emissions in 2021, accounting for 5.2% of national N_2O emissions and 0.3% of total U.S. greenhouse gas emissions. Emissions from wastewater treatment increased by 6.1 MMT CO_2e (41.6%) since 1990 as a result of growing U.S. population and protein consumption.
Transportation	Transportation activities were 8.6% of total North Dakota greenhouse gas emissions in 2018.

[9] Under international GHG inventory protocols this category is called "Land use, land-use change, and forestry."
[10] 2022 State Agriculture Overview – North Dakota https://www.nass.usda.gov/Quick_Stats/Ag_Overview/stateOverview.php?state=NORTH%20DAKOTA
[11] U.S. EIA, State Electricity Profiles, North Dakota Electricity Profile 2021, Table 10, Supply and disposition of electricity, 1990 through 2021.

1.5.2. Decisions to be Made

Existing EPA datasets and the SIT cover categories of GHG emissions by sector and by activity or segment (e.g., electric utility combustion of natural gas). The SIT provides many default values to facilitate developing statewide estimates that are consistent with the National Inventory of GHG Emissions.[12] Task Leaders will be charged with three primary decisions under each task of this project:

1. Determine (for each major activity estimate) if existing EPA data or the SIT default estimate for the sector/activity should be used for the statewide, baseline estimate, or should the state's estimate be derived from existing information available to the state (including other EPA datasets, state inventories, or GHGRP publications)?
2. Determine the best options for reducing emissions of air pollution.
3. Develop an estimate (or range) of reductions that could be achieved under each option.
4. Estimate the uncertainty of the emissions reduction estimate under each option.

1.5.3. Actions to be Taken, Action Limits, and Expected Outcomes

Existing state-level estimates prepared by the EPA or the SIT tool will be utilized with federal default values for each sector/activity relevant to GHG-emitting activities within the state. Actions will involve reducing GHG-emitting activities defined in the SIT or in the existing estimates used by the state. Subsequently, the state may elect to prepare separate, independent estimates for the state's major sector/activities based on the state's existing data resources. If the state elects to incorporate these independent estimates in the inventory, the independent estimate will be compared to the SIT estimate or the EPA's state-level estimate by subject matter experts with the requisite knowledge of the source category, and the rationale for utilizing the state's independent estimate will be documented in the state's GHG inventory report along with the underlying data and calculation methodology. The NDDEQ expects that sectors that include major stationary sources under CAA Title V with longstanding requirements for submission of activity data and emissions estimates may be represented in the GHG inventory. The NDDEQ expects to combine minor sources of GHGs into a single category and focus more on the larger opportunities for reduction. North Dakota is one of the largest energy and agricultural exporters in the nation. Even so, our state one of the least populated and therefore we are only consuming a fraction of what is produced. We plan to quantify the difference between our production and consumption rates.

1.5.4. Reason for Project

The baseline GHG inventory and options analyses developed under this project will be utilized by the NDDEQ for planning purposes to support North Dakota's development of the following three deliverables under the CPRG Program:

- North Dakota's **Priority Climate Action Plan** (PCAP), which is due on March 1, 2024. This plan will include near-term, implementation-ready, priority GHG reduction measures and is a prerequisite for any implementation grant.
- North Dakota's **Comprehensive Climate Action Plan** (CCAP), which is due in 2025. This plan will review all sectors that are significant GHG sources or sinks, and include both near- and long-term GHG emission reduction goals and strategies.
- North Dakota's **Status Report** on progress towards goal, which is due in 2027. This progress report will include updated analyses, plans, and next steps for key metrics.

[10] https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2021

This QAPP describes in detail the necessary QA and QC requirements and technical activities that will be implemented to ensure the baseline GHG inventory and the sector-specific emissions reduction options are reliable for the PCAP and CCAP. As necessary, revisions to the QA and QC requirements defined in this QAPP will be updated in the 2027 Status Report.

1.5.5. Relevant Clean Air Act Mandates and Authorizations

The inventory and options analyses produced under this project will support a grant application authorized under 42 U.S.C.A. § 7437 for *Greenhouse Gas Air Pollution Plans and Implementation Grants*. The inventory and options analyses will be used to evaluate opportunities for reducing GHG emissions from all major-emitting sources including both mobile source categories and stationary source categories. This project will include the fundamental research necessary to evaluate and plan new programs (and amendments to existing Clean Air Act [CAA] programs) for reducing emissions from fossil fuel combustion activities. Many sectors and activities that will be included in the GHG inventory (and subsequent emissions reductions options analyses) include major sources of criteria and toxic pollutants. Accordingly, the purpose of this project (to evaluate and plan for reductions in GHG emissions, including reductions from usage or production of fossil fuels) is also consistent with the following statutory mandates and authorizations under Clean Air Act Title I:

- ***§ 7403. Research, investigation, training, and other activities***
  (a) Research and development program for prevention and control of air pollution
  The Administrator shall establish a national research and development program for the prevention and control of air pollution ….
  (1) conduct, and promote the coordination and acceleration of, research, investigations … and studies related to the causes … extent, prevention, and control of air pollution;
  (2) encourage, cooperate with, and render technical services and provide financial assistance to air pollution control agencies and other appropriate public or private agencies, institutions, and organizations, and individuals in the conduct of such activities ….
  (b) Authorized activities of Administrator in establishing research and development program
  In carrying out the provisions of [paragraph (a)] the Administrator is authorized to–
  (1) collect and make available, through publications and other appropriate means, the results of and other information, including appropriate recommendations by him in connection therewith, pertaining to such research and other activities;….
  (2) make grants to air pollution control agencies … for purposes … in subsection (a)(1) ….

- ***§ 7404. Research related to fuels and vehicles***
  (a) Research programs; grants; ….
  The Administrator shall give special emphasis to research and development into new and improved methods, having industry-wide application, for the prevention and control of air pollution and control of air pollution resulting from the combustion of fuels… he shall–
  (1) conduct and accelerate research programs directed toward development of improved , cost-effective techniques for–
  (A) control of combustion byproducts of fuels, ….
  (B) improving efficiency of fuels combustion so as to decrease atmospheric emissions ….

- ***§ 7405. Grants for support of air pollution planning and control programs***
  (a) Amounts; limitations; assurances of plan development capability.
  (1)(A) The Administrator may make grants to air pollution control agencies … in an amount up to three-fifths of the cost of implementing programs for the prevention and control of air pollution

…. For the purpose of this section, "implementing" means any activity related to the planning, developing, establishing, carrying out, improving, or maintaining of such programs….

(C) With respect to any air quality control region or portion thereof for which there is an applicable implementation plan under section 7410 … grants under subparagraph (A) may be made only to air pollution control agencies which have substantial responsibilities for carrying out such applicable implementation plan.

1.5.6. Information Provided by the EPA under § 7403(b)(1)

Under authority of CAA § 7403(b)(1) the EPA has provided the following resources to states to ensure reliable air emissions inventories are produced to support plans for reducing emissions. :

- Agency-wide Quality Program Documents
- Quality Assurance-specific Directives
  - CIO 2105.3 – *Environmental Information Quality Policy*, April 10, 2023
  - CIO 2105-P-01.3 – *Environmental Information Quality Procedure*, March 7, 2023
  - CIO 2105-S-02.0 – EPA's Environmental Information QA Project Plan (QAPP) Standard
  - EPA Regional Sites for Quality Management Plans and Guidance:
    - Region 1
    - Region 2
    - Region 3
    - Region 4
    - Region 5
    - Region 6
    - Region 7
    - Region 8
    - Region 9
    - Region 10
- QA Guidance
  - EPA QA/G-4 – *Guidance on Systematic Planning Using Data Quality Objectives Process*
  - EPA QA/G-5 – *Guidance for Quality Assurance Project Plans*

The NDDEQ will utilize these resources, as applicable, to ensure evaluation of existing data and utilization of those data are consistent with the EPA's relevant directives and guidance.

1.6. Project / Task Description

An example schedule of deliverables for the technical tasks (Tasks 1-5) for GHG inventory QAPPs is presented in **Tables 2.1** through **2.5.** The work to be performed under this project by the NDDEQ involves preparing a statewide GHG emissions inventory for North Dakota. The organization of the work is based on the use of the EPA's SIT[13] under the following sector-specific tasks:

Task 1: State inventory of agriculture and working lands GHG emissions and sinks.

Task 2: State inventory of oil and natural gas related GHG emissions.

Task 3: State inventory of GHG emissions from electric power generation.

Task 4: State inventory of GHG emissions from industry.

Task 5: State inventory of GHG emissions from transportation.

For each sector-specific task, **Tables 2.1–2.6** provide planned activities and a schedule of deliverables for completion of the GHG inventory and PCAP.

Table 2.1 Technical Task Descriptions for Task 1.

Tasks and Deliverables	Schedule
Task 1. Agriculture and Working Lands	
1. Produce a profile of emissions from agricultural activities and working lands using EPA's SIT tool. a. Download the EPA's State Inventory and Projection Tool (SIT). Use [Ag Module.xlsm] for CO_2 and CO_2 equivalent emissions associated with agriculture in ND. b. Download the EPA's State Inventory and Projection Tool (SIT). Use [Land Use, Land-Use Change, and Forestry.xlsm] for sources and sinks of CO_2. 2. In the GHG inventory report or in a separate report based on the GHG inventory, include a listing of options for emissions reductions from this sector that includes the following components: a. The specific source categories and activities affected by the proposed option. b. The quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. The quantity of criteria emissions reduced by the options with an associated uncertainty estimate. d. The quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate. e. The number of people living in any nonattainment areas where the option would reduce emissions (regardless of the specific pollutant triggering nonattainment). f. A description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity of the	Within 7 days of QAPP approval by EPA or by federally authorized delegate.

[13] https://www.epa.gov/statelocalenergy/state-inventory-and-projection-tool.

Tasks and Deliverables	Schedule
Task 1. Agriculture and Working Lands	
community to an affected source under the option that emits toxic air pollutants. g. Evaluation of the option's impacts on soil, water, or other natural resources.	.

Table 2.2 Technical Task Descriptions for Task 2.

Tasks and Deliverables	Schedule
Task 2. Oil and Natural Gas	
1. Produce a profile of emissions from production of oil and natural gas in North Dakota using EPA's SIT tool. a. Download the EPA's State Inventory and Projection Tool (SIT). Use [Natural Gas and Oil Module.xlsm] for CO_2 and CH_4 emissions associated with oil and gas industry in North Dakota. 2. In the GHG inventory report or in a separate report based on the GHG inventory, include a listing of options for emissions reductions from this sector that includes the following components: a. The specific source categories and activities affected by the proposed option. b. The quantity of GHG emissions reduced by the option with an associated uncertainty estimate. c. The quantity of criteria emissions reduced by the option with an associated uncertainty estimate. d. The quantity of toxic air pollutant emissions (as defined under applicable local, state, or federal rules for air toxics) reduced by the option with an associated uncertainty estimate. e. The number of people living in any nonattainment areas where the option would reduce emissions (regardless of the specific pollutant triggering nonattainment). f. A description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity of the community to an affected source under the option that emits toxic air pollutants. g. Evaluation of the option's impacts on soil, water, or other natural resources.	Within 7 days of QAPP approval by EPA or by federally authorized delegate.

Table 2.3 Technical Task Descriptions for Task 3.

Tasks and Deliverables	Schedule
Task 3. Electric Power Generation	
1. Produce a profile of emissions from Electric Power Generation in North Dakota using EPA's SIT tool. Profile of emissions will exclude any emissions counted in end use sectors. a. Download the EPA's State Inventory and Projection Tool (SIT). Use [CO2FFC Module.xlsm] for CO_2 emissions associated with electric power generation in North Dakota. Use only the 'Electric Utilities' total. b. Download the EPA's State Inventory and Projection Tool (SIT). Use [Stationary Combustion Module.xlsm] for CH_4 and N_2O emissions associated with electric power generation in North Dakota. Use only the 'Electric Utilities' total. c. Download the EPA's State Inventory and Projection Tool (SIT). Use [Electricity Consumption Module.xlsm] to get a total of emissions associated with end use consumption. 2. In the GHG inventory report or in a separate report based on the GHG inventory, include a listing of options for emissions reductions from this sector that includes the following components: a. The specific source categories and activities affected by the proposed option. b. The quantity of GHG emissions reduced by the option with an associated uncertainty estimate. c. The quantity of criteria emissions reduced or mitigated (such as by adsorption of PM2.5 on the surfaces of leaves) by the option with an associated uncertainty estimate. d. The number of people living in any nonattainment areas where the option would reduce emissions or improve air quality conditions by providing shade to urban heat islands (regardless of the specific pollutant triggering nonattainment). e. A description of any benefits that the option will impart to communities with known environmental injustice issues such as providing windbreaks to communities near sources of nuisance dust including dirt roads used for mining operations. f. Evaluation of the option's benefits on soil, water, or other natural resources.	Within 7 days of QAPP approval by EPA or by federally authorized delegate.

Table 2.4 Technical Task Descriptions for Task 4.

Tasks and Deliverables	Schedule
Task 4. Industry	
1. Produce a profile of emissions from Industry in North Dakota using EPA's SIT tool. Emissions will include direct emissions from industry as well as emissions from fossil fuel combustion for process heat and indirect emissions from electric power consumption. a. Download the EPA's State Inventory and Projection Tool (SIT). Use [IP Module.xlsm] for CO_2 emissions and other GHG emissions associated with industrial processes in North Dakota. b. Download the EPA's State Inventory and Projection Tool (SIT). Use [CO2FFC Module.xlsm] for CO_2 emissions associated with industrial use in North Dakota. Use only the 'Industrial' total. c. Download the EPA's State Inventory and Projection Tool (SIT). Use [Stationary Combustion Module.xlsm] for CH_4 and N_2O emissions associated with industrial use in North Dakota. Use only the 'Industrial' total. d. Download the EPA's State Inventory and Projection Tool (SIT). Use [Electricity Consumption Module.xlsm] to get a total of emissions associated with industrial consumption. Use only the 'Industrial' total. e. Profile of emissions from Industry will be a sum of steps a-d described as a CO_2 equivalency. 2. In the inventory document, include a comparison of values calculated from the GHGRP data versus values calculated using the SIT. Evaluate the differences and discuss the types of industrial sources in the state that operate below the GHGRP applicability thresholds under 40 CFR Part 98 subpart A. Discuss the GHG sources in the state that are operating below GHGRP thresholds and provide estimates of the number of minor permits issued in the sectors where the SIT inventory has higher emissions than the GHGRP inventory. 3. In the GHG inventory report or in a separate report based on the inventory, include a listing of options for emission reductions from this sector that includes the following components: a. The specific source categories and activities affected by the proposed option. b. The quantity of GHG emissions reduced by the option with an associated uncertainty estimate. c. The quantity of criteria emissions reduced by the option with an associated uncertainty estimate. d. The quantity of toxic air pollutant emissions (as defined under applicable local, state, or federal rules for air toxics) reduced by the option with an associated uncertainty estimate. e. The number of people living in any nonattainment areas where the option would reduce emissions (regardless of pollutant triggering nonattainment). f. A description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity to an affected source of air toxics under the option. g. Evaluation of the option's impacts on soil, water, or other natural resources.	Within 7 days of QAPP approval by EPA or by federally authorized delegate.

Table 2.5 Technical Task Descriptions for Task 5.

Tasks and Deliverables	Schedule
Task 5. Commercial and Residential Buildings and Waste	
1. Produce a profile of emissions from commercial and residential building in North Dakota using EPA's SIT tool. Emissions will include direct emissions from fossil fuel combustion for heat and indirect emissions from electric power consumption. Utilize EPA's SIT tool to determine emissions from municipal solid waste as well as waste water in ND. a. Download the EPA's State Inventory and Projection Tool (SIT). Use [CO2FFC Module.xlsm] for CO_2 emissions associated with commercial and residential use in North Dakota. Use only the 'Residential' and 'Commercial' totals. b. Download the EPA's State Inventory and Projection Tool (SIT). Use [Stationary Combustion Module.xlsm] for CH_4 and N_2O emissions associated with commercial and residential use in North Dakota. Use only the 'Residential' and 'Commercial' totals. c. Download the EPA's State Inventory and Projection Tool (SIT). Use [Electricity Consumption Module.xlsm] to get a total of emissions associated with commercial and residential consumption. Use only the 'Residential' and 'Commercial' totals. d. Download the EPA's State Inventory and Projection Tool (SIT). Use [Solid Waste Module.xlsm] to get a total of CH_4 and NO2 emissions associated with municipal solid waste. e. Download the EPA's State Inventory and Projection Tool (SIT). Use [Wastewater Module.xlsm] to get a total of CH_4 and NO2 emissions associated with wastewater. f. Profile of emissions from Industry will be a sum of steps a-e described as a CO_2 equivalency. 2. In the GHG inventory report or a separate report based on the inventory, include a listing of option for emission reductions from this sector that includes the following components: a. Specific source categories and activities affected by the proposed option. b. Quantity of GHG emissions reduced by option with uncertainty estimate. c. Quantity of criteria emissions reduced by option with uncertainty estimate. d. Quantity of toxic emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with associated uncertainty estimate. e. Number of people living in any nonattainment areas where option would reduce emissions (regardless of pollutant triggering nonattainment). f. Description of any benefits the option will impart to communities with known environmental injustice issues such as close proximity of the community to an affected source of air toxics under the option. g. Evaluation of the option's impacts on soil, water, or other natural resources.	Within 7 days of QAPP approval by EPA or by federally authorized delegate.

Table 2.6 Technical Task Descriptions for Task 6.

Tasks and Deliverables	Schedule
Task 6. Transportation	
1. Produce a profile of emissions from transportation in North Dakota using EPA's SIT tool. a. Download the EPA's State Inventory and Projection Tool (SIT). Use [CO2FFC Module.xlsm] for CO_2 emissions associated with transportation in North Dakota. Use only the 'Transportation'.	Within 7 days of QAPP approval

Tasks and Deliverables		Schedule
Task 5. Commercial and Residential Buildings and Waste		
b. Download the EPA's State Inventory and Projection Tool (SIT). Use [Mobile Combustion Module.xlsm] for CH_4 and N_2O emissions associated with transportation in North Dakota. c. Profile of emissions from Transportation will be a sum of steps a-b described as a CO_2 equivalency.	by EPA or by federally authorized delegate.	
2. In the GHG inventory report or a separate report based on the inventory, include a listing of option for emission reductions from this sector that includes the following components: a. Specific source categories and activities affected by the proposed option. b. Quantity of GHG emissions reduced by option with uncertainty estimate. c. Quantity of criteria emissions reduced by option with uncertainty estimate. d. Quantity of toxic emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with associated uncertainty estimate. e. Number of people living in any nonattainment areas where option would reduce emissions (regardless of pollutant triggering nonattainment). f. Description of any benefits the option will impart to communities with known environmental injustice issues such as close proximity of the community to an affected source of air toxics under the option. g. Evaluation of the option's impacts on soil, water, or other natural resources.		

1.7. Quality Objectives / Criteria

The Goal for this project is to develop reliable inventories for each of the primary GHG-emitting sectors in North Dakota and to identify options for reducing emissions from those sectors. Accordingly, all quality objectives and criteria are aligned with these goals. The quality system used for this project is the joint responsibility of the NDDEQ PM, Task Leaders, and PQAM. As discussed in Section 1.4, an organizationally independent QA Manager will maintain oversight of all required measures in this QAPP. QC functions will be carried out by technical staff and will be carefully monitored by the responsible Task Leaders, who will work with the QAM and PQAM to identify and implement quality improvements. All activities performed under this project will conform to this QAPP.

1.7.1. Data Quality, Management, and Analyses

For this project, the NDDEQ will use a variety of QC techniques and criteria to ensure the quality of data and analyses. Data of known and documented quality are critical components for the success of the project, as these data will be used to inform the decision-making process for the North Dakota's PCAP and CCAP as discussed in Section 1.5.4 of this QAPP.

The data quality objectives and criteria for this project are accuracy, precision, bias, completeness, representativeness, and comparability. *Accuracy* is a measure of the overall agreement of a measurement to a known value. It includes a combination of random error (precision) and systematic error (bias). *Precision* is a measure of how reproducible a measurement is or how close a calculated estimate is to the actual value. *Bias* is a systematic error in the method of measurement or calculation. If the calculated value is consistently high or consistently low, the value is said to be biased. Our goal is to ensure that information and data generated and collected are as accurate, precise, and unbiased as possible within project constraints. It is not anticipated that this project will include primary data collection.

Generally, existing data and tools provided by the EPA and other qualified sources will be used for project tasks. A subject matter specialist familiar with technical reporting standards (such as a permit writer or compliance engineer with knowledge of the state's facilities operating in the sector) will be used to QA all data utilized for developing the statewide GHG inventory. The NDDEQ will verify the accuracy of all data by checking for logical consistency among datasets. All existing environmental data shall meet the applicable criteria defined in CFR and associated guidance, such as the validation templates provided in the *EPA QA Handbook Volume II*.

Uncertainty can be evaluated using a few different approaches. The most useful uncertainty analysis is quantitative and is based on statistical characteristics of the data such as the variance and bias of estimates. In a sensitivity analysis, the effect of a single variable on the resulting emissions estimate generated by a model (or calculation) is evaluated by varying its value while holding all other variables constant. Sensitivity analyses will help focus on the data that have the greatest impact on the output data. Additional statistical tests may be utilized depending on the need for more or less rigorous tools and on the specific project activity being evaluated.

When available, data originally gathered using published methods whose applicability, sensitivity, accuracy, and precision have been fully assessed, such as EPA reference methods, will be preferred and considered to be of acceptable quality. Project decisions may be adversely impacted if, for example, existing data were used in a manner inconsistent with the originator's purpose. Metadata can be described as the amount and quality of information known about one or more facets of the data or a dataset. It can be used to summarize basic information about the data (e.g., how, why, and when the existing data were collected), which can make working with specific data or datasets easier and provides the user with more confidence. Metadata are valuable when evaluating existing data, as well as when planning for collection primary data that may be required in the future. However, the effort needed to locate and obtain original source materials can be costly. Accordingly, a graded approach to planning will be applied and ongoing discussions with the EPA will be held to determine what magnitude and rigor of QA effort are appropriate and affordable for the project.

For the data analysis completed under this project, analytical methods will be reviewed to ensure the approach is appropriate and calculations are accurate. Spreadsheets will be used to store data and complete necessary analyses. Design of spreadsheets will be configured for the intended use. All data and methodologies specific to each analysis will be defined and documented. Tables and fields will be clearly and unambiguously named. Spreadsheets will be checked to ensure algorithms call data correctly and units of measure are internally consistent. Hand-entered or electronically transferred data will be checked to ensure the data are accurately transcribed and transferred.

The draft inventory will be evaluated for GHG-emitting-sector and geographic completeness. The NDDEQ will utilize the framework of sectors in the EPA's SIT tool or the EPA's state-level GHG inventories to ensure that the inventory prepared under this project includes all major GHG-emitting sectors. To ensure the inventory is geographically complete, the draft inventory will also be submitted for review by NDDEQ staff within the state's regional offices or by stakeholders from the various regions of the state to ensure that all major-emitting activities in all regions of the state are included in the inventory.

Representativeness is a qualitative term that expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. The NDDEQ will use the most complete and accurate information available to compile representative data for this project.

Data c*omparability* is a qualitative term that expresses the measure of confidence that one dataset can be compared to another and can be combined for the decision(s) to be made. The NDDEQ will compare datasets when available from different sources to check for the quality of the data. This QA step

will also ensure that any highly correlated datasets or indicators are identified. Supporting data, such as information on test methods used and complete test reports, are important to ensure the comparability of emissions data.

1.7.2. Document Preparation

All documents produced under this project will undergo internal QC review, as well as technical review and an editorial review, prior to submission to the EPA PO. QC will be performed by an engineer, scientist, or economist, as appropriate, with sufficient knowledge. The technical reviewer will review the document for accuracy and integrity of the technical methodologies, analyses, and conclusions.

An editorial review of all final documents will be performed. Editors will verify clarity, spelling, and grammatical correctness, and ensure documents are free of typographical errors. Editors will verify that references are cited correctly. This will include a comparison against the original documents.

The *QC Documentation Form* (**Appendix A**) will be used to track the approval process. The form must be completed and signed for all document deliverables. The signatures required include those of the Task Leader and technical and editorial reviewers. Completion of this form certifies that technical review, editorial review, and all required QC procedures have been completed to the satisfaction of the TL and PQA Manager. Copies of these signed forms will be maintained in the project files.

1.8. Special Training / Certifications

All NDDEQ QA staff assigned to work on this project shall have appropriate technical and QA training to properly perform their assignments. NDDEQ staff serving in QAM or PQAM roles under this project will have completed a training course on QA/QC activities similar to the course available at https://www.epa.gov/quality/training-courses-quality-assurance-and-quality-control-activities. Individual QA training certificates are the responsibility of each employee and stored with their employee training records and certifications. Certification documentation is available upon request.

The EERC will be responsible for verifying the accuracy of all factual data collection. The EERC and those assisting in data collection are required to have the necessary knowledge and experience to perform all activities.

1.9. Documents and Records

The NDDEQ will document in electronic form QC activities for this project. The TL is responsible for ensuring that copies of all completed QC forms, along with other QA records (including this QAPP), will be maintained in the project files. Project files will be retained by the NDDEQ for at least three years after project completion. The types of documentation that will be prepared for this project include:

- Planning documentation (e.g., QAPP)
- Implementation documentation (i.e., Review/Approval Forms and QA records)
- Assessment documentation (i.e., QA audit reports).

Detailed documentation of QC activities for a specific task or subtask will be maintained using the *QC Documentation Form* shown in **Appendix A**. One or more completed versions of these forms, as necessary, will be maintained in the project files, located on the NDDEQ Intranet. These files are backed up nightly and housed on the North Dakota Information Technology servers. The types of documents for which QC will be conducted and documented may include raw data, data from other sources such as data bases or literature, field logs, sample preparation and analysis logs, instrument printouts, model input and output files, and results of calibration and QC checks.

Technical reviews will be used along with other technical assessments (i.e., QC checks) and QA audits to corroborate the scientific defensibility of any data analyses. A technical review (i.e., internal senior review) is a documented critical review of a specific technical work product. It is conducted by subject matter experts who are collectively equivalent (or senior) in technical expertise to those who performed the work. Given the nature of the deliverables under this project, a technical review is an in-depth assessment of the assumptions, calculations, extrapolations, alternative interpretations, and conclusions in technical work products. Technical review of proposed methods and associated data will be documented in the *QC Documentation Form* shown in **Appendix A**. The form will include the reviewer's charge, comments, and corrective actions taken.

Additionally, the NDDEQ has developed and instituted document control mechanisms for the review, revision, and distribution of QAPPs. Each QAPP has a signed approval form, title page, table of contents, and a document control format that conforms to EPA's Environmental Information QAPP Standard; see header at top of the page. The distribution list for this QAPP was presented in **Table 1.1**. During the course of the project, any revision to the QAPP will be circulated to everyone on the distribution list, as well as to any additional staff supporting this project. Any revision to the QAPP will be documented in a QAPP addendum, approved by the same signatories to this QAPP, and circulated to everyone on the distribution list by the NDDEQ PM.

At this time, the NDDEQ does not know if the project will collect or handle personally identifiable information (PII) subject to the Privacy Act of 1974. However, if during the course of this project technical staff determine that PII is required to support project objectives, the NDDEQ will meet all requirements of the Privacy Act of 1974. **Appendix B** indicates the status of the state's determination regarding applicability of the Privacy Act of 1974 under this project.

2. Existing Data Acquisition and Management Protocols (Group B)

2.1. Sampling Process Design

2.1.1.1. Need and Intended Use of Data Used

As indicated in **Tables 2.1–2.5**, a wide range of data for a diverse set of GHG-emitting activities is necessary to prepare a statewide inventory. Existing data resource may include sector-specific or facility-specific GHG emissions estimates, emissions factors, or activity data for use with emissions factors. The experimental design for this inventory project relies on the EPA's State Inventory Tool (SIT) together with independent estimates prepared by EERC. The SIT allows for expedited estimates for many sectors with default entries included in the tool. Existing data resources from previously completed inventories will be utilized to develop GHG emissions estimates that are comparable to the SIT estimates. Subsequently, the SIT estimates for each sector will be compared to any independent state estimate utilized for the statewide inventory.

2.1.2. Identification of Data Sources and Acquisition

In addition to the data integrated into the EPA's SIT tool, the following data sources will be utilized under each task to develop estimates for the major-emitting sectors in North Dakota:

- Task 1: Activity data for electricity generators published by the U.S. Department of Energy (DOE) under EIA Form 923.
- Task 2: USDA resource data published by state or federal agriculture officials.
- Task 3: Forest resource data published by state or federal forestry officials.
- Task 4: Data published by the EPA under the Greenhouse Gas Reporting Program.
- Task 5: The EPA's SIT tool is expected to be the primary source for this task.

2.2. Quality Control

All environmental information operations conducted for this project will involve existing, non-direct measurement data. All data received will be reviewed by a senior technical staff member to assess data quality and completeness before their use. In addition to reviewing and assessing the data collected, all data entered into spreadsheets and all calculations completed for analyses will be reviewed by a senior technical reviewer. The reviewer will evaluate the approach to ensure the methods are appropriate and have been applied correctly to the analysis. The technical reviewer will also confirm all data were entered correctly and that calculations are complete and accurate. Calculations will be checked by repeating each calculation, independently, and comparing the results of the two calculations. Any data entry and calculation errors will be identified and corrected. Data tables prepared for the draft and final reports will be checked against the spreadsheets used to store the data and complete the analysis.

Where calculations are required to assess the data/datasets, calculations will be performed using computer spreadsheets and calculators to reduce typographical or translation errors–mathematical/ statistical calculations are performed using spreadsheets or software programs with predefined formulas and functions. The NDDEQ will ensure that any manipulations performed on the data/dataset were done correctly. Such calculations could involve statistical checks to look for data outliers. One approach, for example, that may be used to identify outliers or unusual data points is sorting a datasheet for one or more data variables. This approach is a simple but effective way to highlight unusually high or low values. Graphing data using boxplots, histograms, and scatterplots is another method used to identify gaps in the data (missing data), outliers, or unusual data points. Another approach is the use of Z-scores, which can quantify the unusualness of an observation when data follow a normal distribution. A Z-score for a particular value indicates the number of standard deviations above and below the mean that the value falls. For example, a Z-score of 2 indicates that an observation is two standard deviations above the average while a Z-score of -2 indicates the value is two standard deviations below the mean. A Z-score of zero represents a value that equals the mean. As appropriate, we will also use hypothesis tests to find outliers, or an interquartile range (IQR) to calculate boundaries for what constitutes minor and major outliers. The methods used will be driven by the scale and type of data. The NDDEQ will determine outlier detection methods to be used based on the initial review of the data. Identified outliers will be highlighted to the EPA PO or delegate with options for treatment.

2.3. Non-direct Measurements

All environmental information operations conducted on this project will involve existing, non-direct measurement data. All existing data received will be reviewed by a senior technical staff member to assess data quality and completeness before their use.

Consistent with the EPA's QA requirements, this QAPP describes the procedures that will be used to ensure the selection of appropriate data and information to support the goals and objectives of this project. Specific elements addressed by this QAPP include:

- Identifying the sources of existing data,
- Presenting the hierarchy for data selection,
- Describing the review process and data quality criteria,
- Discussing quality checks and procedures should errors be identified, and
- Explaining how data will be managed, analyzed, and interpreted.

Data presented in the GHG inventory will be traced to its source (e.g., database input and output). Key resources include data collected by the EPA (e.g., GHGRP data), and data from EPA-approved data sources (e.g., EIA Form 923 data). These sources may include primary literature (i.e., peer-reviewed journal articles and reports) or databases. We may also use approved existing sources (e.g., handbooks, databases). Original sources for all information and data contained in the document will be included in a list of references with appropriate citations. When peer-reviewed literature or EPA-approved data sources cannot be used, we will document any significant limitations to the data sources used.

We will document information regarding each dataset and our rationale/selection criteria for selecting the data sources used in the inventory. The TL will be responsible for overseeing and confirming the selection of the data for the project tasks.

Table 3.1 presents an example hierarchy for data quality when identifying and reviewing available sources of data and information. When evaluating data resources, efforts will be made to identify and select data sources that most closely conform to the highest ranked criteria. Data quality metrics and documentation may not be provided by each source, and as necessary, we may consult with subject matter experts from permitted facilities or trade associations operating in North Dakota to qualify data for use to meet project objectives.

Any available data quality information will be reviewed by the NDDEQ and project advisors to ensure that the data represent full-scale designs and commercial processes, and that they are applicable to economic and regulatory conditions in the United States. EERC will document data sources used and any significant limitations of utilized data or information to ensure that the data are appropriate for their intended use. An internal technical reviewer will review the approach for selecting and compiling data; the review will include examination of the data sources and the intended use of the data. The specific QC techniques used will depend on the technical activity or analysis to which they are applied. The NDDEQ TL is responsible for verifying the usability of data and related information.

Table 3.1 Existing Data Quality Ranking Hierarchy

Quality Rank	Source Type
Highest	Federal, state, and local government agencies
Second	Consultant reports for state and local government agencies
Third	NGO studies; peer-reviewed journal articles; trade journal articles; conference proceedings
Fourth	Conference proceedings and other trade literature: non-peer-reviewed
Fifth	Individual estimates (e.g., via personal communication with vendors)

The NDDEQ will work with EPA to ensure that all data used for the project are appropriate for their intended use. The main criteria that will be used in the selection of the data are the quality of the data (based on peer review, credible source, and/or QA documentation), availability, suitability for the intended purpose, and agreement with SIT estimates.

The NDDEQ will use the Secondary Data Quality Ranking Hierarchy when identifying and reviewing available sources of information. The source types in **Table 3.1** appear in the order in which they are likely to meet data quality criteria. For example, federal government data are more likely to be from a credible source, thoroughly reviewed, suitable, available, and representative, and any exceptions to these data criteria are likely to be noted in the government data, providing transparency. Data from individuals are expected to be less reliable, not peer reviewed, and may not be suitable or representative.

If it is determined that data meeting the fourth (i.e., conference proceedings and other trade literature: non peer-reviewed) or fifth (i.e., individual estimates such as personal communications with vendors) level are from the best or only available data source, the TL will include in the inventory a description of these data with associated limitations for review by the EPA PO or delegate.

These measures of data quality will be used to judge whether the data are acceptable for their intended use. In cases where available data do not or may not meet data quality acceptance criteria, the TL will include in the inventory a discussion for review by the EPA PO or delegate explaining how emissions estimates that relied on such data compare to SIT estimates.

We will also consider, for example, the age (i.e., date of dataset) and the representativeness of the data and will include in the inventory report for review by the EPA of any quality concerns regarding data that are outdated or that have other quality issues, like data gaps or inconsistency with other sources. Any data source utilized that is older than 10 years will specifically be flagged in the inventory report.

Representativeness will be evaluated by determining that the emissions or activity data are descriptive of conditions in the United States, data are current, and data are descriptive of similar processes within North Dakota. Any incomplete datasets will be identified, and deficiencies will be evaluated to determine whether data are missing or confusing and if they meet the secondary-use quality objectives.

Key screening criteria will be used to screen the sources identified. The NDDEQ TL will provide oversight into the screening process to ensure sources collected are the most relevant and meet quality

requirements. Available data and information from the selected sources will be compiled and relevant summary information will be extracted from the information sources to develop the required output for each of the project tasks.

2.3.1. Criteria for Accepting Existing Data for Intended Use

The criteria for determining whether the data are acceptable for use in developing the statewide inventory is typically based on a comparison of the associated emissions estimate to the emissions estimate produced using the EPA's SIT. EERC is utilizing EPA's SIT and the associated data sources for completion of the Inventory, so it is understood that this data is acceptable for use. EERC will be required to have any data sources outside of EPA's SIT accompanied by an explanation which will be subject to approval by the EPA.

2.3.2. Criteria for Options Identification in Planning Phase

The criteria for reviewing all activities under each task and identifying the best options for emissions reductions will be based on the following criteria[14] in the EPA's CPRG program guidance:

1. Quantity of reductions in emissions of climate pollution under the option.
2. Number of jobs likely to be created by the option.
3. Environmental justice benefits of the project including the number of people living in overburdened neighborhoods that will benefit from the option.
4. Quantity of reductions in criteria and toxic air pollutants that can be achieved by option.
5. Number of people living, working, recreating, and going to school in the area(s) benefiting from the option.

[14] CPRG Program Guidance, page 4. Available at https://www.epa.gov/inflation-reduction-act/climate-pollution-reduction-grants#CPRGProgramGuidance.

2.4. Data Management

Data management procedures include file storage and file transfer. All project and data files will be stored on NDDEQ project servers. Files will be organized and maintained by the TL in folders by project, task, and function, including a system of file labeling to ensure version control. Once complete, the TL will transfer all final deliverables to the NDDEQ. Any files containing confidential business information will be stored on secure computers. The most recent copy of the QAPP will be uploaded to the NDDEQ Intranet. The TL will make sure that staff are trained and adhere to the project file organization and version control labeling to ensure that files are placed in consistent locations. All files will be backed up each night to avoid loss of data. Data are stored in various formats that correspond to the software being used. As necessary, data will be transferred using various techniques, including email, File Transfer Protocol, or shared drives. Typically, records will be archived once the project is completed. Record retention times will be based on contractual and statutory requirements or will follow NDDEQ practices for storing materials of up to 10 years after the end of the period of performance (POP). Multiple project staff are granted access rights to the archived file system for each project. Records may be retrieved from archived file system by the TL, PM, or other project staff with access during the records retention period. As soon as allowed by applicable regulations or the grant agreement, records will be destroyed according to NDDEQ policies and procedures. For any sensitive information that is gathered under the project, NDDEQ's policy is consistent with EPA–recommended methods of destruction, which include degaussing, reformatting, or secure deletion of electronic records; physical destruction of electronic media; recycling; shredding; incineration; and pulping. Should the grant specify some other manner of disposition (e.g., transfer to the client), the NDDEQ will comply with that directive. As noted above, the NDDEQ has developed a file naming convention/nomenclature for electronic file tracking and record keeping. Foremost, all files must be given a short but descriptive name. For those records and files gathered or provided to the NDDEQ, the filename may include the identification of "original" in its filename.

Similarly, files that have undergone a review by an independent, qualified person will include, at the end of the filename, the initials of the reviewer or the suffix "rev" (in lieu of initials) if more than one reviewer reviewed the file, along with the date reviewed and version number, as a way to track which staff person(s) reviewed the file and when. Filenames of draft versions will follow an incremental, decimal numbering system. More specifically, each successive draft of a document is numbered sequentially from version 0.1, 0.2, 0.3… until a final version is complete. Final versions will be indicated by whole numbers (e.g., version 1.0). Final versions of documents that undergo revisions will be labeled version X.1 for the first set of revisions. While the document is under review, subsequent draft versions will increase incrementally (e.g., 1.2, 1.3, 1.4) until a revised final version is complete (e.g., version 2.0).

In the event data retrieval is requested and to prevent loss of data, all draft and final file versions will be retained electronically—that is, superseded versions will not be deleted.

Note that changes made to deliverables will be done using the software's *track changes* feature, which allows a user to track and view all changes that are made to the document version.

For this project, it is not anticipated that any special hardware or software will be used. General software available through the Microsoft Suite including Excel, PowerPoint, Access, and Word will be sufficient to perform the work (described in **Tables 2.1–2.5)** for this project.

3. Assessment and Oversight (Group C)

The NDDEQ is committed to preparing a comprehensive and reliable inventory of GHG emissions from North Dakota. Under this project our senior management team has dedicated the necessary resources to ensure we deliver an inventory that can be relied upon for future policy decisions. Accordingly, under this project, we will concurrently implement existing quality management systems that the NDDEQ has previously utilized for submissions to the EPA under Title I of the Act where task-level deliverables will be subjected to required, regular reviews (e.g., quarterly) to ensure that technical, financial, and schedule requirements of this project are consistent with the EPA PO's and QAM's expectations. This section discusses Elements C.1 (assessments and response actions) and C.2 (reporting) applicable to this project.

3.1. Assessments and Response Actions

The QA program includes periodic review of data files and draft deliverables. The essential steps in the QA program are as follows:

1. Identify and define the problem
2. Assign responsibility for investigating the problem
3. Investigate and determine the cause of the problem
4. Assign and accept responsibility for implementing appropriate corrective actions
5. Establish the effectiveness of and implement the corrective action
6. Verify that the corrective action has eliminated the problem.

The TL will provide day-to-day oversight of the quality system. Periodic project file reviews will be carried out by the PQA Manager, at least once per year to verify that required records, documentation, and technical review information are maintained in the files. The PQA Manager will ensure that problems found during the review are brought to the attention of the Task Leader and are corrected immediately. All nonconforming data will be noted, and corrective measures to bring nonconforming data into conformance will be recorded.

The TLs and QA Manager are responsible for determining whether the quality system established for the project is appropriate and functioning in a manner that ensures the integrity of all work products. All technical staff have roles and will participate in the corrective action process. Corrective actions for errors found during QC checks will be determined by the TL and, if necessary, with the QA Manager. The originator of the work will make the corrections and will note on the QC form that the errors were corrected. A reviewer or TL, not involved in the creation of the work, will review the corrections to ensure the errors were corrected. Any problems noted during audits will be reviewed and corrected by the QA Manager and discussed with the TL as needed. Depending on the severity of the deficiency, the TL may consult the QA Manager and stop work until the cited deficiency is resolved. Deficiencies identified and their resolution will be documented in monthly project reports, as applicable. The QA Manager and TL will comply and respond to all internal and EPA audits on the project, as needed. The QA Manager will produce a report outlining any corrective actions taken.

3.2. Reports to Management

The periodic progress reports (to the EPA PO) required in the grant agreement will be reviewed by the PM and the PM's manager, Dave Glatt, to ensure the project is meeting milestones and that the resources committed to the project are sufficient to meet project objectives. These periodic progress reports will describe the status of the project, accomplishments during the reporting period, activities planned for the next period, and any special problems or events including any QA/QC issues. Reports to the EPA will be drafted by the PM or other project staff familiar with project activities during the reporting period.

Any QC issues impacting the quality of a deliverable, the project budget, or schedule will be identified and promptly discussed with the assigned TL and the PM or PQAM as appropriate. All significant findings will be included in monthly reports with the methods used to resolve the specific QC issue or the recommendations for resolution for consideration by the EPA's PO or designee.

Based on the technical work completed during the reporting period, progress reports will be reviewed internally by an independent, qualified technical person (equivalent or senior to the TL), prior to submitting to the PM. The PM will conduct a final review of the report before transmitting the progress report to the EPA PO and the PM's manager will be cc'd on all progress reports.

4. Data Validation and Usability (Group D)

4.1. Data Review, Verification, Validation

All work conducted under this project will be subject to technical and editorial review. When existing data for the same GHG-emitting activity are available from multiple sources, the background information documents will be reviewed for all sources to determine the dataset that is the most representative of operations in the state. Additionally, the inventory report will include the vintage of the existing data resource and preference will be given to the most recent dataset that is representative of similar GHG-emitting activities in the state. Reviews will be conducted by an independent, qualified person—or a person not directly involved in the production of the deliverable. The term "validation" refers to whether the data meet the QAPP-defined user requirements while the term "verification" refers to whether conclusions can be correctly drawn from the data. The quality of data used and generated for the project will be reviewed and verified at multiple levels by the project team. This review will be conducted by the NDDEQ TL or a senior technical reviewer with specific, applicable expertise. All original and modified data files will be reviewed for input, handling, and calculation errors. Additionally, all units of measure will be checked for consistency. Any potential issues identified through this review process will be evaluated and, if necessary, data will be corrected, and analysis will be revised as necessary, using corrected data. These corrections will be documented in project records. These measures of data quality will be used to judge whether the data are acceptable for their intended use. In cases where available data do not or may not meet data quality acceptance criteria, the TL will document these findings in the inventory along with corrective actions or use of alternative data sources.

4.2. Verification and Validation Methods

As a standard operating procedure, all data (retrieved and generated) will be verified and validated through a review of data files by an independent, qualified technical staff member (i.e., someone other than the document originator), and ultimately, the NDDEQ TL. Forms for documenting QC activities and review of deliverables are included in **Appendix A**. Documentation of calculations will be included in spreadsheet work products and in supporting memoranda, as appropriate.

The TL is responsible for day-to-day technical activities of tasks, including planning, data gathering, documentation, reporting, and controlling technical and financial resources. The TL is the primary person responsible for quality of work on tasks under this project and will approve all-related plans and reports. These reports will be transmitted by the TL to the QAM for final review and approval.

Source data will be verified and validated through a review of data files by the technical staff, and ultimately the TL. Reviews of analyses will include a thorough evaluation of content and calculated values. All original and modified data files will be reviewed for input, handling, and calculation errors. Additionally, all measurement units will be checked for consistency. Any potential issues identified through this review process will be evaluated, errors corrected, and analysis repeated using the corrected data. All corrections will be documented in project records.

Source data will be verified and validated through a review of data files by the technical staff, and ultimately the TL. Typical data verification reviews can include checks of the following:

- Data sources are clearly documented,
- Calculations are appropriately documented,
- All relevant assumptions are clearly documented,
- Conclusions are relevant and supported by results, and
- Text is well-written and easy to understand.

The documented review process will be stored with deliverables for the project. For the narrative describing the methodologies used for the inventory, all comments on drafts will be clearly and concisely summarized including a description of how substantive issues raised by commenters were resolved.

As discussed in Section 1.7, QC objectives include verification that data in database tables are stored and transferred correctly, algorithms call data correctly, units are internally consistent, and reports pull the required data. These data management issues will be addressed as part of the QC checks of data acquisition and document preparation.

For this project, it is not anticipated that any special data validation software will be required. However, where calculations are required to assess the data/datasets, calculations will be performed using computer spreadsheets (like Excel spreadsheets with predefined functions, or formulas) and calculators to reduce typographical or translation errors. General software available through the Microsoft Suite including Excel, PowerPoint, Access, and Word will be sufficient to perform the work as described in Section 1.6 for this project.

4.3. Reconciliation with User Requirements

All data (retrieved and generated) and deliverables in this project will be analyzed and reconciled with project data quality requirements. To ensure deliverables meet user requirements, the TL or senior technical lead will review all data and deliverables throughout the project to ensure that the data, methodologies, and tools used meet data quality objectives, are clearly conveyed, and represent sound and established science.

The NDDEQ will review each project with the EPA at the planning stage to ensure the approach is fundamentally sound and will meet the project objectives. The TL or senior technical lead will evaluate data continuously during the life term of the project to ensure they are of sufficient quality and quantity to meet the project goals. Prior to submission of draft and final products, the TL or senior technical lead will make a final assessment to determine whether the objectives have been fulfilled in a technically sound manner. Assumptions made in preparing project analyses will be clearly specified in the inventory.

As discussed in Section 1.7.1, uncertainty can be evaluated using a few different approaches. The most useful uncertainty analysis is quantitative and is based on statistical characteristics of the data such as the variance and bias of estimates. In a sensitivity analysis, the effect of a single variable on the resulting emissions estimate generated by a model (or calculation) is evaluated by varying its value while holding all other variables constant. Sensitivity analyses will help focus on the data that have the greatest impact on the output data. Additional statistical tests may be utilized depending on the need for more or less rigorous tools and on the specific inventory activity being evaluated.

5. References

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USDA Forest Service, *Greenhouse gas emissions and removals from forest land, woodlands, and urban trees in the United States, 1990-2019* at https://www.fs.usda.gov/research/treesearch/62418. Accessed on 7/26/2023.

US DOT, *Highway Statistics Series* at https://www.fhwa.dot.gov/policyinformation/statistics/2021/vm1.cfm . Accessed on 7/26/2023.

Appendix A: Example QC Documentation Form

NDDEQ Documentation of QA Approval of Electronic Deliverables

Approvals on this form verify that all technical and editorial reviews have been completed and the deliverable meets the criteria for scientific defensibility, technical and editorial accuracy, and presentation clarity as outlined in the Quality Assurance (QA) Project Plan, QA Narrative, Quality Management Plan, and/or according to direction of the EPA PO.

Client: EPA Region 8
Grant Number: 00105300
EPA Project Officer: Jennifer Wintersteen
Project Number:
Project Name: ND CPRG Grant
Grantee Org. Project Manager: Jennifer Skjod

QA Form Details

Item Number	File Name (Copy of the name of the file reviewed)	Deliverable Description	Date Sent to Client	Deliverable (Draft)	Deliverable (Final)	Document Originator	QA Review Information: Review Type	QA Review Information: Reviewer Name	QA Review Information: Date Review Was Performed	QA Review Information: Brief Summary of Review Findings

Appendix B: Compliance with Requirements Under the Privacy Act of 1974

Important Note about Personally Identifiable Information (PII)

The Privacy Act of 1974 (5 U.S.C. § 552a) mandates how federal agencies maintain records about individuals. Per OMB Circular A-130, Personally Identifiable Information (PII) is "information that can be used to distinguish or trace an individual's identity, either alone or when combined with other information that is linked or linkable to a specific individual."

EPA systems/applications that collect PII must comply with EPA's Privacy Policy and procedures to guard against unauthorized disclosure or misuse of PII in all forms. For more information click here. If PII are collected, then the QAPP will describe how the PII are managed and controlled.

Personally identifiable information (PII):

Please verify one of the following two options by checking the corresponding box:

1. This project **will not** collect Personally Identifiable Information (PII): ☐
2. This project **will** collect Personally Identifiable Information (PII): ☐

This QAPP will comply with 5 U.S.C. § 552a and EPA's Privacy Policy.

Please delete the PII text below if there are no PII for this project.

Personally identifiable information (PII) and the requirements for safeguarding this information are described for EPA grantees within the EPA Privacy Policy (CIO 2151, current version). PII is defined as any information about an individual's identity, including personal information which is linked or linkable to an individual (e.g., name, date of birth, address). The Privacy Act of 1974 (5 U.S.C. § 552a) sets forth requirements for federal agencies when they collect, maintain, or disseminate Privacy Act information.

APPENDIX F NORTH DAKOTA LIDAC BLOCK GROUPS

NORTH DAKOTA LIDAC BLOCK GROUPS

Table 6. North Dakota Identified LIDAC Block Groups

Block Group ID	National Supp. Index	State Supp. Index	CEJST	American Indian Reservations	Off Reservation Trust Lands	LIDAC
380039682001	No	Yes	No	No	No	Yes
380059401001	No	No	Yes	Yes	No	Yes
380059401002	No	Yes	Yes	Yes	No	Yes
380059402001	No	Yes	Yes	Yes	No	Yes
380059402002	No	No	Yes	Yes	No	Yes
380119652002	No	Yes	No	No	No	Yes
380139533001	No	No	No	No	Yes	Yes
380150101003	Yes	Yes	No	No	No	Yes
380150101004	Yes	Yes	No	No	No	Yes
380150102001	No	Yes	No	No	No	Yes
380150102002	No	Yes	No	No	No	Yes
380150102003	No	Yes	No	No	No	Yes
380150102004	Yes	Yes	No	No	No	Yes
380150103002	No	Yes	No	No	No	Yes
380150103004	No	Yes	No	No	No	Yes
380150103005	No	Yes	No	No	No	Yes
380150106002	No	Yes	No	No	No	Yes
380150107001	No	Yes	No	No	No	Yes
380150108001	No	Yes	No	No	No	Yes
380150108002	No	Yes	No	No	No	Yes
380150109002	No	Yes	No	No	No	Yes
380150111032	No	Yes	No	No	No	Yes
380170001001	No	Yes	No	No	No	Yes
380170001003	No	Yes	No	No	No	Yes
380170001004	No	Yes	No	No	No	Yes
380170002032	No	Yes	No	No	No	Yes
380170002041	No	Yes	No	No	No	Yes

Block Group ID	National Supp. Index	State Supp. Index	CEJST	American Indian Reservations	Off Reservation Trust Lands	LIDAC
380170002042	No	Yes	No	No	No	Yes
380170002043	No	Yes	No	No	No	Yes
380170003001	Yes	Yes	No	No	No	Yes
380170003003	Yes	Yes	No	No	No	Yes
380170004001	Yes	Yes	No	No	No	Yes
380170004002	No	Yes	No	No	No	Yes
380170004003	No	Yes	No	No	No	Yes
380170005011	No	Yes	No	No	No	Yes
380170005012	No	Yes	No	No	No	Yes
380170005013	No	Yes	No	No	No	Yes
380170005021	Yes	Yes	Yes	No	No	Yes
380170005022	Yes	Yes	Yes	No	No	Yes
380170005023	Yes	Yes	Yes	No	No	Yes
380170005024	Yes	Yes	Yes	No	No	Yes
380170006011	No	Yes	Yes	No	No	Yes
380170006012	Yes	Yes	Yes	No	No	Yes
380170006013	No	Yes	Yes	No	No	Yes
380170006021	Yes	Yes	Yes	No	No	Yes
380170006022	Yes	Yes	Yes	No	No	Yes
380170006023	No	Yes	Yes	No	No	Yes
380170007001	No	Yes	No	No	No	Yes
380170007002	No	Yes	No	No	No	Yes
380170008011	No	Yes	No	No	No	Yes
380170008012	No	Yes	No	No	No	Yes
380170008021	No	Yes	No	No	No	Yes
380170008022	Yes	Yes	No	No	No	Yes
380170008023	Yes	Yes	No	No	No	Yes
380170009011	No	Yes	No	No	No	Yes
380170009012	Yes	Yes	No	No	No	Yes
380170009013	No	Yes	No	No	No	Yes
380170009014	No	Yes	No	No	No	Yes

Block Group ID	National Supp. Index	State Supp. Index	CEJST	American Indian Reservations	Off Reservation Trust Lands	LIDAC
380170009031	No	Yes	No	No	No	Yes
380170009032	No	Yes	No	No	No	Yes
380170009033	No	Yes	No	No	No	Yes
380170009041	No	Yes	No	No	No	Yes
380170009042	No	Yes	No	No	No	Yes
380170009043	No	Yes	No	No	No	Yes
380170010031	No	Yes	No	No	No	Yes
380170010032	No	Yes	No	No	No	Yes
380170010033	No	Yes	No	No	No	Yes
380170010041	No	Yes	No	No	No	Yes
380170010042	Yes	Yes	No	No	No	Yes
380170010043	No	Yes	No	No	No	Yes
380170101061	No	Yes	Yes	No	No	Yes
380170101062	No	Yes	Yes	No	No	Yes
380170101063	No	No	Yes	No	No	Yes
380170101064	Yes	Yes	Yes	No	No	Yes
380170101071	No	Yes	Yes	No	No	Yes
380170101072	No	Yes	Yes	No	No	Yes
380170101073	No	Yes	Yes	No	No	Yes
380170101074	No	Yes	Yes	No	No	Yes
380170101075	No	No	Yes	No	No	Yes
380170101091	No	Yes	No	No	No	Yes
380170101111	Yes	Yes	No	No	No	Yes
380170101112	No	Yes	No	No	No	Yes
380170102061	No	Yes	No	No	No	Yes
380170102064	No	Yes	No	No	No	Yes
380170103031	No	Yes	No	No	No	Yes
380170103032	No	Yes	No	No	No	Yes
380170103061	No	Yes	No	No	No	Yes
380170103062	No	Yes	No	No	No	Yes
380170103063	No	Yes	No	No	No	Yes

Block Group ID	National Supp. Index	State Supp. Index	CEJST	American Indian Reservations	Off Reservation Trust Lands	LIDAC
380170103081	No	Yes	No	No	No	Yes
380170103082	No	Yes	No	No	No	Yes
380170103083	No	Yes	No	No	No	Yes
380170405044	No	Yes	No	No	No	Yes
380170405092	No	Yes	No	No	No	Yes
380170405093	No	Yes	No	No	No	Yes
380170405094	No	Yes	No	No	No	Yes
380170407001	No	Yes	No	No	No	Yes
380170407002	No	Yes	No	No	No	Yes
380170407003	No	Yes	No	No	No	Yes
380199511002	No	No	No	No	Yes	Yes
380239545001	No	No	No	No	Yes	Yes
380259622002	No	Yes	No	Yes	No	Yes
380279592001	No	Yes	No	No	No	Yes
380279592002	No	No	No	Yes	No	Yes
380279592003	No	No	No	Yes	No	Yes
380299665004	No	Yes	No	No	No	Yes
380350101002	No	Yes	No	No	No	Yes
380350101003	No	Yes	No	No	No	Yes
380350101004	No	Yes	No	No	No	Yes
380350102002	No	Yes	No	No	No	Yes
380350102003	No	Yes	No	No	No	Yes
380350102005	No	Yes	No	No	No	Yes
380350103011	Yes	Yes	No	No	No	Yes
380350103021	Yes	Yes	No	No	No	Yes
380350104001	No	Yes	No	No	No	Yes
380350104002	Yes	Yes	No	No	No	Yes
380350104004	No	Yes	No	No	No	Yes
380350106001	No	Yes	Yes	No	No	Yes
380350106002	No	Yes	Yes	No	No	Yes
380350107002	No	Yes	No	No	No	Yes

Block Group ID	National Supp. Index	State Supp. Index	CEJST	American Indian Reservations	Off Reservation Trust Lands	LIDAC
380350108011	No	Yes	No	No	No	Yes
380350108012	No	Yes	No	No	No	Yes
380350108014	Yes	Yes	No	No	No	Yes
380350108042	Yes	Yes	No	No	No	Yes
380350108043	No	Yes	No	No	No	Yes
380350108061	Yes	Yes	No	No	No	Yes
380350108062	No	Yes	No	No	No	Yes
380350109002	No	Yes	No	No	No	Yes
380350110001	No	Yes	No	No	No	Yes
380350110002	No	Yes	No	No	No	Yes
380350112012	No	Yes	No	No	No	Yes
380350114001	No	Yes	No	No	No	Yes
380419647001	No	Yes	No	No	No	Yes
380419648001	No	Yes	No	No	No	Yes
380439668001	No	No	Yes	No	No	Yes
380439668002	No	No	Yes	No	No	Yes
380439668003	No	No	Yes	No	No	Yes
380499556002	No	No	No	No	Yes	Yes
380519729003	No	Yes	No	No	No	Yes
380539401001	No	Yes	Yes	Yes	No	Yes
380539623011	No	Yes	No	No	No	Yes
380539623012	No	Yes	No	No	No	Yes
380539623021	No	Yes	No	No	No	Yes
380539623023	No	Yes	No	No	No	Yes
380559401001	No	Yes	No	Yes	No	Yes
380559610012	No	No	No	No	Yes	Yes
380559610013	No	No	No	No	Yes	Yes
380579617002	Yes	Yes	No	No	No	Yes
380579618001	No	Yes	No	Yes	No	Yes
380579618002	No	Yes	No	No	No	Yes
380590201002	No	Yes	No	No	No	Yes

Block Group ID	National Supp. Index	State Supp. Index	CEJST	American Indian Reservations	Off Reservation Trust Lands	LIDAC
380590202003	Yes	Yes	No	No	No	Yes
380590202005	No	Yes	No	No	No	Yes
380590203021	No	Yes	No	No	No	Yes
380590203031	No	Yes	No	No	No	Yes
380590205003	No	Yes	No	No	No	Yes
380619403001	No	Yes	Yes	Yes	No	Yes
380619404001	No	Yes	Yes	Yes	No	Yes
380619404002	Yes	Yes	Yes	Yes	No	Yes
380619552002	No	No	No	No	Yes	Yes
380639590004	No	No	No	Yes	No	Yes
380699561001	No	No	Yes	No	No	Yes
380699561002	No	No	Yes	No	No	Yes
380719576002	No	Yes	No	No	No	Yes
380719576004	No	Yes	No	No	No	Yes
380719577001	No	No	No	Yes	No	Yes
380719577002	No	No	No	Yes	No	Yes
380739689002	No	Yes	No	No	No	Yes
380739691001	No	Yes	No	No	No	Yes
380779709001	No	Yes	No	No	No	Yes
380779709002	No	Yes	No	No	No	Yes
380779710001	No	Yes	Yes	No	No	Yes
380779710002	Yes	Yes	Yes	No	No	Yes
380779710003	No	Yes	Yes	No	No	Yes
380779711001	No	Yes	No	No	No	Yes
380779714002	No	Yes	No	No	No	Yes
380779714003	No	No	No	Yes	Yes	Yes
380799418001	No	No	Yes	Yes	No	Yes
380799418002	No	No	Yes	Yes	No	Yes
380799418003	No	No	Yes	Yes	No	Yes
380799418004	No	No	Yes	Yes	No	Yes
380799418005	No	Yes	Yes	Yes	No	Yes

Block Group ID	National Supp. Index	State Supp. Index	CEJST	American Indian Reservations	Off Reservation Trust Lands	LIDAC
380799516001	No	Yes	Yes	No	No	Yes
380799517001	No	No	Yes	No	Yes	Yes
380799517002	No	No	Yes	No	Yes	Yes
380799517003	No	No	Yes	No	Yes	Yes
380799519001	No	Yes	Yes	No	Yes	Yes
380799519002	No	Yes	Yes	No	No	Yes
380819742001	No	No	No	Yes	No	Yes
380859408001	Yes	Yes	Yes	Yes	No	Yes
380859408002	No	No	Yes	Yes	No	Yes
380859409001	Yes	Yes	Yes	Yes	No	Yes
380859409002	Yes	Yes	Yes	Yes	No	Yes
380899635024	No	Yes	No	No	No	Yes
380899636003	No	Yes	No	No	No	Yes
380899637002	No	Yes	No	No	No	Yes
380899637004	No	Yes	No	No	No	Yes
380899638003	Yes	Yes	No	No	No	Yes
380939674011	No	Yes	No	No	No	Yes
380939674024	No	Yes	No	No	No	Yes
380939678001	Yes	Yes	Yes	No	No	Yes
380939678002	No	No	Yes	No	No	Yes
380939678003	No	Yes	Yes	No	No	Yes
380939678004	Yes	Yes	Yes	No	No	Yes
380939678005	No	No	Yes	No	No	Yes
380939678006	No	Yes	Yes	No	No	Yes
380959515003	No	Yes	No	No	No	Yes
380979702002	No	Yes	No	No	No	Yes
380999579001	No	No	Yes	No	No	Yes
380999579002	No	Yes	Yes	No	No	Yes
380999580001	No	Yes	Yes	No	No	Yes
380999580002	No	No	Yes	No	No	Yes
381010101001	Yes	Yes	No	No	No	Yes

Block Group ID	National Supp. Index	State Supp. Index	CEJST	American Indian Reservations	Off Reservation Trust Lands	LIDAC
381010101002	No	Yes	No	No	No	Yes
381010101003	No	Yes	No	No	No	Yes
381010101004	No	Yes	No	No	No	Yes
381010102002	No	Yes	No	No	No	Yes
381010102003	No	Yes	No	No	No	Yes
381010103013	No	Yes	No	No	No	Yes
381010104004	Yes	Yes	No	No	No	Yes
381010107011	No	Yes	No	No	No	Yes
381010107012	No	Yes	No	No	No	Yes
381010107022	No	Yes	No	No	No	Yes
381010113004	No	No	No	Yes	No	Yes
381059534002	No	Yes	No	No	No	Yes
381059535001	No	No	No	No	Yes	Yes
381059535002	No	No	No	No	Yes	Yes
381059536001	No	Yes	No	No	No	Yes
381059536002	No	Yes	No	No	Yes	Yes
381059537012	Yes	Yes	No	No	No	Yes
381059538001	No	Yes	No	No	No	Yes
381059538002	No	Yes	No	No	No	Yes
381059541003	No	Yes	No	No	No	Yes
381059541004	No	Yes	No	No	No	Yes
380019656001	No	No	No	No	No	No
380019656002	No	No	No	No	No	No
380039679001	No	No	No	No	No	No
380039679002	No	No	No	No	No	No
380039680001	No	No	No	No	No	No
380039680002	No	No	No	No	No	No
380039680003	No	No	No	No	No	No
380039682002	No	No	No	No	No	No
380039682003	No	No	No	No	No	No
380039682004	No	No	No	No	No	No

Block Group ID	National Supp. Index	State Supp. Index	CEJST	American Indian Reservations	Off Reservation Trust Lands	LIDAC
380039683001	No	No	No	No	No	No
380039683002	No	No	No	No	No	No
380039683003	No	No	No	No	No	No
380039683004	No	No	No	No	No	No
380059567001	No	No	No	No	No	No
380059567002	No	No	No	No	No	No
380059567003	No	No	No	No	No	No
380079631001	No	No	No	No	No	No
380099523001	No	No	No	No	No	No
380099523002	No	No	No	No	No	No
380099524001	No	No	No	No	No	No
380099524002	No	No	No	No	No	No
380099524003	No	No	No	No	No	No
380099525001	No	No	No	No	No	No
380099525002	No	No	No	No	No	No
380119652001	No	No	No	No	No	No
380119653001	No	No	No	No	No	No
380119653002	No	No	No	No	No	No
380139533002	No	No	No	No	No	No
380150101001	No	No	No	No	No	No
380150101002	No	No	No	No	No	No
380150103001	No	No	No	No	No	No
380150103003	No	No	No	No	No	No
380150103006	No	No	No	No	No	No
380150104001	No	No	No	No	No	No
380150104002	No	No	No	No	No	No
380150104003	No	No	No	No	No	No
380150105001	No	No	No	No	No	No
380150105002	No	No	No	No	No	No
380150105003	No	No	No	No	No	No
380150105004	No	No	No	No	No	No

Block Group ID	National Supp. Index	State Supp. Index	CEJST	American Indian Reservations	Off Reservation Trust Lands	LIDAC
380150106001	No	No	No	No	No	No
380150106003	No	No	No	No	No	No
380150107002	No	No	No	No	No	No
380150107003	No	No	No	No	No	No
380150109001	No	No	No	No	No	No
380150109003	No	No	No	No	No	No
380150110011	No	No	No	No	No	No
380150110012	No	No	No	No	No	No
380150110013	No	No	No	No	No	No
380150110014	No	No	No	No	No	No
380150110021	No	No	No	No	No	No
380150110022	No	No	No	No	No	No
380150110023	No	No	No	No	No	No
380150110024	No	No	No	No	No	No
380150111011	No	No	No	No	No	No
380150111012	No	No	No	No	No	No
380150111013	No	No	No	No	No	No
380150111014	No	No	No	No	No	No
380150111031	No	No	No	No	No	No
380150111041	No	No	No	No	No	No
380150111042	No	No	No	No	No	No
380150111043	No	No	No	No	No	No
380150111051	No	No	No	No	No	No
380150111052	No	No	No	No	No	No
380150111053	No	No	No	No	No	No
380150112001	No	No	No	No	No	No
380150112002	No	No	No	No	No	No
380150112003	No	No	No	No	No	No
380150112004	No	No	No	No	No	No
380150113001	No	No	No	No	No	No
380150113002	No	No	No	No	No	No

Block Group ID	National Supp. Index	State Supp. Index	CEJST	American Indian Reservations	Off Reservation Trust Lands	LIDAC
380150113003	No	No	No	No	No	No
380150114001	No	No	No	No	No	No
380150114002	No	No	No	No	No	No
380150115001	No	No	No	No	No	No
380150115002	No	No	No	No	No	No
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380170002033	No	No	No	No	No	No
380170003002	No	No	No	No	No	No
380170003004	No	No	No	No	No	No
380170003005	No	No	No	No	No	No
380170101092	No	No	No	No	No	No
380170101093	No	No	No	No	No	No
380170101101	No	No	No	No	No	No
380170101102	No	No	No	No	No	No
380170102011	No	No	No	No	No	No
380170102012	No	No	No	No	No	No
380170102013	No	No	No	No	No	No
380170102051	No	No	No	No	No	No
380170102052	No	No	No	No	No	No
380170102053	No	No	No	No	No	No
380170102062	No	No	No	No	No	No
380170102063	No	No	No	No	No	No
380170103033	No	No	No	No	No	No
380170103034	No	No	No	No	No	No
380170103071	No	No	No	No	No	No
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380170401001	No	No	No	No	No	No
380170402001	No	No	No	No	No	No
380170402002	No	No	No	No	No	No
380170403001	No	No	No	No	No	No

Block Group ID	National Supp. Index	State Supp. Index	CEJST	American Indian Reservations	Off Reservation Trust Lands	LIDAC
380170403002	No	No	No	No	No	No
380170403003	No	No	No	No	No	No
380170405011	No	No	No	No	No	No
380170405012	No	No	No	No	No	No
380170405013	No	No	No	No	No	No
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380170405022	No	No	No	No	No	No
380170405023	No	No	No	No	No	No
380170405024	No	No	No	No	No	No
380170405031	No	No	No	No	No	No
380170405032	No	No	No	No	No	No
380170405041	No	No	No	No	No	No
380170405042	No	No	No	No	No	No
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380170405072	No	No	No	No	No	No
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380170408002	No	No	No	No	No	No
380170408003	No	No	No	No	No	No
380199509001	No	No	No	No	No	No
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Block Group ID	National Supp. Index	State Supp. Index	CEJST	American Indian Reservations	Off Reservation Trust Lands	LIDAC
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380219732002	No	No	No	No	No	No
380219732003	No	No	No	No	No	No
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380219734001	No	No	No	No	No	No
380219734002	No	No	No	No	No	No
380239545002	No	No	No	No	No	No
380259622001	No	No	No	No	No	No
380259622003	No	No	No	No	No	No
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380299665002	No	No	No	No	No	No
380299665003	No	No	No	No	No	No
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380350108051	No	No	No	No	No	No
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Block Group ID	National Supp. Index	State Supp. Index	CEJST	American Indian Reservations	Off Reservation Trust Lands	LIDAC
380350111001	No	No	No	No	No	No
380350111002	No	No	No	No	No	No
380350111003	No	No	No	No	No	No
380350111004	No	No	No	No	No	No
380350112011	No	No	No	No	No	No
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380419648002	No	No	No	No	No	No
380459721001	No	No	No	No	No	No
380459721002	No	No	No	No	No	No
380459722001	No	No	No	No	No	No

Block Group ID	National Supp. Index	State Supp. Index	CEJST	American Indian Reservations	Off Reservation Trust Lands	LIDAC
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380479725002	No	No	No	No	No	No
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380499559001	No	No	No	No	No	No
380499559002	No	No	No	No	No	No
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380590201004	No	No	No	No	No	No
380590202001	No	No	No	No	No	No
380590202002	No	No	No	No	No	No
380590202004	No	No	No	No	No	No

Block Group ID	National Supp. Index	State Supp. Index	CEJST	American Indian Reservations	Off Reservation Trust Lands	LIDAC
380590203011	No	No	No	No	No	No
380590203012	No	No	No	No	No	No
380590204001	No	No	No	No	No	No
380590204002	No	No	No	No	No	No
380590204003	No	No	No	No	No	No
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380590205004	No	No	No	No	No	No
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380699562003	No	No	No	No	No	No
380719576001	No	No	No	No	No	No
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380719577003	No	No	No	No	No	No
380719577004	No	No	No	No	No	No

Block Group ID	National Supp. Index	State Supp. Index	CEJST	American Indian Reservations	Off Reservation Trust Lands	LIDAC
380719578001	No	No	No	No	No	No
380719578002	No	No	No	No	No	No
380719578003	No	No	No	No	No	No
380719578004	No	No	No	No	No	No
380739689001	No	No	No	No	No	No
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380739691002	No	No	No	No	No	No
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380819740002	No	No	No	No	No	No
380819742002	No	No	No	No	No	No
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380819742004	No	No	No	No	No	No
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380899634001	No	No	No	No	No	No
380899634002	No	No	No	No	No	No
380899634003	No	No	No	No	No	No
380899635011	No	No	No	No	No	No
380899635012	No	No	No	No	No	No

Block Group ID	National Supp. Index	State Supp. Index	CEJST	American Indian Reservations	Off Reservation Trust Lands	LIDAC
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380899635023	No	No	No	No	No	No
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380939670002	No	No	No	No	No	No
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380939672002	No	No	No	No	No	No
380939672003	No	No	No	No	No	No
380939672004	No	No	No	No	No	No
380939673001	No	No	No	No	No	No
380939674021	No	No	No	No	No	No
380939674022	No	No	No	No	No	No
380939674023	No	No	No	No	No	No
380939675001	No	No	No	No	No	No
380939675002	No	No	No	No	No	No
380939675003	No	No	No	No	No	No

Block Group ID	National Supp. Index	State Supp. Index	CEJST	American Indian Reservations	Off Reservation Trust Lands	LIDAC
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380979701002	No	No	No	No	No	No
380979701003	No	No	No	No	No	No
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381010103023	No	No	No	No	No	No
381010103024	No	No	No	No	No	No
381010104001	No	No	No	No	No	No
381010104002	No	No	No	No	No	No
381010104003	No	No	No	No	No	No

Block Group ID	National Supp. Index	State Supp. Index	CEJST	American Indian Reservations	Off Reservation Trust Lands	LIDAC
381010104005	No	No	No	No	No	No
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381010105003	No	No	No	No	No	No
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381010112003	No	No	No	No	No	No
381010113001	No	No	No	No	No	No
381010113002	No	No	No	No	No	No
381010113003	No	No	No	No	No	No

Block Group ID	National Supp. Index	State Supp. Index	CEJST	American Indian Reservations	Off Reservation Trust Lands	LIDAC
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381039600003	No	No	No	No	No	No
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381059539003	No	No	No	No	No	No
381059539004	No	No	No	No	No	No
381059541001	No	No	No	No	No	No
381059541002	No	No	No	No	No	No

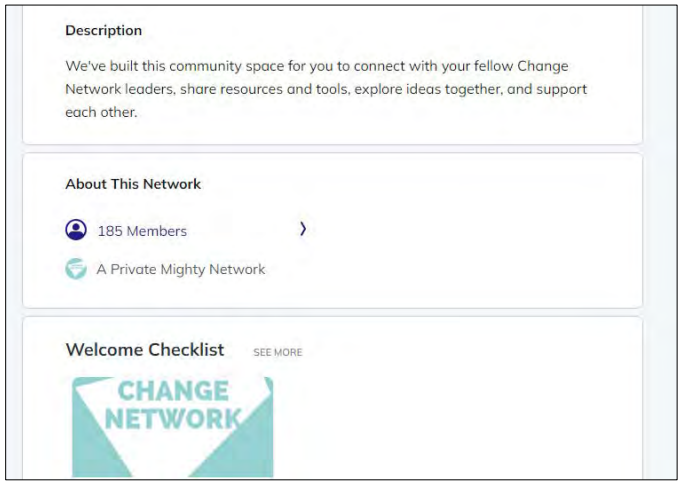
APPENDIX G PCAP COMMUNICATIONS WITH LIDAC RESIDENTS

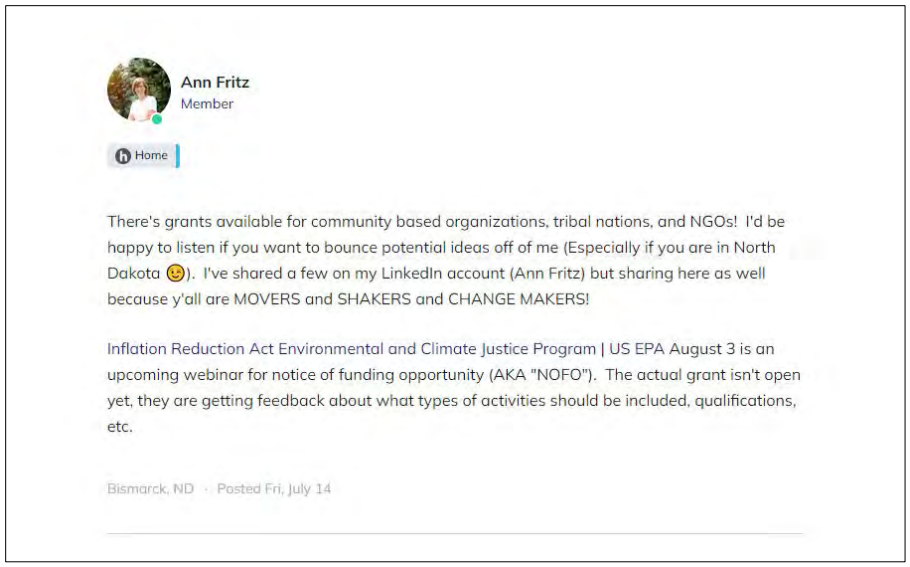
PCAP COMMUNICATIONS WITH LIDAC RESIDENTS

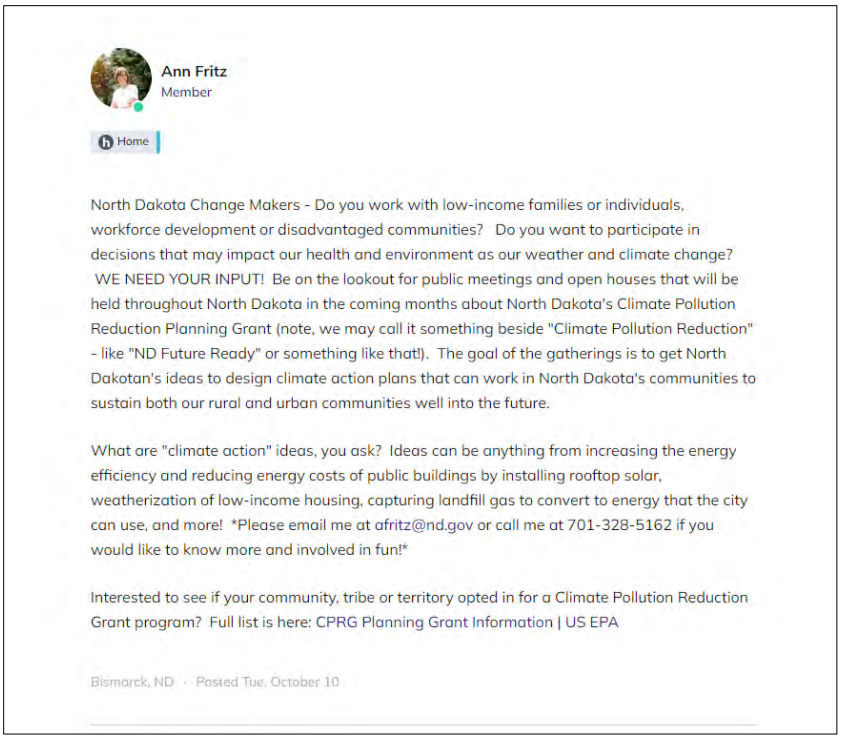
Figures 9-12 are copies of selected communications to advertise and gain interest in LIDAC residents and advocates to participate in the Sustainability Input Forums.

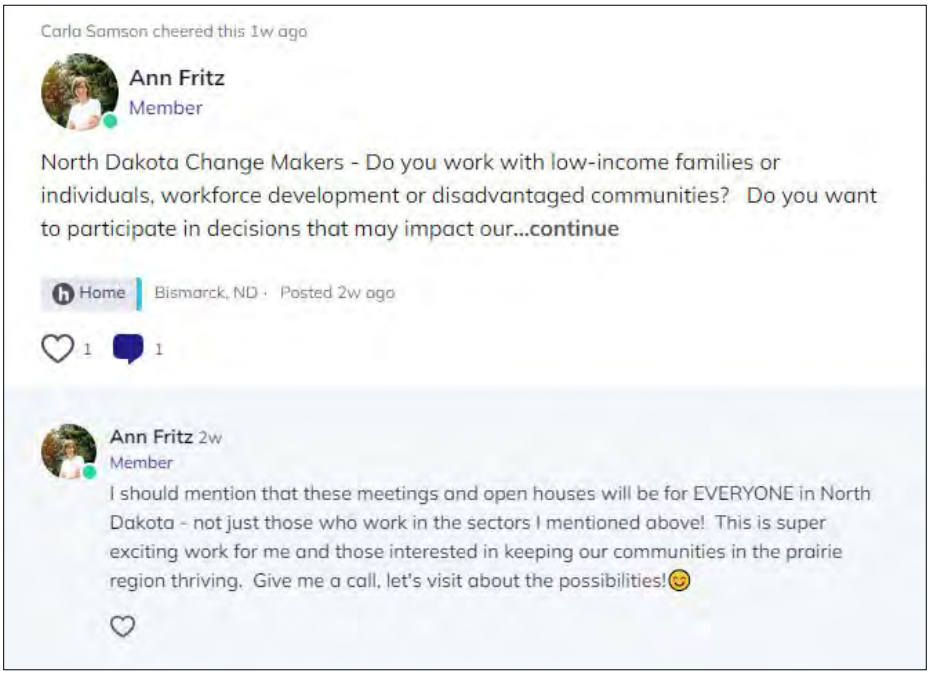
NDDEQ's Environmental Justice Coordinator posted from July 14, 2023 to October 2023 in the Change Network Community, a private Mighty Network online forum. Change Network Community members are people throughout North and South Dakota who have received a Bush Foundation / Arts Strategies "Change Network Grant." There are currently 185 members in seven different cohorts who have received grants since 2017. The Change Network - Mighty Network is a private network, so to respect the privacy on that network, responses have not been captured.

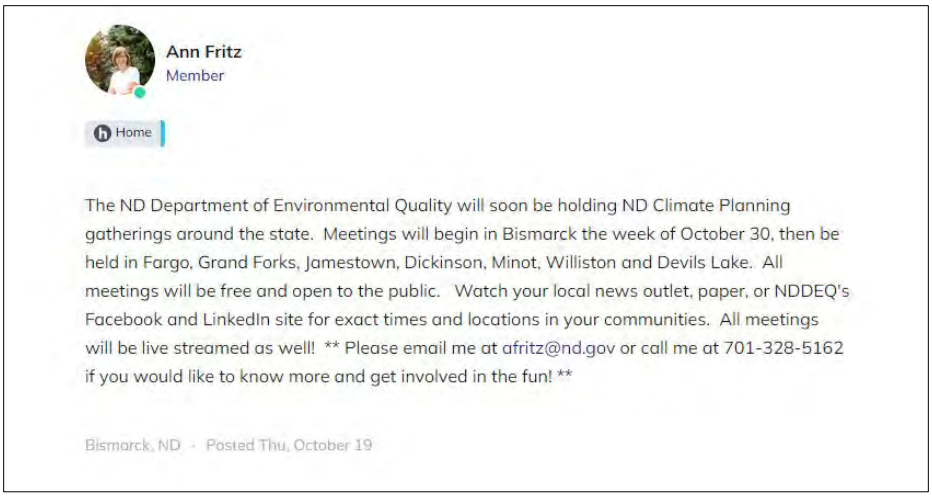
Figure 9. NDDEQ Postings to Change Network Community






Ann Fritz
Member
Home
North Dakota Change Makers - Do you work with low-income families or individuals, workforce development or disadvantaged communities? Do you want to participate in decisions that may impact our health and environment as our weather and climate change? WE NEED YOUR INPUT! Be on the lookout for public meetings and open houses that will be held throughout North Dakota in the coming months about North Dakota's Climate Pollution Reduction Planning Grant (note, we may call it something beside "Climate Pollution Reduction" - like "ND Future Ready" or something like that!). The goal of the gatherings is to get North Dakotan's ideas to design climate action plans that can work in North Dakota's communities to sustain both our rural and urban communities well into the future.
What are "climate action" ideas, you ask? Ideas can be anything from increasing the energy efficiency and reducing energy costs of public buildings by installing rooftop solar, weatherization of low-income housing, capturing landfill gas to convert to energy that the city can use, and more! *Please email me at afritz@nd.gov or call me at 701-328-5162 if you would like to know more and involved in fun!*
Interested to see if your community, tribe or territory opted in for a Climate Pollution Reduction Grant program? Full list is here: CPRG Planning Grant Information | US EPA
Bismarck, ND · Posted Tue, October 10


Carla Samson cheered this 1w ago
Ann Fritz
Member
North Dakota Change Makers - Do you work with low-income families or individuals, workforce development or disadvantaged communities? Do you want to participate in decisions that may impact our...continue
Home
Bismarck, ND · Posted 2w ago
1
1
Ann Fritz 2w
Member
I should mention that these meetings and open houses will be for EVERYONE in North Dakota - not just those who work in the sectors I mentioned above! This is super exciting work for me and those interested in keeping our communities in the prairie region thriving. Give me a call, let's visit about the possibilities!



Ann Fritz
Member

Home

The ND Department of Environmental Quality will soon be holding ND Climate Planning gatherings around the state. Meetings will begin in Bismarck the week of October 30, then be held in Fargo, Grand Forks, Jamestown, Dickinson, Minot, Williston and Devils Lake. All meetings will be free and open to the public. Watch your local news outlet, paper, or NDDEQ's Facebook and LinkedIn site for exact times and locations in your communities. All meetings will be live streamed as well! ** Please email me at afritz@nd.gov or call me at 701-328-5162 if you would like to know more and get involved in the fun! **

Bismarck, ND · Posted Thu, October 19

Figure 10 depicts an email from October 24, 2023, to past North Dakota Change Network Community recipients, many of whom work for NGO, local government, tribal communities, tribal colleges or with immigrant communities.

Figure 10. NDDEQ Press Release Email to Past North Dakota Change Network Community Recipients

FW: NEWS RELEASE: Department of Environmental Quality Announces Sustainability Input Forums

Fritz, Ann M.
To Fritz, Ann M.
Bcc Tim Baumann; Megan Laudenschlager (megan@strengthennd.com); rstromme@midco.net; kaylaannschmidt@gmail.com; matuor20@gmail.com; fayme.stringer@gmail.com; goodfood@morningjoyfarm.com; pamkarpenko@gmail.com; jessicaackerman@gmail.com; **+59 others**

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Tue 10/24/2023 5:17 PM

You forwarded this message on 10/24/2023 5:19 PM.
Click here to download pictures. To help protect your privacy, Outlook prevented automatic download of some pictures in this message.

Hello Change Makers in North Dakota!

I'm excited about the possibilities that can result from these listening forums. The goal of the gatherings is to get North Dakotan's ideas to design climate action plans that can work in North Dakota's communities to sustain both our rural and urban communities well into the future. What are "climate action" ideas, you ask? Ideas can be anything from increasing the energy efficiency and reducing energy costs of buildings by installing rooftop solar, weatherization of low-income housing, capturing landfill gas to convert to energy that a city can use, and more. We'd love to have your ideas be part of the plan! Plan to attend the meeting near your community in person or via ZOOM link, as described in the press release, below. Apologies if you are already receiving the NDDEQ's Press Releases.

Thank you!

Ann Fritz, GISP
(she/her/hers)
Office of the Director • Non-discrimination / Environmental Justice Program Coordinator

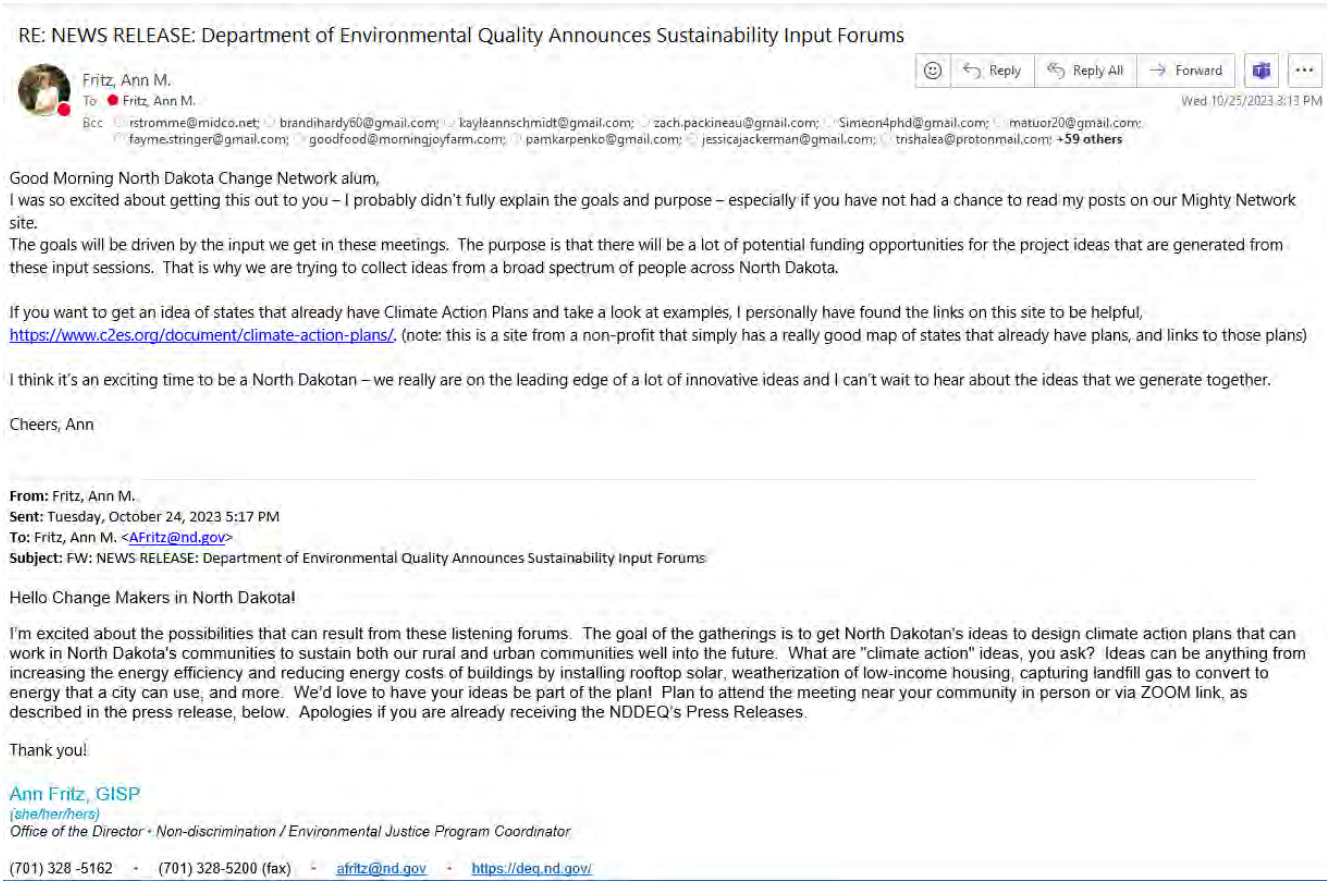
(701) 328 -5162 · (701) 328-5200 (fax) · afritz@nd.gov · https://deq.nd.gov/

NORTH Dakota | Environmental Quality
Be Legendary.

4201 Normandy Street · Bismarck, ND · 58503-1324

From: North Dakota Department of Environmental Quality <DEQ@info.nd.gov>
Sent: Tuesday, October 24, 2023 4:06 PM
To: Fritz, Ann M. <AFritz@nd.gov>
Subject: NEWS RELEASE: Department of Environmental Quality Announces Sustainability Input Forums

Figure 11. NDDEQ Outreach Email to Change Network Community Announcing Round One Sustainability Input Forums



RE: NEWS RELEASE: Department of Environmental Quality Announces Sustainability Input Forums

Fritz, Ann M.
To: Fritz, Ann M.
Bcc: rstromme@midco.net; brandihardy60@gmail.com; kaylaannschmidt@gmail.com; zach.packineau@gmail.com; Simeon4phd@gmail.com; matuor20@gmail.com; fayme.stringer@gmail.com; goodfood@morningjoyfarm.com; pamkarpenko@gmail.com; jessicajackerman@gmail.com; trishalea@protonmail.com; **+59 others**

Reply | Reply All | Forward
Wed 10/25/2023 3:13 PM

Good Morning North Dakota Change Network alum,
I was so excited about getting this out to you – I probably didn't fully explain the goals and purpose – especially if you have not had a chance to read my posts on our Mighty Network site.
The goals will be driven by the input we get in these meetings. The purpose is that there will be a lot of potential funding opportunities for the project ideas that are generated from these input sessions. That is why we are trying to collect ideas from a broad spectrum of people across North Dakota.

If you want to get an idea of states that already have Climate Action Plans and take a look at examples, I personally have found the links on this site to be helpful, https://www.c2es.org/document/climate-action-plans/. (note: this is a site from a non-profit that simply has a really good map of states that already have plans, and links to those plans)

I think it's an exciting time to be a North Dakotan – we really are on the leading edge of a lot of innovative ideas and I can't wait to hear about the ideas that we generate together.

Cheers, Ann

From: Fritz, Ann M.
Sent: Tuesday, October 24, 2023 5:17 PM
To: Fritz, Ann M. <AFritz@nd.gov>
Subject: FW: NEWS RELEASE: Department of Environmental Quality Announces Sustainability Input Forums

Hello Change Makers in North Dakota!

I'm excited about the possibilities that can result from these listening forums. The goal of the gatherings is to get North Dakotan's ideas to design climate action plans that can work in North Dakota's communities to sustain both our rural and urban communities well into the future. What are "climate action" ideas, you ask? Ideas can be anything from increasing the energy efficiency and reducing energy costs of buildings by installing rooftop solar, weatherization of low-income housing, capturing landfill gas to convert to energy that a city can use, and more. We'd love to have your ideas be part of the plan! Plan to attend the meeting near your community in person or via ZOOM link, as described in the press release, below. Apologies if you are already receiving the NDDEQ's Press Releases.

Thank you!

Ann Fritz, GISP
(she/her/hers)
Office of the Director • Non-discrimination / Environmental Justice Program Coordinator

(701) 328 -5162 • (701) 328-5200 (fax) • afritz@nd.gov • https://deq.nd.gov/

Figure 12. NDDEQ LinkedIn Post Announcing Round One Sustainability Input Forums

APPENDIX H LIDAC PARTICIPATION IN SUSTAINABILITY INPUT FORUMS

DETERMINING LIDAC PARTICIPATION IN SUSTIANBAILITY INPUT FORUMS

The only location-identifying information that was asked during the Sustainability Input Forums was for participants to provide their ZIP codes. This allowed the planning team to track participation across the state. By design, all comments from Round One Sustainability Input Forums (both online and in-person) were collected anonymously. Online comments, however, can be coded to ZIP codes requested in the survey. In-person participants were asked to mark an approximate location of where they live on a map. Round Two Sustainability Input Forums were all online and included a request for participant ZIP codes through registration.

It is well documented that ZIP codes should not be equated with population statistics or demographics.[1,2] However, a method of determining if a participant is from a LIDAC area was necessary for the planning team to determine whether LIDAC residents participated in the stakeholder outreach efforts. As it was the only data available to the planning team, ZIP code is the most appropriate data to use to determine if a person resides in an area considered to be LIDAC. Using a town would not be specific enough, as a person can live a few miles outside of their named town and be in a different census block group. Other geographic identifiers, such as census geography (block group or tract), legislative district or school district, are typically not known by individuals. Therefore, the planning team used self-reported ZIP code information from respondents to determine the likelihood that a person from a particular ZIP code lived in a designated LIDAC census block group.

The goal of the analysis was to determine the likelihood that a resident in a particular ZIP code would be from a designated LIDAC area in North Dakota. The geospatial calculation the planning team used would answer the question, "What percentage of the ZIP code area is in each census block group?" Statistically, there will be a threshold value wherein anything over that threshold value could considered to be from LIDAC, depending on how much of that particular ZIP code area falls within the census block. Figure 13 represents the geospatial logic, with the grey lines depicting the census block group boundaries; shaded green areas representing LIDAC block groups; and pink solid line representing ZIP code boundary. ZIP code areas 58061 and 58008 both contain portions of a designated LIDAC census

[1] Grubesic, T.H., Matisziw, T.C. December 13, 2006. "On the use of ZIP codes and ZIP code tabulation areas (ZCTAs) for the spatial analysis of epidemiological data." International Journal of Health Geographics 5(58). Accessed February 2024. Retrieved from: https://doi.org/10.1186/1476-072X-5-58

[2] Krieger, Nancy; Pamela Waterman, Jarvis T. Chen, Mah-Jabeen Soobader, S. V. Subramanian, and Rosa Carson. July 2002. "Zip Code Caveat: Bias Due to Spatiotemporal Mismatches Between Zip Codes and US Census–Defined Geographic Areas—The Public Health Disparities Geocoding Project." American Journal of Public Health 92(7):1100-1102. Accessed February 2024. Retrieved from: https://doi.org/10.2105/AJPH.92.7.1100

block group, 380779714003. However, the likelihood that a participant from ZIP code 58061 would be from a low-income disadvantaged community is higher than a participant from 58008 ZIP code.

Figure 13. LIDAC ZIP Code Analysis Geospatial Logic

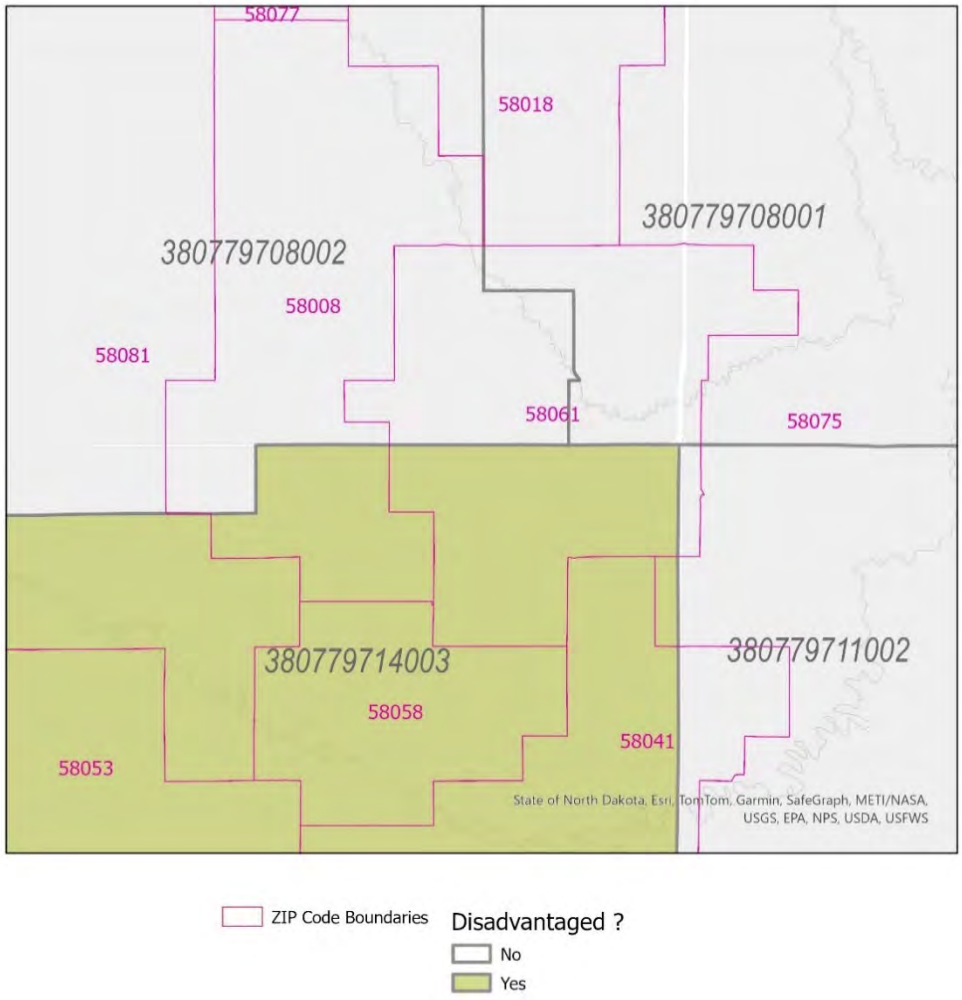
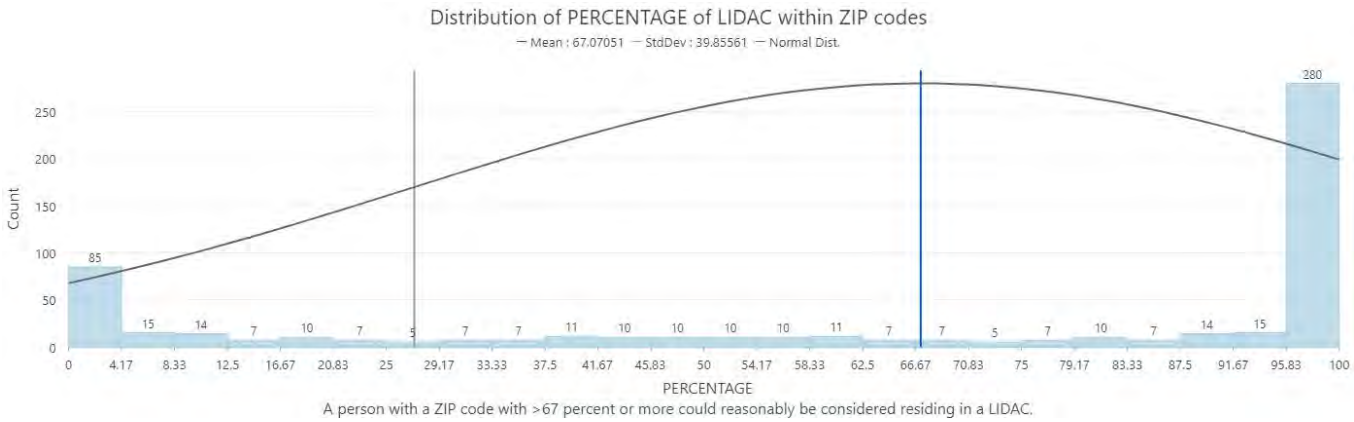


Figure 14 displays the distribution of ZIP code areas within census block groups. It indicates that if a ZIP code contains more than 67% LIDAC census block group area (e.g., the green shaded area in Figure 13), then there is a strong likelihood that a participant can be considered from a LIDAC area.

Figure 14. Distribution of Percentage of LIDAC Block Groups withing ZIP Code Boundaries



The planning team used the EPA IRA dataset[3] and the ZIP code dataset from Tom Tom[4] and ESRI,[5] given the ZIP code tabulation areas (ZCTA)[6] contain additional features such as lakes and rivers and fragmented polygons that make geospatial analysis problematic.[7] All data were projected into the same coordinate system, UTM zone 14, to ensure geographic conformity. Given the EPA IRA dataset[8] was compiled and not the original source data, the planning team verified attributes using the original

[3] U.S. Environmental Protection Agency. 2024. "Index of /EPA_IRA_Public – EPA IRA Disadvantaged." Accessed October 23, 2023. Retrieved from: https://gaftp.epa.gov/EPA_IRA_Public/

[4] ArcGIS - Environmental System Research Institute (ESRI), TomTom North America, U.S. Post Office. 2023. "U.S. ZIP Code Areas provides ZIP Code, postal district name, population, and area for the ZIP Code areas in the United States." Accessed February 2024. Retrieved from: https://www.arcgis.com/home/item.html?id=8d2012a2016e484dafaac0451f9aea24#

[5] Environmental System Research Institute (ESRI). N.D. "ArcGIS Pro Documentation - Tabulate Intersection (Analysis)." Accessed February 2024. Retrieved from: https://pro.arcgis.com/en/pro-app/3.1/tool-reference/analysis/tabulate-intersection.htm

[6] U.S. Census Bureau. August 2023. "Zip Code Tabulation Areas (ZCTAs)." Accessed October 2023. Retrieved from: https://www.census.gov/programs-surveys/geography/guidance/geo-areas/zctas.html

[7] Grubesic, T.H., Matisziw, T.C. December 13, 2006. "On the use of ZIP codes and ZIP code tabulation areas (ZCTAs) for the spatial analysis of epidemiological data." International Journal of Health Geographics 5(58). Accessed February 2024. Retrieved from: https://doi.org/10.1186/1476-072X-5-58

[8] U.S. Environmental Protection Agency. 2024. "Index of /EPA_IRA_Public – EPA IRA Disadvantaged." Accessed October 23, 2023. Retrieved from: https://gaftp.epa.gov/EPA_IRA_Public/

EJScreen Supplemental Indexes.[9] Four census block groups in the Williston area had different supplemental index values on EJScreen than the EPA IRA dataset. The planning team made edits to attributes to correctly reflect the EJScreen Supplemental Index values. Additional attribute fields, "CPRG_LIDAC_ND" and "EXCEED_COUNT_90_SUP", were added to aid final interpretation and symbolization of results.

The planning team used the Tabulate Intersection tool within ArcPro (v 3.1) to compute the intersection between the two feature classes of the same geometry. The two feature classes are referred to as the zone and the class features; in this case the zone feature is ZIP code boundaries and class features is the identified LIDAC census block group layer. The tool computes the intersection and cross tabulates the area of the intersecting features. The result is a table of ZIP code polygons paired with the census block group identification of LIDAC or not. Using the median value of 67% as the threshold for LIDAC determination, it was determined that there are 71 of the 571 ZIP codes within North Dakota wherein a resident with that ZIP code is highly likely to be from a LIDAC census block group. The results of the analysis of LIDAC designations and ZIP code areas are listed in Table 7. The Percentage column is the percent of the ZIP code area intersected by the LIDAC-designated census block.

Table 7. LIDAC ZIP Codes Results

ZIP Code	LIDAC	Area (km^2)	Percentage
58335	Yes	4.21	100.00
58366	Yes	530.19	100.00
58757	Yes	472.30	100.00
58770	Yes	797.13	100.00
58058	Yes	67.19	100.00
58769	Yes	450.64	100.00

[9] U.S. Environmental Protection Agency. September 2023. "Download EJScreen Data: State Level Geodatabase at Block Group Level". Accessed October 20, 2023. Retrieved from: https://www.epa.gov/ejscreen/download-ejscreen-data

ZIP Code	LIDAC	Area (km^2)	Percentage
58853	Yes	15.53	100.00
58076	Yes	0.10	100.00
58735	Yes	405.15	100.00
58381	Yes	369.35	100.00
58775	Yes	503.42	100.00
58847	Yes	393.25	100.00
58316	Yes	367.31	100.00
58405	Yes	0.44	100.00
58244	Yes	144.06	100.00
58370	Yes	224.42	100.00
58580	Yes	286.89	100.00
58428	Yes	453.12	100.00
58353	Yes	327.19	100.00
58540	Yes	1139.11	100.00
58327	Yes	534.74	99.99
58482	Yes	645.54	99.99
58380	Yes	404.65	99.99
58361	Yes	288.19	99.99
58369	Yes	225.04	99.99

ZIP Code	LIDAC	Area (km^2)	Percentage
58528	Yes	103.34	99.99
58845	Yes	976.43	99.99
58541	Yes	200.54	99.98
58538	Yes	789.18	99.98
58385	Yes	276.01	99.98
58727	Yes	613.52	99.98
58478	Yes	661.89	99.98
58568	Yes	1629.47	99.96
58487	Yes	731.68	99.95
58488	Yes	600.91	99.93
58103	Yes	29.71	99.87
58255	Yes	8.15	99.79
58013	Yes	215.77	99.77
58707	Yes	0.15	99.77
58202	Yes	0.96	99.76
58235	Yes	192.52	98.54
58053	Yes	569.80	98.43
58634	Yes	1043.82	97.89
58475	Yes	259.02	97.07

ZIP Code	LIDAC	Area (km^2)	Percentage
58844	Yes	666.74	96.62
58779	Yes	785.13	96.07
58854	Yes	1755.45	95.49
58788	Yes	1140.77	94.54
58856	Yes	362.72	94.04
58041	Yes	468.32	92.26
58329	Yes	604.76	91.41
58374	Yes	537.68	89.68
58356	Yes	735.67	89.39
58357	Yes	406.78	86.95
58801	Yes	1835.82	86.80
58716	Yes	148.03	86.12
58646	Yes	1360.93	84.83
58301	Yes	731.01	82.79
58030	Yes	264.84	82.69
58771	Yes	521.87	82.05
58640	Yes	1621.48	80.74
58523	Yes	1191.50	79.66
58763	Yes	1107.95	78.39

ZIP Code	LIDAC	Area (km^2)	Percentage
58843	Yes	355.08	77.18
58362	Yes	92.63	74.79
58310	Yes	14.23	73.47
58367	Yes	290.57	70.53
58759	Yes	430.40	70.27
58638	Yes	349.88	69.83
58730	Yes	529.72	69.48
58441	No	406.64	100.00
58204	No	5.31	100.00
58276	No	256.57	100.00
58497	No	261.91	100.00
58002	No	8.59	100.00
58016	No	167.49	100.00
58006	No	115.65	100.00
58560	No	286.48	100.00
58262	No	49.82	100.00
58331	No	305.31	100.00
58521	No	365.43	100.00
58228	No	282.84	100.00

ZIP Code	LIDAC	Area (km²)	Percentage
58062	No	167.46	100.00
58424	No	513.84	100.00
58768	No	252.52	100.00
58630	No	455.42	100.00
58758	No	324.34	100.00
58461	No	573.40	100.00
58012	No	164.76	100.00
58572	No	566.61	100.00
58760	No	470.46	100.00
58277	No	249.22	100.00
58456	No	530.22	100.00
58790	No	371.84	100.00
58227	No	328.06	100.00
58377	No	642.54	100.00
58533	No	851.86	100.00
58036	No	129.65	100.00
58472	No	453.83	100.00
58040	No	208.20	100.00
58069	No	157.10	100.00

ZIP Code	LIDAC	Area (km²)	Percentage
58260	No	271.71	100.00
58430	No	294.50	100.00
58484	No	98.89	100.00
58710	No	495.22	100.00
58079	No	350.09	100.00
58426	No	335.87	100.00
58705	No	9.52	100.00
58007	No	131.61	100.00
58031	No	406.89	100.00
58311	No	365.97	100.00
58442	No	642.33	100.00
58458	No	429.45	100.00
58463	No	1054.02	100.00
58712	No	217.98	100.00
58722	No	228.23	100.00
58046	No	607.47	100.00
58429	No	317.00	100.00
58566	No	254.37	100.00
58267	No	585.07	100.00

ZIP Code	LIDAC	Area (km²)	Percentage
58323	No	127.31	100.00
58420	No	378.90	100.00
58486	No	342.78	100.00
58495	No	861.66	100.00
58645	No	1261.80	100.00
58654	No	1035.88	100.00
58725	No	395.82	100.00
58029	No	138.00	100.00
58051	No	275.77	100.00
58063	No	325.88	100.00
58210	No	340.70	100.00
58212	No	458.58	100.00
58433	No	871.57	100.00
58438	No	400.07	100.00
58479	No	211.90	100.00
58642	No	583.87	100.00
58740	No	496.53	100.00
58001	No	0.66	100.00
58009	No	93.21	100.00

ZIP Code	LIDAC	Area (km²)	Percentage
58049	No	299.66	100.00
58065	No	16.61	100.00
58236	No	33.90	100.00
58332	No	459.09	100.00
58355	No	24.68	100.00
58425	No	654.69	100.00
58431	No	191.03	100.00
58452	No	5.50	100.00
58460	No	602.85	100.00
58480	No	333.64	100.00
58737	No	332.78	100.00
58776	No	319.06	100.00
58793	No	446.19	100.00
58313	No	0.44	100.00
58448	No	355.12	100.00
58535	No	832.58	100.00
58048	No	272.68	100.00
58330	No	475.32	100.00
58455	No	412.99	100.00

ZIP Code	LIDAC	Area (km²)	Percentage
58476	No	608.94	100.00
58564	No	201.80	100.00
58004	No	135.21	100.00
58761	No	779.19	100.00
58052	No	438.59	100.00
58492	No	347.46	100.00
58481	No	312.26	100.00
58454	No	617.39	100.00
58622	No	1034.52	100.00
58338	No	177.20	100.00
58558	No	326.36	100.00
58021	No	170.20	100.00
58035	No	242.05	100.00
58077	No	353.05	100.00
58544	No	561.79	100.00
58270	No	313.03	100.00
58238	No	217.41	100.00
58341	No	1184.95	100.00
58787	No	300.62	100.00

ZIP Code	LIDAC	Area (km²)	Percentage
58750	No	615.97	100.00
58071	No	249.56	100.00
58736	No	487.53	100.00
58273	No	186.48	100.00
58490	No	280.57	100.00
58650	No	677.85	100.00
58731	No	171.32	100.00
58064	No	442.00	100.00
58216	No	160.19	100.00
58011	No	295.87	100.00
58033	No	408.30	100.00
58056	No	299.80	100.00
58466	No	395.90	100.00
58520	No	525.27	100.00
58230	No	396.73	100.00
58785	No	100.60	100.00
58477	No	402.51	100.00
58068	No	272.64	100.00
58762	No	225.97	100.00

ZIP Code	LIDAC	Area (km²)	Percentage
58440	No	553.19	100.00
58241	No	143.18	100.00
58723	No	444.37	100.00
58579	No	669.77	100.00
58059	No	311.96	100.00
58656	No	457.63	100.00
58057	No	191.35	100.00
58250	No	241.25	100.00
58240	No	437.77	100.00
58655	No	254.89	100.00
58229	No	242.45	100.00
58243	No	207.44	100.00
58559	No	278.39	100.00
58352	No	421.32	100.00
58222	No	213.37	100.00
58704	No	5.33	100.00
58565	No	36.78	100.00
58205	No	13.60	100.00
58415	No	199.91	100.00

ZIP Code	LIDAC	Area (km²)	Percentage
58272	No	327.87	100.00
58620	No	1314.13	100.00
58220	No	421.22	100.00
58224	No	33.66	100.00
58792	No	540.46	100.00
58711	No	321.83	100.00
58422	No	383.18	100.00
58474	No	894.75	100.00
58783	No	754.02	100.00
58443	No	407.01	100.00
58365	No	676.83	100.00
58781	No	348.34	100.00
58318	No	769.26	100.00
58494	No	872.18	100.00
58653	No	723.09	100.00
58214	No	178.19	100.00
58530	No	995.55	100.00
58721	No	600.53	100.00
58641	No	215.71	100.00

ZIP Code	LIDAC	Area (km²)	Percentage
58627	No	1086.64	100.00
58733	No	246.51	100.00
58439	No	361.96	100.00
58436	No	868.88	100.00
58496	No	773.11	100.00
58372	No	232.26	99.99
58651	No	1660.91	99.99
58831	No	861.07	99.99
58649	No	520.66	99.99
58748	No	274.54	99.99
58573	No	958.12	99.99
58632	No	359.51	99.99
58416	No	482.88	99.99
58569	No	386.96	99.99
58256	No	296.75	99.99
58275	No	307.32	99.99
58363	No	167.63	99.99
58652	No	1077.61	99.99
58444	No	408.80	99.98

ZIP Code	LIDAC	Area (km²)	Percentage
58339	No	126.91	99.98
58542	No	421.79	99.98
58017	No	522.13	99.98
58005	No	260.04	99.98
58045	No	634.42	99.98
58032	No	283.55	99.98
58639	No	1890.99	99.98
58018	No	204.79	99.98
58529	No	1198.75	99.98
58549	No	398.48	99.98
58581	No	278.68	99.98
58038	No	160.21	99.97
58643	No	772.02	99.97
58451	No	362.07	99.97
58042	No	197.34	99.97
58278	No	237.79	99.97
58223	No	150.49	99.97
58218	No	330.10	99.96
58561	No	819.22	99.96

ZIP Code	LIDAC	Area (km²)	Percentage
58343	No	78.32	99.96
58782	No	365.13	99.95
58225	No	497.24	99.95
58621	No	1158.06	99.94
58265	No	234.23	99.94
58072	No	868.13	99.94
58239	No	297.25	99.94
58258	No	101.90	99.93
58271	No	336.62	99.93
58838	No	2008.56	99.91
58219	No	42.89	99.86
58503	No	353.96	99.79
58274	No	348.81	99.76
58601	No	1403.90	99.72
58421	No	1039.86	99.63
58015	No	69.69	99.63
58746	No	1034.15	99.55
58401	No	1137.71	99.31
58703	No	341.99	99.26

ZIP Code	LIDAC	Area (km²)	Percentage
58623	No	1361.80	99.10
58577	No	575.65	99.09
58413	No	1172.03	98.90
58552	No	1456.87	98.90
58423	No	184.83	98.73
58269	No	392.77	98.70
58054	No	741.77	98.47
58504	No	335.94	98.12
58257	No	214.93	96.95
58237	No	678.23	96.15
58078	No	87.39	96.11
58203	No	165.68	96.07
58075	No	600.52	96.03
58027	No	419.21	95.39
58261	No	378.66	95.38
58744	No	274.10	95.26
58554	No	1452.34	95.22
58562	No	1059.00	95.06
58201	No	173.18	93.99

ZIP Code	LIDAC	Area (km²)	Percentage
58789	No	420.54	93.68
58647	No	1097.58	93.42
58348	No	799.41	92.12
58467	No	528.64	92.05
58325	No	263.49	91.94
58483	No	326.45	91.07
58576	No	436.45	91.06
58418	No	483.26	90.97
58251	No	443.35	90.93
58382	No	229.80	90.56
58501	No	55.40	89.97
58545	No	785.73	89.96
58794	No	106.36	89.93
58741	No	560.76	89.81
58346	No	517.86	88.86
58281	No	231.24	88.12
58351	No	331.37	85.68
58778	No	318.33	84.87
58266	No	231.88	84.04

ZIP Code	LIDAC	Area (km^2)	Percentage
58317	No	340.72	82.96
58445	No	110.72	82.65
58047	No	155.12	82.24
58701	No	560.45	80.29
58563	No	1152.17	80.16
58008	No	120.09	78.83
58524	No	378.59	78.55
58259	No	272.34	77.34
58081	No	331.03	76.26
58345	No	309.04	76.21
58718	No	759.75	74.14
58102	No	64.09	72.18
58532	No	319.94	72.05
58734	No	335.93	70.62
58368	No	1362.92	69.76
58784	No	998.85	68.54
58626	No	311.55	66.42
58575	No	400.61	66.13
58755	No	123.80	64.94

ZIP Code	LIDAC	Area (km^2)	Percentage
58835	No	273.44	64.40
58060	No	395.87	64.38
58386	No	196.34	64.30
58061	No	93.92	63.18
58233	No	183.99	61.43
58249	Yes	768.92	61.36
58282	No	317.61	61.08
58830	No	475.71	60.35
58852	Yes	552.56	60.10
58231	No	166.97	60.01
58104	Yes	40.16	60.00
58849	Yes	386.60	59.32
58321	No	130.67	59.22
58636	No	625.35	58.95
58752	Yes	159.43	58.64
58067	Yes	78.22	57.88
58043	No	93.28	57.64
58464	Yes	225.06	57.36
58625	No	108.72	57.29

ZIP Code	LIDAC	Area (km^2)	Percentage
58772	Yes	103.44	55.92
58833	Yes	175.00	55.84
58571	No	190.61	55.10
58384	No	459.20	55.10
58105	No	0.51	54.86
58765	Yes	203.84	54.81
58324	Yes	280.52	54.12
58531	Yes	187.74	53.98
58254	Yes	216.30	53.37
58773	Yes	399.50	52.56
58631	No	413.99	51.52
58795	No	226.15	51.40
58713	Yes	173.40	50.97
58756	Yes	145.93	50.95
58570	No	403.21	50.28
58344	Yes	304.80	50.02
58344	No	304.60	49.98
58570	Yes	398.66	49.72
58756	No	140.50	49.05

ZIP Code	LIDAC	Area (km²)	Percentage
58713	No	166.80	49.03
58795	Yes	213.83	48.60
58631	Yes	389.63	48.48
58773	No	360.52	47.44
58254	No	188.99	46.63
58531	No	160.08	46.02
58324	No	237.84	45.88
58765	No	168.07	45.19
58105	Yes	0.42	45.14
58384	Yes	374.24	44.90
58571	Yes	155.33	44.90
58833	No	138.42	44.16
58772	No	81.51	44.07
58625	Yes	81.04	42.71
58464	No	167.33	42.64
58043	Yes	68.22	42.15
58067	No	56.91	42.12
58752	No	112.46	41.36
58636	Yes	435.41	41.05

ZIP Code	LIDAC	Area (km^2)	Percentage
58321	Yes	89.98	40.78
58849	No	265.11	40.68
58231	Yes	111.28	39.99
58104	No	26.75	39.95
58852	No	366.91	39.90
58830	Yes	312.49	39.65
58282	Yes	202.32	38.91
58249	No	484.14	38.63
58233	Yes	115.51	38.57
58061	Yes	54.74	36.82
58386	Yes	109.00	35.70
58060	Yes	219.04	35.62
58835	Yes	151.13	35.60
58755	Yes	66.83	35.06
58575	Yes	205.14	33.87
58626	Yes	157.54	33.58
58784	Yes	458.47	31.46
58730	No	232.55	30.50
58368	Yes	590.81	30.24

ZIP Code	LIDAC	Area (km^2)	Percentage
58638	No	151.17	30.17
58759	No	182.07	29.73
58367	No	121.43	29.47
58734	Yes	139.76	29.38
58532	Yes	124.12	27.95
58102	Yes	24.62	27.73
58310	No	5.14	26.53
58718	Yes	265.06	25.86
58362	No	31.23	25.21
58345	Yes	96.46	23.79
58081	Yes	103.04	23.74
58843	No	104.96	22.82
58259	Yes	79.78	22.66
58763	No	305.49	21.61
58524	Yes	103.41	21.45
58008	Yes	32.24	21.17
58523	No	304.26	20.34
58563	Yes	285.11	19.84
58701	Yes	137.55	19.71

ZIP Code	LIDAC	Area (km²)	Percentage
58640	No	386.68	19.26
58771	No	114.20	17.95
58047	Yes	33.46	17.74
58445	Yes	23.25	17.35
58030	No	55.34	17.28
58301	No	151.94	17.21
58317	Yes	69.97	17.04
58266	Yes	44.02	15.96
58646	No	243.44	15.17
58778	Yes	56.74	15.13
58351	Yes	55.40	14.32
58716	No	23.87	13.88
58801	No	278.95	13.19
58357	No	61.07	13.05
58281	Yes	31.17	11.88
58346	Yes	64.89	11.14
58356	No	87.31	10.61
58374	No	61.84	10.32
58741	Yes	63.60	10.19

ZIP Code	LIDAC	Area (km^2)	Percentage
58794	Yes	11.91	10.07
58545	Yes	87.68	10.04
58501	Yes	6.17	10.03
58382	Yes	23.95	9.44
58251	Yes	44.23	9.07
58418	Yes	47.99	9.03
58576	Yes	42.85	8.94
58483	Yes	32.02	8.93
58329	No	56.83	8.59
58325	Yes	23.10	8.06
58467	Yes	45.68	7.95
58348	Yes	68.35	7.88
58041	No	38.67	7.62
58647	Yes	77.26	6.58
58789	Yes	28.36	6.32
58201	Yes	11.02	5.98
58856	No	23.01	5.96
58788	No	65.83	5.46
58562	Yes	55.03	4.94

ZIP Code	LIDAC	Area (km^2)	Percentage
58554	Yes	72.89	4.78
58744	Yes	13.64	4.74
58027	Yes	20.27	4.61
58261	Yes	18.28	4.61
58854	No	82.82	4.51
58779	No	32.15	3.93
58075	Yes	24.57	3.93
58203	Yes	6.75	3.91
58078	Yes	3.54	3.89
58237	Yes	27.13	3.85
58844	No	23.20	3.36
58257	Yes	6.76	3.05
58475	No	7.82	2.93
58634	No	22.48	2.11
58504	Yes	6.44	1.88
58054	Yes	11.49	1.53
58235	No	2.86	1.46
58053	No	8.32	1.44
58269	Yes	5.19	1.30

ZIP Code	LIDAC	Area (km^2)	Percentage
58423	Yes	2.37	1.27
58552	Yes	16.26	1.10
58413	Yes	12.93	1.09
58577	Yes	5.28	0.91
58623	Yes	12.37	0.90
58703	Yes	2.54	0.74
58401	Yes	7.88	0.69
58746	Yes	4.66	0.45
58421	Yes	3.88	0.37
58601	Yes	3.96	0.28
58274	Yes	0.84	0.24
58202	No	0.00	0.24
58707	No	0.00	0.23
58503	Yes	0.74	0.21
58258	Yes	0.07	0.07
58838	Yes	1.37	0.07
58488	No	0.39	0.07
58072	Yes	0.55	0.06
58487	No	0.36	0.05

ZIP Code	LIDAC	Area (km^2)	Percentage
58343	Yes	0.03	0.04
58561	Yes	0.30	0.04
58451	Yes	0.10	0.03
58478	No	0.16	0.02
58549	Yes	0.09	0.02
58529	Yes	0.27	0.02
58385	No	0.04	0.02
58541	No	0.03	0.02
58339	Yes	0.02	0.02
58444	Yes	0.06	0.02
58652	Yes	0.15	0.01
58363	Yes	0.02	0.01
58727	No	0.07	0.01
58569	Yes	0.04	0.01
58528	No	0.01	0.01
58416	Yes	0.05	0.01
58361	No	0.02	0.01
58538	No	0.06	0.01
58568	No	0.13	0.01

ZIP Code	LIDAC	Area (km^2)	Percentage
58380	No	0.03	0.01
58482	No	0.05	0.01
58748	Yes	0.02	0.01
58256	Yes	0.02	0.01
58831	Yes	0.05	0.01
58327	No	0.03	0.01
58639	Yes	0.08	0.00
58103	No	0.00	0.00
58496	Yes	0.03	0.00
58540	No	0.04	0.00
58733	Yes	0.01	0.00
58627	Yes	0.03	0.00
58641	Yes	0.01	0.00
58530	Yes	0.02	0.00
58214	Yes	0.00	0.00
58494	Yes	0.02	0.00
58353	No	0.01	0.00
58428	No	0.01	0.00
58781	Yes	0.00	0.00

ZIP Code	LIDAC	Area (km^2)	Percentage
58580	No	0.00	0.00
58370	No	0.00	0.00
58443	Yes	0.00	0.00
58318	Yes	0.01	0.00
58422	Yes	0.00	0.00
58792	Yes	0.00	0.00
58224	Yes	0.00	0.00
58220	Yes	0.00	0.00
58244	No	0.00	0.00
58620	Yes	0.00	0.00
58573	Yes	0.00	0.00
58272	Yes	0.00	0.00
58239	Yes	0.00	0.00
58405	No	0.00	0.00

AMENDMENT

NORTH DAKOTA TRIBAL PRIORITIES

On March 11, 2024, the North Dakota Priority Climate Action Plan was amended to add the following GHG reduction measures for tribal governments within North Dakota to be implemented by those tribal governments.

1. **Energy efficient housing:** Reduce greenhouse gas (GHG) emissions from residential buildings (single and multi-family) by promoting energy efficiency, renewable energy, electrification, lower-carbon design, materials, fuels, as well as retrofitting or building housing.

2. **Clean transportation:** Accelerate the transition to low- and no-carbon fuels in vehicles, equipment, and infrastructure as well as increase availability and adoption of clean travel options (rideshare, public transit expansion).

3. **Waste reduction:** Reduce GHG emissions by adopting recycling and organics programs to reduce landfill GHG emissions.

4. **Clean energy and efficient buildings:** Reduce GHG emissions from public, commercial, and manufacturing facilities, by supporting development, re-opening, or transition of public buildings and facilities to renewable energy sources, implementation of energy efficiency measures, and/or shifting production methods or products to lower-impact options.

NORTH DAKOTA GREENHOUSE GAS INVENTORY

Revised Final Report

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

NORTH DAKOTA GREENHOUSE GAS INVENTORY

EXECUTIVE SUMMARY

The Energy & Environmental Research Center (EERC) at the University of North Dakota (UND) compiled a high-level greenhouse gas (GHG) inventory of the state of North Dakota in support of the North Dakota Department of Environmental Quality (NDDEQ) work on the Climate Pollution Reduction Grant (CPRG) and potential future GHG reduction efforts. Six sectors were identified to structure the inventory based on their importance to the state and emissions impact: Agriculture, Natural, and Working Lands; Oil and Natural Gas; Electric Power Generation; Industry; Commercial and Residential Buildings and Waste; and Transportation. Carbon dioxide (CO_2) was included in the state's inventory as well as methane (CH_4) and nitrous oxide (N_2O) calculated as a CO_2 equivalent. Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3) were included as a relatively small (3%) but potent portion of GHGs in the industrial sector.

The inventory was completed using the U.S. Environmental Protection Agency's (EPA's) State Inventory Tool (SIT) (1). The toolset is broken down into 11 modules that identify sources and sinks within each state. Default data were verified and used for this initial inventory. Deviations from methodology because of a lack of readily available information are discussed. Completed modules provided summary files that were used to compile the inventory based upon the sectors identified.

In 2019, North Dakota's gross GHG emissions were 85.6 million standard tons of CO_2 equivalent ($MMtCO_2e$) and net emissions were 80.8 $MMtCO_2e$. Industry accounted for the largest share at 21% followed by Oil and Natural Gas (20%); Agriculture, Natural, and Working Lands (19%); Electric Power Generation (16%); Commercial and Residential Buildings and Waste (13%); and Transportation (11%).

NORTH DAKOTA GREENHOUSE GAS INVENTORY

INTRODUCTION

The Energy & Environmental Research Center (EERC) at the University of North Dakota (UND) compiled a high-level greenhouse gas (GHG) inventory of the state of North Dakota in support of the North Dakota Department of Environmental Quality (NDDEQ) work on the Climate Pollution Reduction Grant (CPRG) and potential future GHG reduction efforts. The primary objective of this initial effort was to establish a state GHG inventory fulfilling CPRG requirements. The year 2019 was used as a baseline year to forecast and eventually measure the impact of subsequent GHG reduction programs in the states Priority Climate Action Plan (PCAP). 2019 was selected as the baseline year because it was the most recent year with widely available published data that was not significantly affected by the global COVID-19 pandemic. A substantial decrease in emissions was observed in the data between 2019 and 2020, and the years 2022–2023 were not assessed due to the inherent lag between years' end and the publishing of large aggregate datasets.

The EERC identified six sectors to structure the inventory based on their importance to the state and emission impact according to the 2018 data from the U.S. Environmental Protection Agency's (EPA's) Inventory of U.S. Greenhouse Gas Emissions and Sinks by State: 1990–2021 (2). These sectors and their 2018 emission impact are described below:

- Agriculture, Natural, and Working Lands – Agriculture accounted for 22% of the state's 2018 emissions and is nearly ubiquitous across the geographical extent of the state. The land within the state both left within a natural state and used agriculturally acts as sinks for carbon, removing CO_2 from the atmosphere.

- Oil and Natural Gas – The state's oil and gas production accounted for 11.5% of all U.S. production in 2018, and methane's potency as a GHG has put it under scrutiny nationwide.

- Electric Power Generation – The electric power sector generated 32% of North Dakota's 2018 emissions and is responsible for the state's status as a net energy exporter.

- Industry – Industrial sources, including fertilizer production, food processing, and manufacturing, were the largest source of emissions for the state in 2018 at 34%.

- Commercial and Residential Buildings and Waste – While the magnitude of emissions in these sectors are relatively small, commercial and residential buildings represent some end use of power generation, landfills have a large impact on methane emissions, and wastewater treatment is a major source of nitrous oxide emissions. EPA's national GHG data listed emissions associated with residential and commercial at less than 3% of the total emissions by their methodology. Percentages for waste were not independently provided in the summary.

- Transportation – Transportation activities accounted for 8.6% of North Dakota's 2018 emissions.

Three primary GHGs were included in the state's inventory as CO_2 equivalents. These gases are CO_2, CH_4, and N_2O.

GREENHOUSE GAS INVENTORY PROCEDURE AND METHODOLOGY

The preliminary inventory was generated using EPA's SIT. This tool consists of a series of Microsoft Excel workbooks that are frequently updated by EPA. The toolset comprises 11 modules:

- CO_2 from fossil fuel combustion (CO_2FFC)
- CO_2 from electricity consumption (CO_2EC)
- Stationary combustion
- Mobile combustion
- Coal mining
- Natural gas and oil systems
- Industrial processes
- Agriculture
- Land use, land-use change, and forestry (LULUCF)
- Municipal solid waste
- Wastewater

Each module included some level of default data. For the purposes of this inventory, default data include datasets contained within the SIT modules that can be used to populate inputs. Data that were not included within modules but were suggested by a module were also considered to be default data. Default data were given priority and utilized whenever possible while completing these modules given the timeline and scope for this first phase. The default data within each module were checked for accuracy against their external sources. If default data were not available, data from other federal, state, or industry sources were used, or it was confirmed that data were truly missing. Instances where default data were not used will be described with the applicable modules.

As each of the modules were completed, summary files were loaded into the Synthesis Tool of the SIT. The aggregate data from the modules were then sorted into the appropriate sector resulting in the baseline North Dakota state GHG inventory. The sorting process is described by sector:

- Agriculture, Natural, and Working Lands – consists of CO_2, CH_4, and N_2O emissions in the Agriculture module as well as CO_2 emissions and sinks in the LULUCF module.

- Oil and Natural Gas – consists of CO_2 and CH_4 emissions in the Natural Gas and Oil Systems module.

- Electric Power Generation – consists of CO_2 emissions from the Electric Utilities total in the CO_2FFC module, CH_4 and N_2O emissions from the Electric Utilities total in the Stationary Combustion module, and CO_2 emissions from end-use consumption in the CO_2EC module. Electric Power Generation also included emissions (CH_4) from the Coal module since the end use was for power generation.

- Industry – consists of total emissions in the Industrial Processes module, CO_2 emissions from the Industrial total in the CO_2FFC module, CH_4 and N_2O emissions from the Industrial total in the Stationary Combustion module, and total emissions from the Industrial total in the Electricity Consumption module.

- Commercial and Residential Buildings and Waste – consists of CO_2 emissions from the Residential and Commercial totals in the CO_2FFC module, CH_4 and N_2O emissions from the Residential and Commercial totals in the Stationary Combustion module, total emissions from the Residential and Commercial totals in the Electricity Consumption module, CH_4 and N_2O emissions in the Municipal Solid Waste module, and CH_4 and N_2O emissions in the Wastewater module.

- Transportation – consists of CO_2 emissions from the transportation total in the CO_2FFC Module. CH_4 and N_2O emissions from Mobile Combustion module were added to the CO_2 total.

GREENHOUSE GAS INVENTORY RESULTS

Table 1 summarizes the emission totals by sector and provides the module(s) used to contribute to the overall sector total. Gross emissions for 2019 totaled 89.8 million metric tons of CO_2 equivalent ($MMtCO_2e$), and net emissions for 2019, sum of sources and sinks, totaled 85.0 $MMtCO_2e$. Figure 1 shows the percentage breakdown of each sector. Figure 2 shows the compositional breakdown of the GHG warming effect with respect to the gases investigated.

Agriculture, Natural, and Working Lands included CO_2, CH_4, and N_2O emissions associated with agricultural as well as those from LULUCF. Agriculture's largest emissions came from enteric fermentation and manure management associated with livestock. The largest component of LULUCF as a sink of emissions is attributed to agricultural soil carbon flux and grasslands. This important sink of emissions removed 4.8$MMtCO_2e$ from the atmosphere, offsetting North Dakota's GHG emissions. The amount of carbon stored in cropland is a function of the acres of cropland, crop, farming practices, and climate. Differences existed between the EPA state-level estimate, and this estimate attributed to where each inventory counted agriculture transportation and energy emissions.

Emissions from Oil and Natural Gas are primarily CH_4 emissions, where the GHG potential has been converted to $MMtCO_2e$. Additionally, CO_2 emissions from flaring are directly counted. Next to Industry, this sector accounted for the largest share of direct emissions.

Table 1. Emissions by Sector

Sector	Emissions in MMtCO_2e	
Agriculture, Natural, and Working Lands		15.1
Agriculture	19.9	
LULUCF	−4.8	
Oil and Natural Gas		16.8
Equivalent from CH_4	6.5	
Flaring	10.2	
Electric Power Generation		13.7
CO_2FFC Electric Utilities	28.3	
Indirect CO_2 from Electricity Consumption	−14.9	
Stationary CO_2e	0.12	
Coal	0.15	
Industry		18.2
IP	0.78	
CO_2FFC Industrial	10.9	
Stationary CO_2e Industrial	0.04	
Indirect CO_2 from Electricity Consumption Industrial	6.5	
Commercial and Residential Buildings and Waste		11.5
Residential	4.9	
CO_2FFC Residential	1.3	
Stationary CO_2e Residential	0.01	
Indirect CO_2 from Electricity Consumption Residential	3.6	
Commercial	6.1	
CO_2FFC Commercial	1.3	
Stationary CO_2e Commercial	0.01	
Indirect CO_2 from Electricity Consumption Commercial	4.9	
Waste	0.48	
Equivalent from Municipal Solid Waste (MSW)	0.41	
Equivalent from Wastewater	0.07	
Transportation		9.7
CO_2FFC	9.58	
Mobile CO_2E	0.13	
Sequestered CO_2		**−4.8**
Gross GHG Emissions		**89.8**
Net GHG Emissions		**85.0**

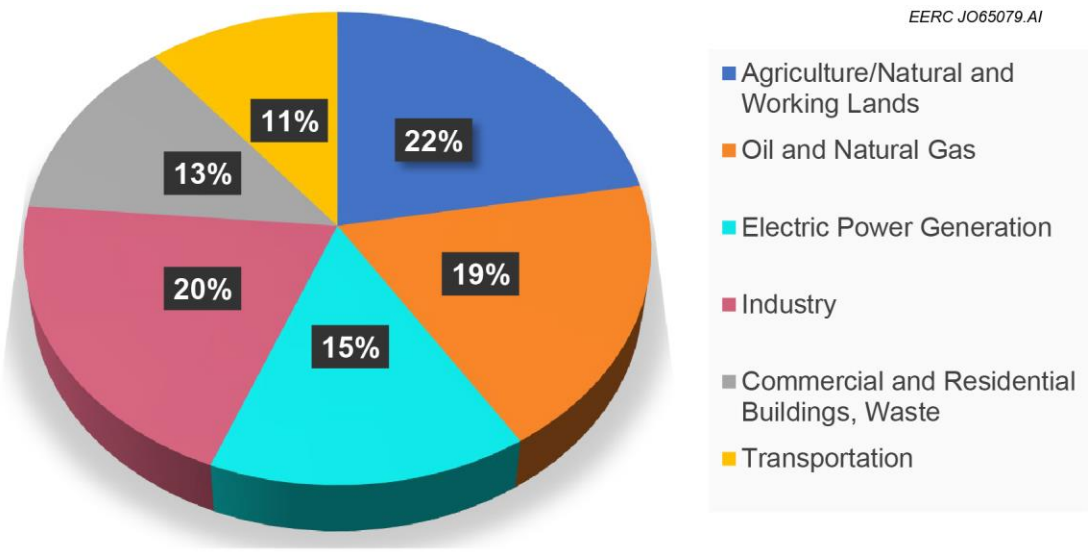

Figure 1. Percentage contribution by sector.

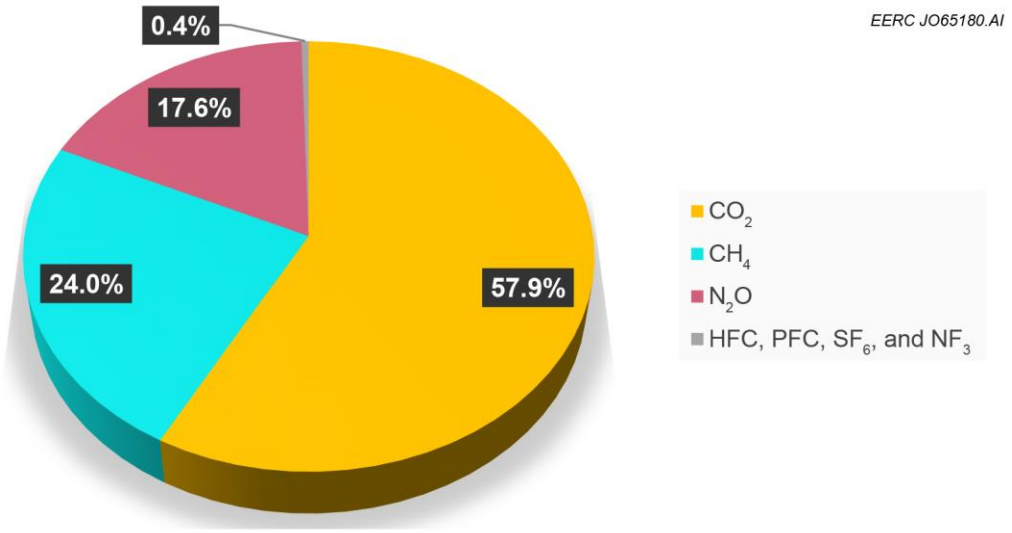

Figure 2. Percentage contribution by gas.

Electric power generation emissions totaled 28.45 $MMtCO_2e$. Figure 3 demonstrates allocation of emissions to their end uses in residential, commercial, and industrial. The 13.53 $MMtCO_2e$ is representative of the emissions associated with electricity exported via the grid to end uses outside of North Dakota. The breakdown of consumption can be seen in Figure 2. Because of the end use of this power occurring outside of the state, it is worth noting the net GHG emissions are 67.24 $MMtCO_2e$, a difference of 17%. Differences existed between EPA and this estimate primarily because of EPA keeping emissions from electrical production together, whereas this inventory breaks them into their sectors.

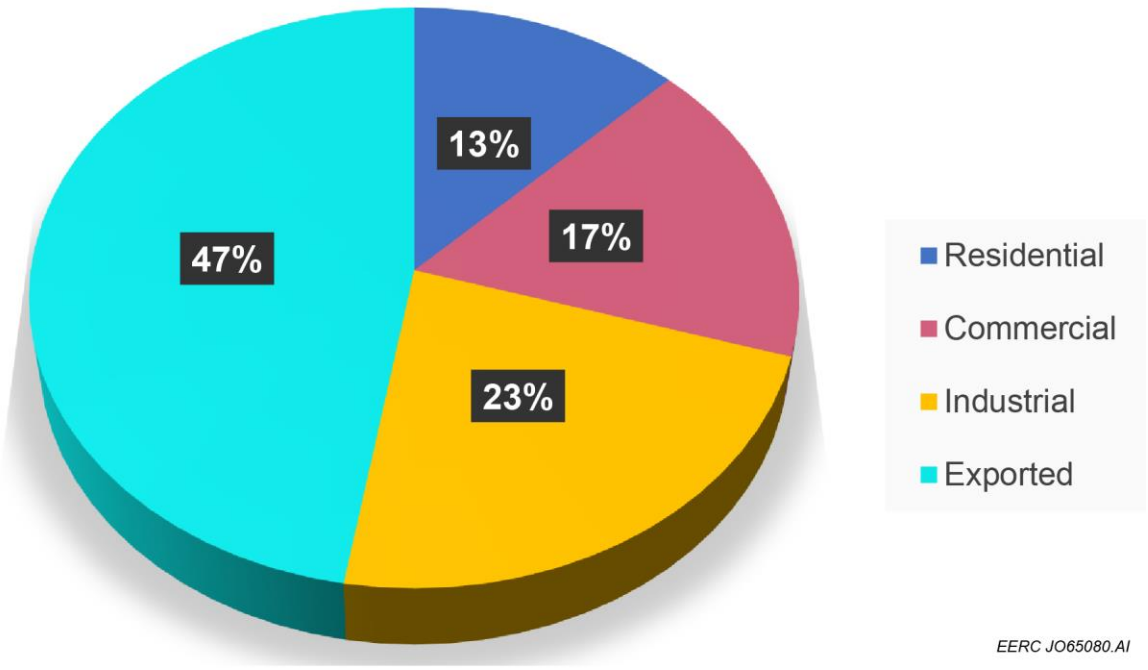

Figure 3. Electric power generation breakdown.

Industry included values for the direct emissions of industrial processes (IP), emissions from combustion of fossil fuels for process heat and building conditioning, indirect emissions of electrical consumption, and CO_2 equivalent emissions from NO_2 and CH_4 associated with the combustion of fossil fuels. This category is the largest contributor to emissions. Differences existed between EPA and this estimate primarily because of EPA combining the Oil and Gas sector with the Industry sector.

Commercial and Residential Buildings and Waste is broken down into three subtotals. This group was kept together as they are largely associated with the population of the state. Waste included a breakdown by equivalent emissions of NO_2 and CH_4 associated with MSW and wastewater treatment. Any carbon sinks such as landfilling of yard waste, trimmings, or food scraps are not counted in the MSW section and were calculated/included in the LULUCF model.

Transportation consisted of 9.71 $MMtCO_2e$ in 2019. The total for transportation was tabulated based upon combustion of fossil fuels and the equivalent emissions for NO_2 and CH_4. Any transportation associated with electrical vehicles would have been counted in the module for Indirect CO_2 from Electricity Consumption. Electrical power for transportation was not included in this section and otherwise included in residential and commercial power consumption.

Differences between EPA state estimates and this estimate can be further understood by the methodology employed. EPA state estimates must sum to the national total and often use top-down methodologies. State estimates utilizing state data and a bottom-up methodology result in differences in the numbers. According to EPA, the organization “recognizes that there will be differences between the EPA’s state-level estimates and some inventory estimates developed

independently by individual state governments. Inventories compiled by states may differ for several reasons and differences do not necessarily mean that one set of estimates is more accurate, or 'correct'" (3).

Data Methodology Deviations

Default data were not necessarily available for the entirety of each module, as previously mentioned. Alternative data sources were used in these instances. Deviations are described below by module. If a module is not included, that module was completed using default data.

- CO_2 from Electricity Consumption – Data from the U.S. Department of Transportation Bureau of Transportation (4) Statistics were used to confirm that North Dakota did not consume electricity for transportation.

- Coal Mining – Data from the U.S. Department of Labor Mine Safety and Health Administration's Mine Data Retrieval (5) System were used to populate the Additional Abandoned Coal Mines list on the CH_4 from Abandoned Coal Mines tab.

- Natural Gas and Oil Systems – Regarding the Natural Gas–Transmission tab, transmission and gathering pipeline mileage was pulled from the U.S. Department of Transportation Pipeline Hazardous Materials Safety Administration (6) (PHMSA) annual reports as suggested by the module. The first concern with this dataset is PHMSA-regulated lines are only a small fraction of the total mileage in the state. Secondly, the mileage reported is often for multiple states with no clear indication which portion belongs to each state. For this initial inventory, the mileage was divided evenly among each state. Data for the number of gas-processing plants were obtained from the North Dakota Pipeline Authority (NDPA) (7). Regarding the oil transportation values on the Petroleum Systems tab, the full export capacity across all options provided by NDPA was assumed. Refining values on the same tab were obtained from Energy Information Administration (EIA) (8) data and assumed to be the maximum daily capacity reported in barrels per calendar day.

- Land Use, Land-Use Change, and Forestry – Data from the National Interagency Fire Center's InFORM Fire Occurrence Data Records (9) were used to determine a real extent of wildfire burns.

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