APPENDIX L

Carbon Neutral by 2030:
A North Dakota Journey

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Environmental Quality

Introduction

Background

Current and Proposed Projects

Opportunities

Observations

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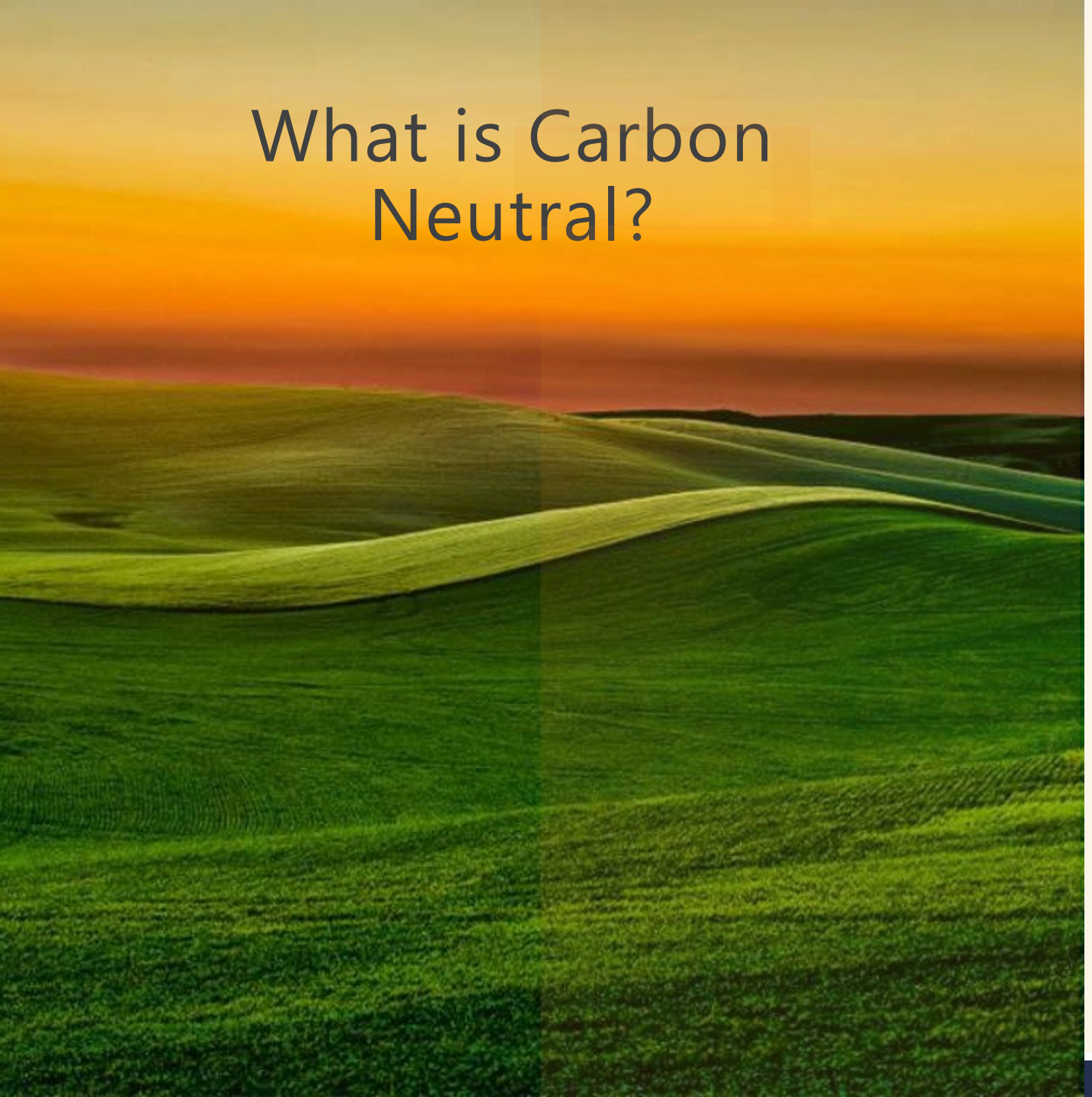
State Goal and Legislative Directives

In 2021 Governor Burgum expressed a **goal that the state of North Dakota be carbon neutral by 2030**. Citing North Dakota's **unique state geology coupled with the development of new innovative technologies** as our path to a carbon neutral economy.

During the Sixty-seventh Legislative Assembly Senate Bill 2024 Section 7 directed the DEQ to *"…gather information from private industry, private organizations and government which relates to carbon reduction initiatives, rules, or policies that will affect North Dakota residents and industries. In gathering information, the department of environmental quality shall consider, review and report, as appropriate, technologies, operational practices and conservation opportunities directed at reducing the state's carbon intensity…"*



What is Carbon Neutral?

Carbon-neutral *(adjective)*
making no net release of carbon dioxide to the atmosphere, especially **through offsetting emissions** by planting trees.

Carbon Neutrality "is a state of net zero carbon dioxide emissions. This can be achieved by **balancing emissions of carbon dioxide with its removal (often through carbon offsetting) or by eliminating emissions from society** (the transition to the "post carbon economy"). The term is used in context of carbon dioxide-releasing processes associated with transportation, energy production, agriculture, and industry." Wikipedia

Why Now?

> *Market Direction – Global/National Interest*
> *State Geology-Fossil Fuel Innovation*
> *Impact of West Virginia v EPA?*

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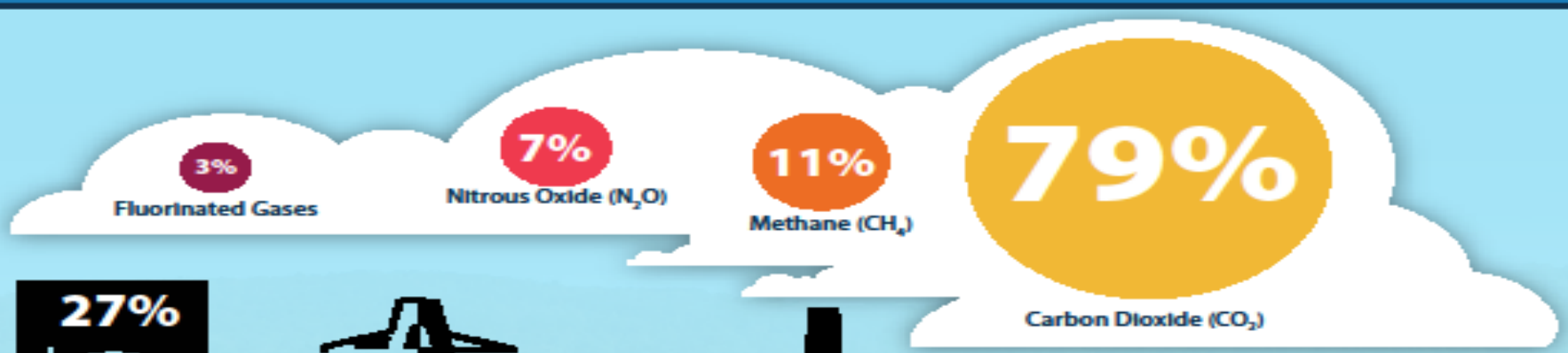
Fast Facts

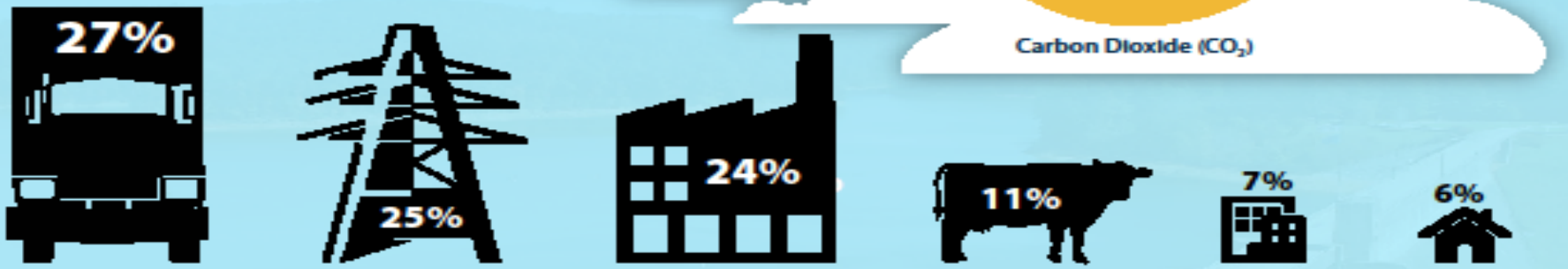
1990–2020

National-Level U.S. Greenhouse Gas Inventory

U.S. Greenhouse Gas Emissions in 2020*



Total U.S. Greenhouse Gas Emissions by Economic Sector in 2020*



U.S. Greenhouse Gas Emissions*

2020 Total Emissions	2019–2020 Change	1990–2020 Change
5,981 million metric tons of CO_2 equivalent	↓ **-9.0%** total emissions	↓ **-7.3%** total emissions
CO_2 emissions from fossil fuel combustion: **72.6%** of total emissions	↓ **-10.3%** CO_2 emissions	↓ **-7.9%** CO_2 emissions
CO_2 removals by forests and other lands: **13.6%** of total emissions	↓ **-10.5%** CO_2 emissions from fossil fuel combustion	↓ **-8.2%** CO_2 emissions from fossil fuel combustion

To learn more about the inventory, visit www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks, or explore the data at https://cfpub.epa.gov/ghgdata/inventoryexplorer.

* Percentages may not add to 100% due to independent rounding and the way the inventory qualifies U.S. territories (not shown) as a separate sector. Emissions from Land-Use, Land-Use Change and Forestry are reported separately and not shown in the figure.

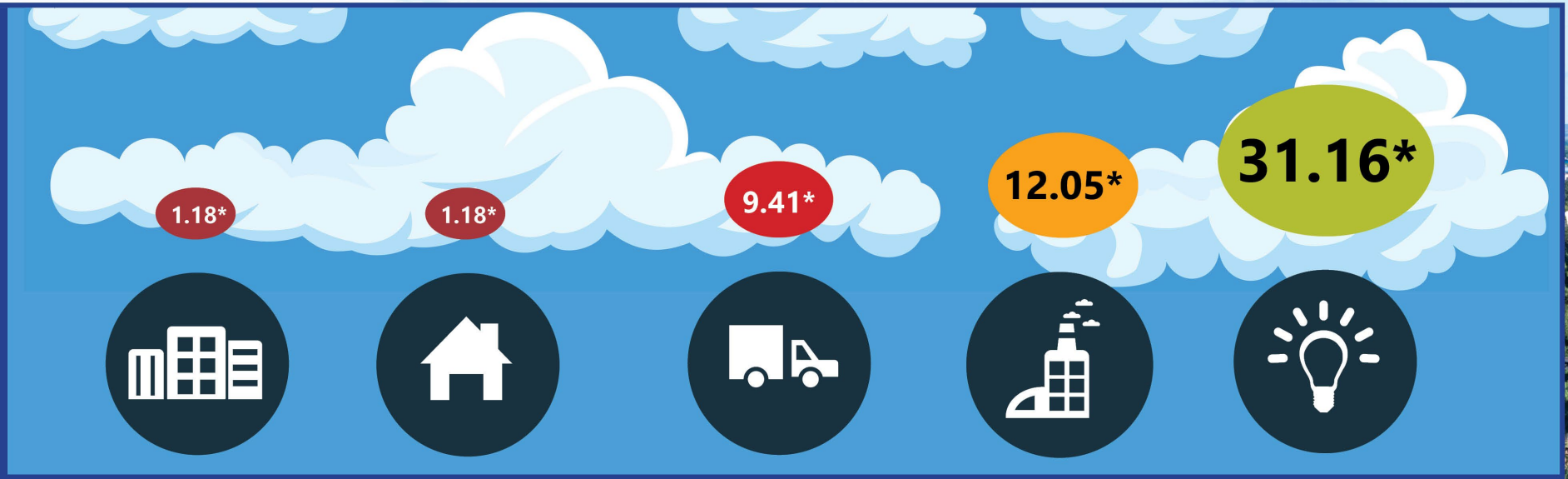
EPA United States Environmental Protection Agency

April 2022
EPA 430-F-22-001

ND Emissions 1990-2018

North Dakota Level U.S. Greenhouse Gas Inventory

Total ND Greenhouse Gas Emissions by Economic Sector in 2018*



ND Greenhouse Gas Emissions*

2018 Total Emissions

54.97 millions metric tons of CO_2 equivalent from fossil fuel combustion

2015-2018 Change

+.37% Total emissions

54.97 2018
54.77 2015

1990-2018 Change

+34% Total emissions

- **+39%** Commercial emissions
- **+5%** Residential emissions
- **+103%** Transportation emissions
- **+83%** Industrial emissions
- **+12%** Electric Power emissions

* Millions of Tons

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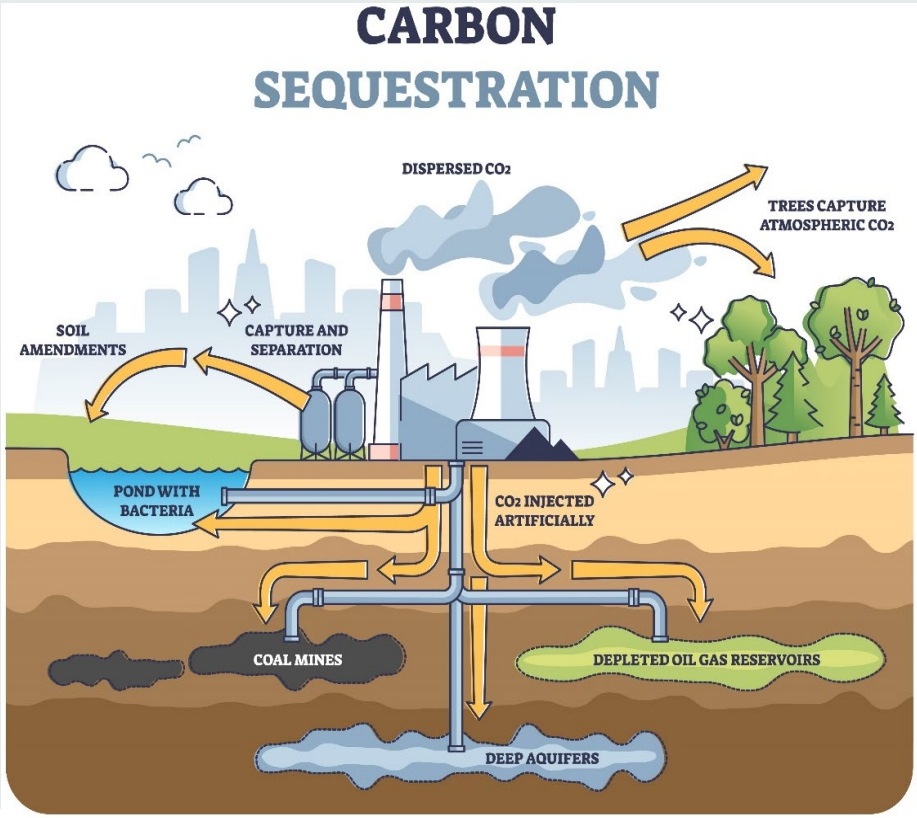
Energy Sector

- Red Trail Energy- First Carbon Capture and Sequestration (Class VI)
- Project Tundra- Largest Post Emission Carbon Capture/Sequestration
- Proposed Hydrogen Hub
- Gas to Liquid Fuel Processing
- Biodegradable Plastics – Carbon Neutral to Carbon Negative
- Greenhouse Development Utilizing CO2 from combustion source
- Ethanol Plant Carbon Capture – Pipeline from multiple facilities from multiple states
- Dickenson Bio-Refinery
- EOR with Captured GHG
- Improved Methane Detection at Oil and Gas Facilities
- Oil and Gas Facility Design Improvements



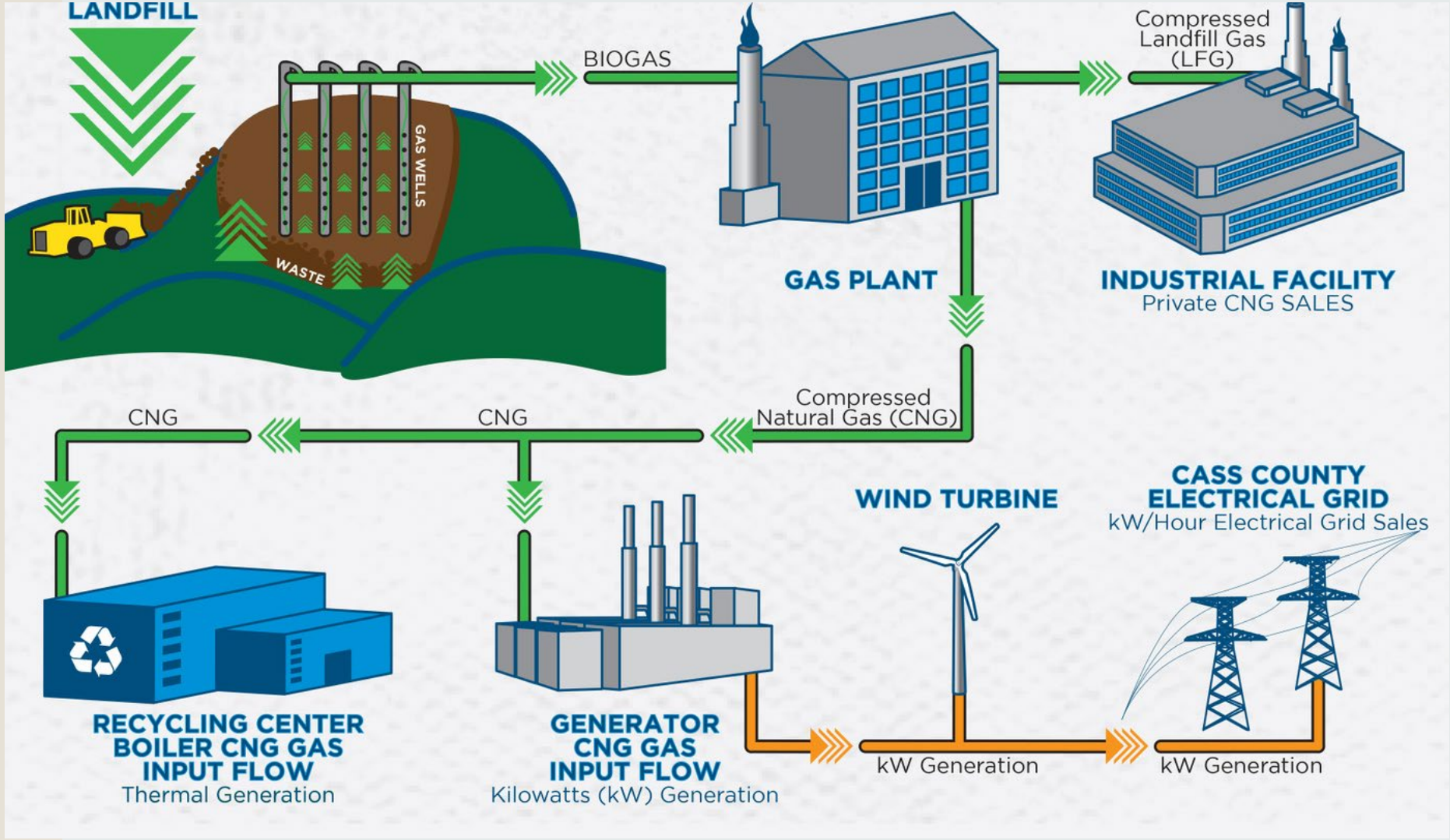
Agriculture Sector

- Carbon Sequestration
  - Grassland and Cultivated Land Potential
  - Carbon Credits(?)
  - Soil Health – replenish carbon in soils
  - Water quality
  - Drought Resistant
- Best Management Practices
  - Manure handling and use
  - Soil Health
  - Fertilizer use
  - Precision farming

Municipal/ Transportation/ Residential

LANDFILL METHANE COLLECTION AND USE

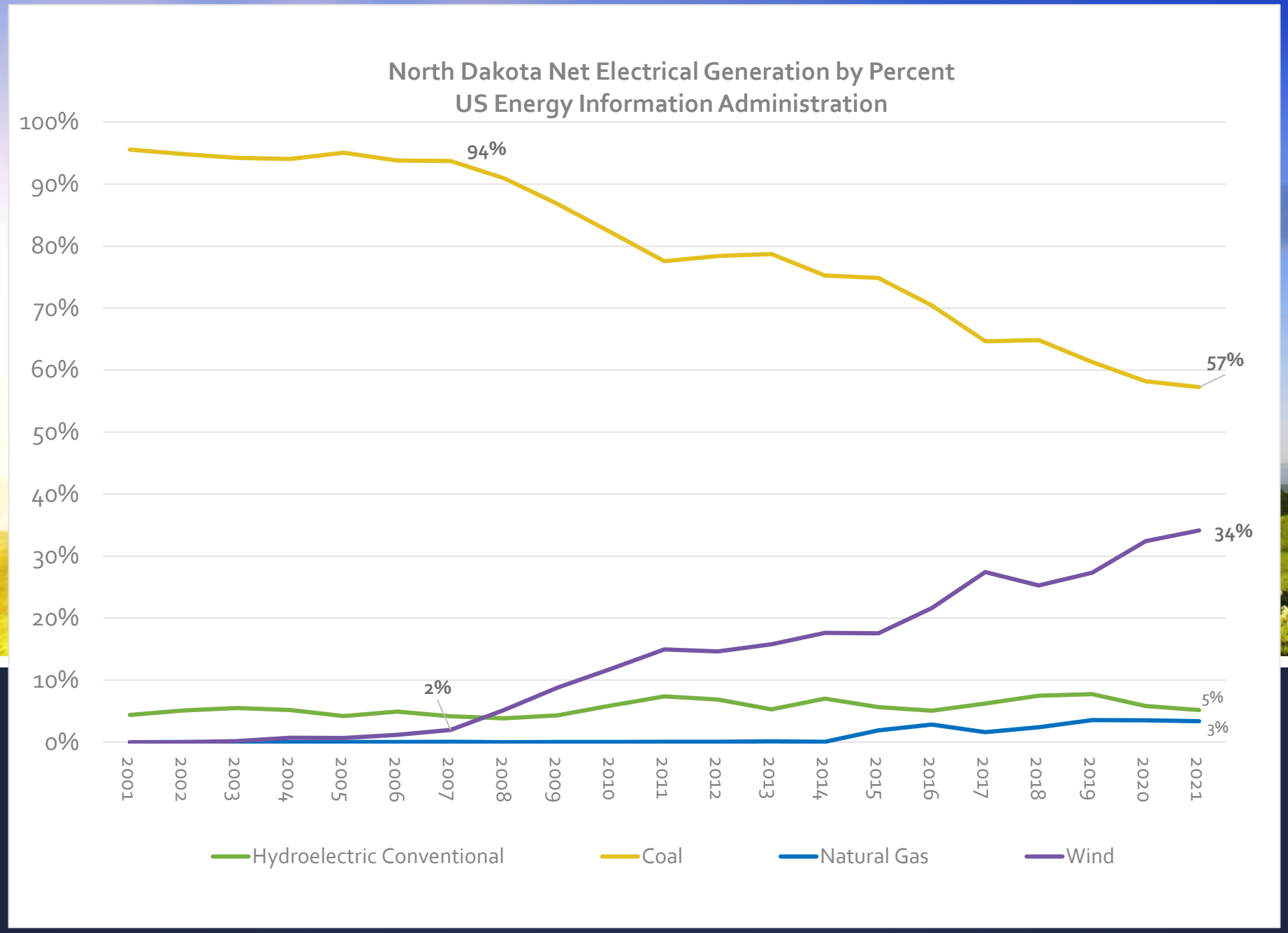
Fargo Landfill Biogas
- CNG
- Electricity
- Carbon Credits?



Community Design Opportunities

- Walkable Communities
- Increased Energy Conservation
- Electric Vehicle Charging
- Transit Opportunities
- Residential Conservation

Renewable Energy


North Dakota Net Electrical Generation by Percent
US Energy Information Administration
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
94%
57%
34%
2%
5%
3%
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Hydroelectric Conventional
Coal
Natural Gas
Wind

State and Federal Assistance

- Clean Sustainable Energy Authority (Funding – Loans/Grants)
- Commerce Programs
- 319 Non-point Grants – Cost Share Agricultural Practices/Ed.
- Federal Grants – DOT/DOE/EPA (i.e. EV Infrastructure, low emission buses etc…)
- Others

Observations

- Accounting of Greenhouse Gas Reductions Needed
- Establish a Transparent and Verifiable Agriculture Carbon Credit Program (Gold Standard)
- Needed Education Strategy following the science:
  - Address concerns and Misinformation
  - Allow for Alternate Solutions and Flexibility
- Innovation over Regulation