MAXIMIZING THE USE OF NORTH DAKOTA'S NATURAL GAS RESOURCE

JOINT ASSESSMENT BETWEEN THE ENERGY & ENVIRONMENTAL RESEARCH CENTER AND THE NORTH DAKOTA PIPELINE AUTHORITY

Final Report

Prepared by:

Bradley G. Stevens
Nicholas S. Kalenze

Energy & Environmental Research Center
University of North Dakota
15 North 23rd Street, Stop 9018
Grand Forks, ND 58202-9018

Justin J. Kringstad

North Dakota Pipeline Authority
600 East Boulevard Avenue, Dept 405
Bismarck, ND 58505-0840

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NOMENCLATURE

ACS	American Crystal Sugar
Bcf	billion cubic feet
Bcfd	billion cubic feet per day
Btu	British thermal unit
cf	cubic foot
DMR	Department of Mineral Resources
Dth	dekatherm
Dth/d	dekatherm per day
EERC	Energy & Environmental Research Center
FERC	Federal Energy Regulatory Commission
GOR	gas-to-oil ratio
LDCs	local distribution companies
Mcf	thousand cubic feet
Mcfd	thousand cubic feet per day
MMcfd	million cubic feet per day
MW	megawatts
NDPA	North Dakota Pipeline Authority
NGLs	natural gas liquids
NPN	Northern Plains Nitrogen

MAXIMIZING THE USE OF NORTH DAKOTA'S NATURAL GAS RESOURCE

EXECUTIVE SUMMARY

The Energy & Environmental Research Center (EERC), in collaboration with the North Dakota Pipeline Authority, prepared this study focused on understanding and supporting the full use of North Dakota's natural gas resources across the state, including the potential natural gas demand and pipeline infrastructure viability for delivery in northeastern North Dakota. The goal of the study was to provide information on natural gas production, delivery, and use, as well as projections and pathways to expand natural gas availability within northeastern North Dakota—home to growing economic development, the University of North Dakota, and diverse energy and agricultural resources within the state. Natural gas in North Dakota is used within a diversified energy portfolio spanning industries that include commercial, industrial, agricultural, and residential.

This study assessed the various participants and roles served along the natural gas value chain that included producers, midstream companies, transmission pipeline companies, local distribution companies, marketers and shippers, and end users. System capacities, geography, and deliverability constraints shape how decisions are made and where natural gas can ultimately be used in the state. North Dakota's regional transmission infrastructure within the Williston Basin and its production and downstream natural gas markets are supported by WBI Energy's Baker and Elk Basin storage facilities, which provide seasonal balancing and reliability for the broader Williston Basin gas system. These are critical components of the broader Williston Basin gas system that can provide an economic benefit for usage across the entire state.

As a case study, the project team identified and quantified current and forecast natural gas demand from the Grand Forks region within the foreseeable future. Grand Forks and the surrounding Red River Valley region in northeastern North Dakota are projected to have sufficient natural gas demand within the next several years to potentially capitalize on natural gas infrastructure development opportunities for industrial, commercial, and residential end users. Under a full build-out scenario that includes current, known future, and hypothetical large-load developments, natural gas demand in the case study region could exceed 800 million dekatherms per day (Dth/d) over time.

As shown in the case study, natural gas markets in the Grand Forks metropolitan statistical area of approximately 104,000 people are served by two 6-inch pipelines from the Viking pipeline in northwestern Minnesota. The Viking pipeline supplies approximately 57,000 Dth/d of natural gas to residential, commercial, and industrial users in the study area. Based on public information and discussions with City of Grand Forks staff, additional natural gas demand more than 78,000 Dth/d is likely to exist in the near future, primarily related to development of agricultural processing and power generation for data centers. An attempt was also made to quantify hypothetical future natural gas demand which had the potential to exist in the future. These plausible users range from conversion of existing operations to natural gas use and potential new users (primarily large load data center campuses). Hypothetical natural gas demand represented a significant increase exceeding 690,000 Dth/d.

MAXIMIZING THE USE OF NORTH DAKOTA'S NATURAL GAS RESOURCE

1.0 INTRODUCTION

WBI Energy, a natural gas transportation services company, is in the commercial development stage on a significant natural gas pipeline project called the Bakken East Pipeline Project. The proposed Bakken East pipeline would operate as part of WBI's interstate pipeline system, transporting natural gas from the Williston Basin to end users across central and eastern North Dakota. In addition, the Bakken East pipeline will tie into the existing Viking pipeline in western Minnesota. While the current focus for this pipeline is delivery of natural gas to new industrial users in proximity of the proposed pipeline route, there is potential for stakeholders to enhance the availability of natural gas in other parts of the state.

This study focused on understanding and supporting the full use of North Dakota's natural gas resources across the state, including the potential natural gas demand and pipeline infrastructure viability for natural gas delivery in northeastern North Dakota. The natural gas case study focused on the Grand Forks metropolitan statistical area in northeastern North Dakota reported as approximately 104,000 people in 2024. The northeast part of North Dakota represents a significant population area of the state and stakeholders have expressed interest in bringing natural gas to this part of the state via the Bakken East pipeline. Grand Forks is the third-largest city in North Dakota with a population of over 55,000.[1]

2.0 GOALS AND OBJECTIVES

The goal of this work is to support the distribution and use of North Dakota's natural gas resources across the state. Objectives that were accomplished include assessing current and projected natural gas production in the state, mapping out the major company and service types across the natural gas value chain, and conducting a case study to document existing and forecasting potential future natural gas demand in northeastern North Dakota.

The natural gas investigation is anticipated to positively impact North Dakota in two primary ways.

First, at the case study level, if the collected data is compelling, natural gas transportation companies, such as WBI Energy, and other engaged parties will have additional evidence to consider when evaluating potential expansion of the Bakken East pipeline into northeastern North Dakota. Such an expansion could support new industrial development in the state and greatly enhance the lives of residents. While the northeast part of North Dakota will serve as the initial case study, this type of assessment could be replicated in other areas of the state.

Second, at the state level, construction of new or expansion existing pipelines allowing access to new North Dakota users could result in increased in-state use of natural gas delivered from the Williston Basin. This, in turn, would support continued oil and gas production in North Dakota, which is of critical fiscal importance to the state economy.

[1] City of Grand Forks, About Grand Forks, 2026, https://www.grandforksgov.com/our-city.

3.0 NATURAL GAS PRODUCTION, TRANSPORT, AND USE

North Dakota is a major natural gas-producing state, with production driven primarily by oil development in the Bakken and Three Forks formations. Statewide natural gas production exceeds in-state consumption; however, the availability of natural gas for specific regions and end uses is determined by infrastructure availability, pipeline configuration, and deliverability rather than an inadequate local supply of gas alone.

Natural gas access in North Dakota is governed by the physical and commercial structure of gathering, processing, and transmission systems. This section presents a life cycle-based overview of natural gas production, transport, and use, emphasizing the role of infrastructure capacity and regional constraints.

3.1 Natural Gas Production

Natural gas production in North Dakota is concentrated in western North Dakota and is almost exclusively associated gas produced as part of crude oil development (Figure 1). Production levels are therefore closely tied to oil drilling activity and increasing gas-to-oil ratio (GOR) dynamics.

Key production characteristics include:

- Gas output that scales with oil development and rising GORs rather than gas demand or gas market price signals.
- A rich gas stream with significant volumes, typically 10–12+ gallons of natural gas liquids (NGLs) per thousand cubic feet (Mcf) of natural gas.
- Marketed residue (i.e., dry) natural gas production is typically around 70% of gas plant inlet volumes after NGLs are removed.

Because associated gas production cannot be easily curtailed independently of oil production, timely development of gathering, processing, and transmission infrastructure is essential to capture and move gas to market.

Looking forward, the North Dakota Pipeline Authority's (NDPA's) production outlook anticipates continued growth in natural gas volumes over the medium and long terms, driven primarily by sustained oil development and increasing GORs in the Williston Basin (Figure 2). The forecast reflects a production trajectory that outpaces in-state demand growth and reinforces the importance of continued investment in gathering, processing, transmission, and storage infrastructure to ensure that incremental volumes can be reliably captured and transported to market. While production growth is expected to moderate over the next ten years relative to peak historical growth rates, statewide associated gas volumes are projected to remain substantial for the foreseeable future.

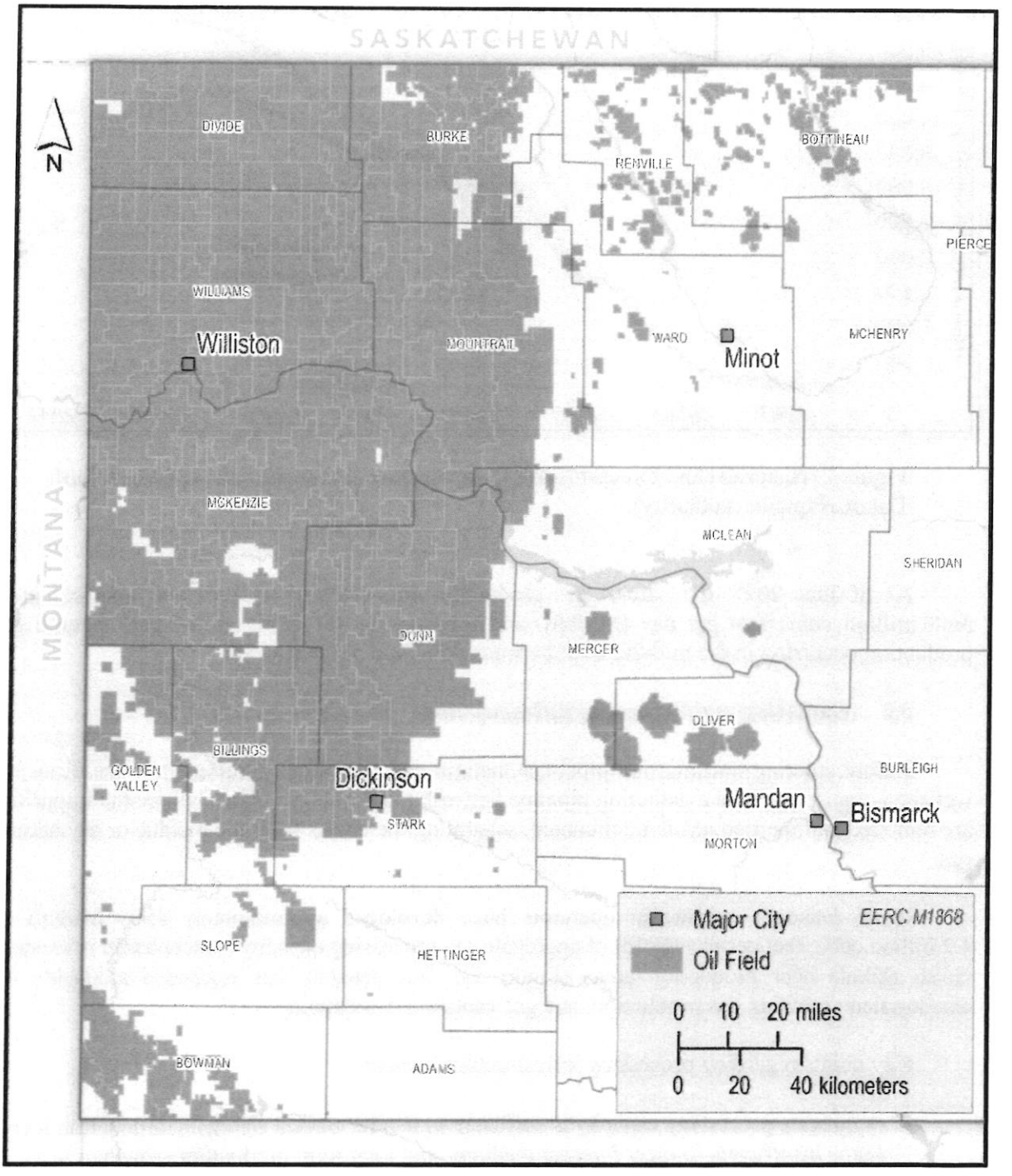

Figure 1. Oil field locations representing the prime areas of oil production in the Williston Basin.

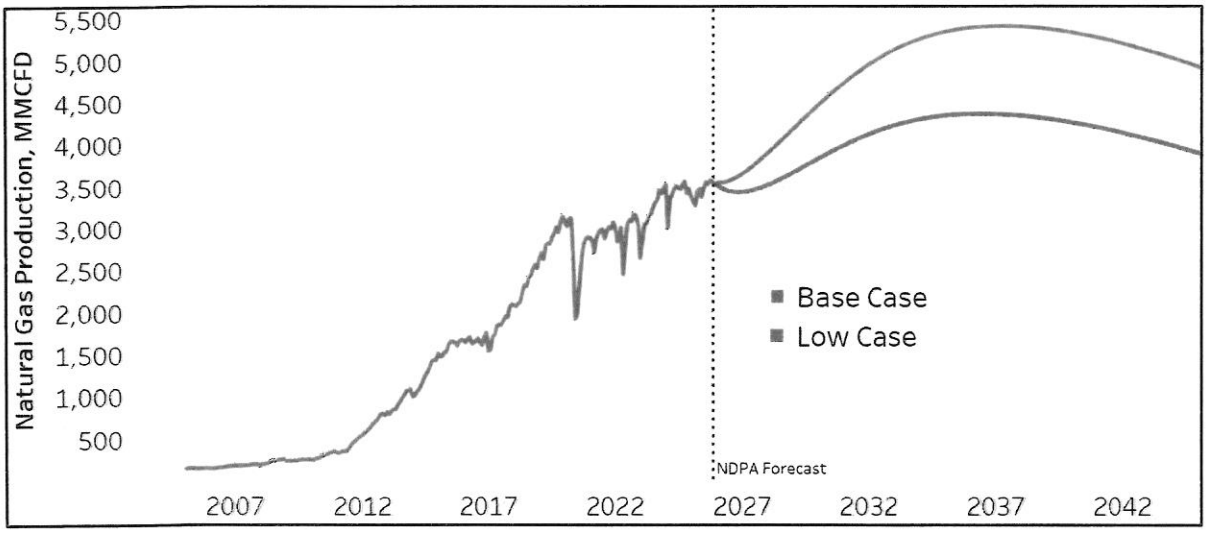

Figure 2. Historical and forecast North Dakota natural gas production (Source: North Dakota Pipeline Authority).

As of June 2025, the natural gas production rate in North Dakota was approximately 3500 million cubic feet per day (MMcfd) and forecasts by the NDPA show peak natural gas production occurring in the mid-2030s at between 4500 and 5500 MMcfd.

3.2 Gathering and Processing Infrastructure

Before entering transmission pipelines, natural gas, specifically rich natural gas, from the wellsite is transported via a gathering pipeline network to several gas plants, where the impurities are removed and the rich gas is fractionated, separating the NGLs from the residue or dry natural gas.

North Dakota's midstream operators have developed approximately 4200 MMcfd or 4.2 billion cubic feet per day (Bcfd) of aggregate gas processing capacity, concentrated in western North Dakota near production areas (Figure 3). This capacity has expanded alongside oil development, growing gas production, and gas capture requirements.

Key points regarding processing infrastructure include:

- Aggregate processing capacity is sufficient to handle current statewide production levels but is insufficient to meet forecast medium- and long-term production growth.
- Processing plants are connected to major interstate transmission pipelines.
- Processing capacity alone does not guarantee market access without downstream transmission capacity for both dry gas and NGLs.

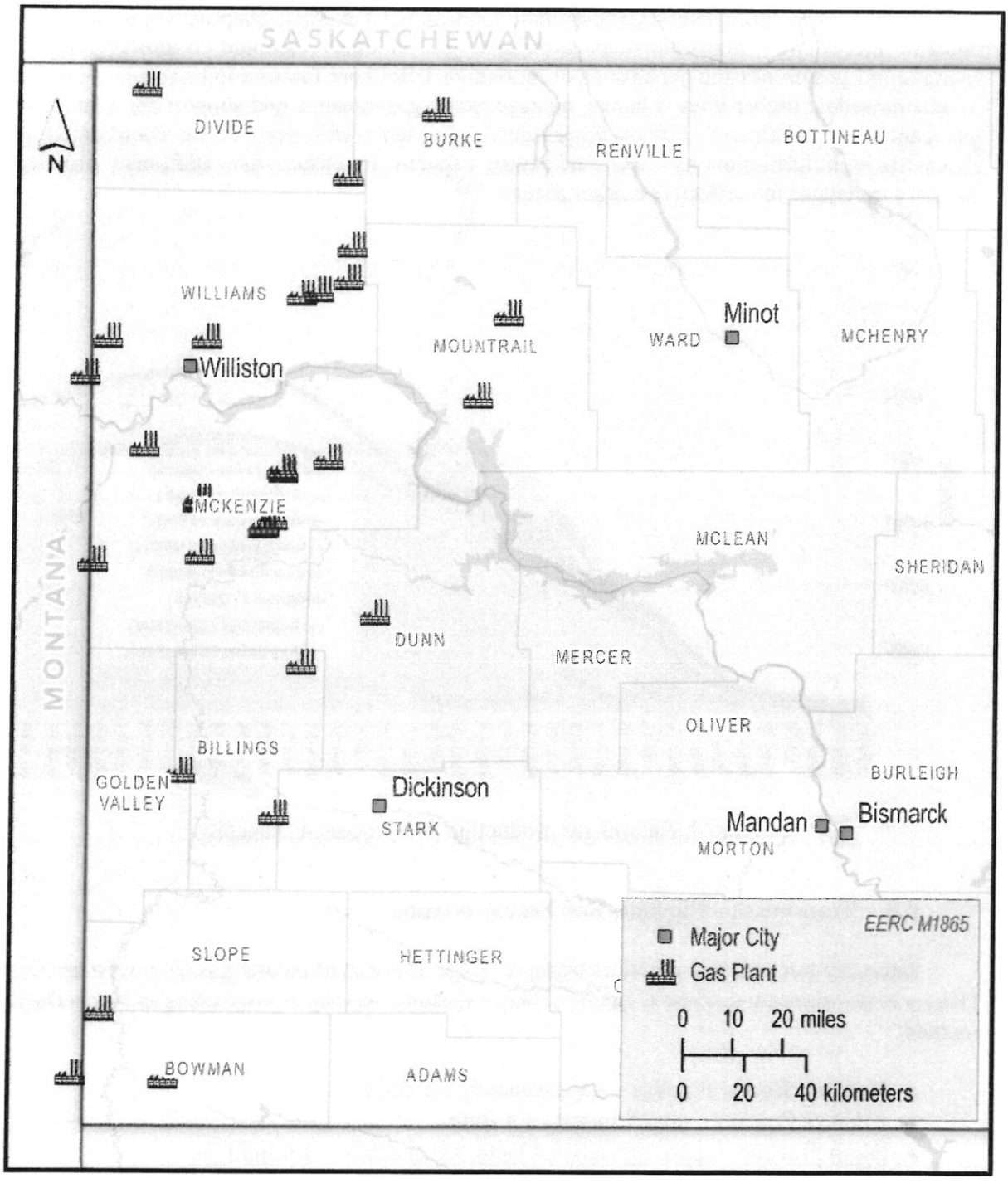

Figure 3. Natural gas processing plants in western North Dakota.

Forecasts of future natural gas production indicate that existing gas processing capacity will become increasingly constrained as associated gas volumes continue to grow (Figure 4). Incremental gas processing expansions of more than 1 Bcfd are forecast to be required over time to accommodate higher inlet volumes, manage richer gas streams, and support compliance with gas capture requirements. Future processing investments will need to be coordinated with downstream transmission and NGL takeaway capacity to ensure that additional processing capacity translates into effective market access.

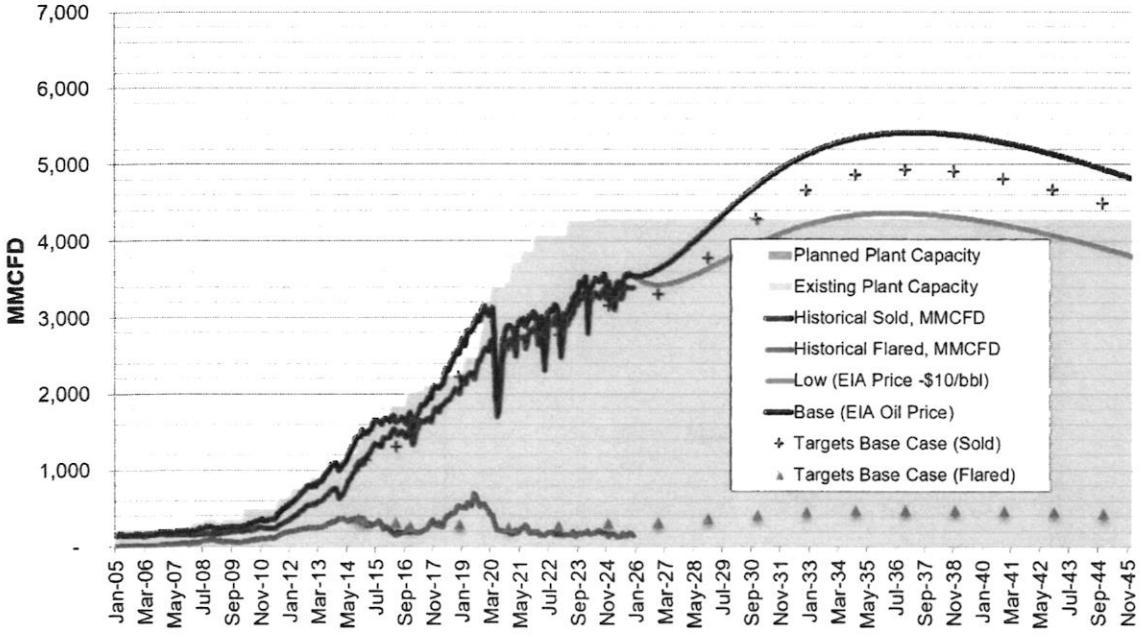

Figure 4. Natural gas production and processing capacity.

3.3 Transmission Pipelines and Transportation

Interstate transmission pipelines transport large volumes of natural gas from western North Dakota to downstream markets (Figure 5). Major systems serving or originating in North Dakota include:

- Northern Border Pipeline – approximately 2.4 Bcfd
- Alliance Pipeline – approximately 1.5 Bcfd
- Bison Pipeline – approximately 0.4 Bcfd, expandable to 1.0 Bcfd
- Viking Gas Transmission – approximately 0.5 Bcfd
- Aux Sable/Prairie Rose interconnect – greater than 120 MMcfd
- Alliance Tioga Lateral – approximately 126 MMcfd
- WBI North Bakken Expansion Project – 250 MMcfd initial, expandable to 600 MMcfd
- WBI Grasslands expansion/reversal – approximately 94 MMcfd
- WBI Southeast North Dakota expansion (Mapleton–Wahpeton) – approximately 20.6 MMcfd

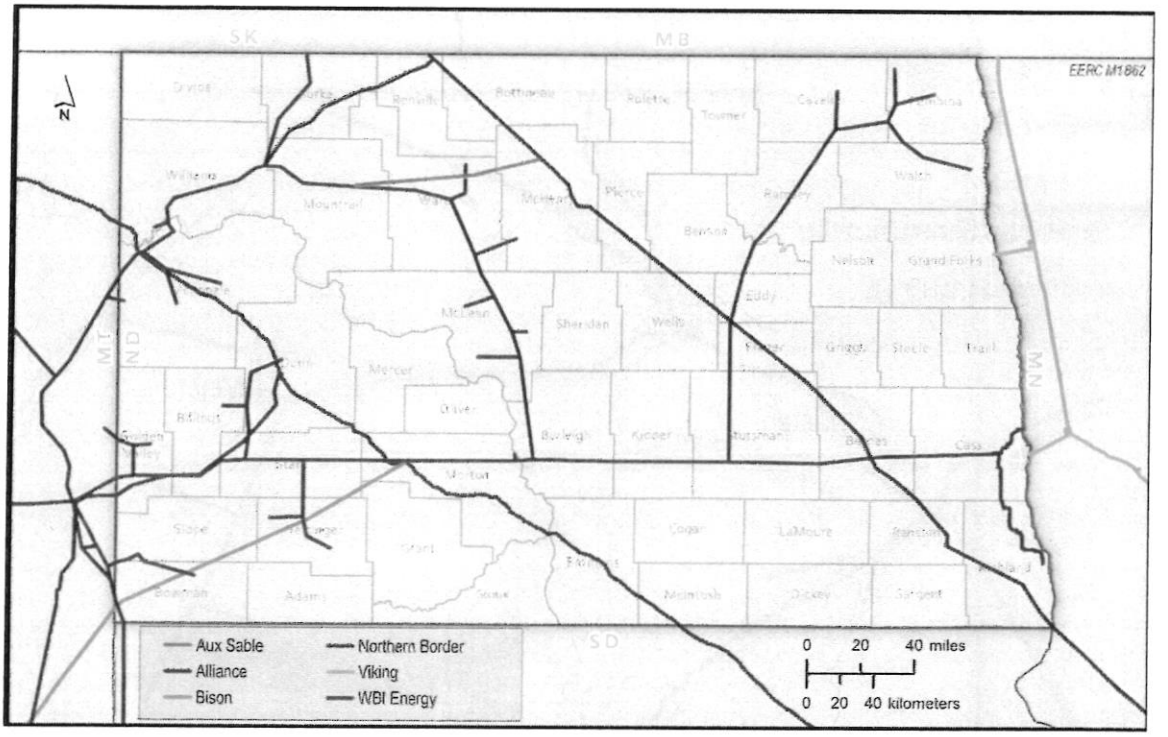

Figure 5. Interstate natural gas transmission pipelines.

These pipelines were developed for specific flow directions and market objectives. Legacy flow orientation and segment-specific constraints limit flexibility without additional infrastructure such as looping, compression, or bidirectional capabilities.

Although statewide transmission capacity exists at the Bcfd scale, capacity is not uniformly accessible across regions. Eastern North Dakota is, for all practical purposes, physically removed from western production corridors and depends on Alberta production delivered via the Viking pipeline in western Minnesota.

3.4 Storage and System Balancing

Natural gas storage plays a critical role in the efficient and reliable operation of the Williston Basin natural gas transportation network. Storage provides both seasonal and operational balancing by allowing gas to be injected during periods of lower demand and withdrawn during peak usage periods, helping to manage short-term variability in production, transportation, and demand.

While North Dakota does not host large in-state underground natural gas storage facilities, WBI Energy's Baker Storage Field in eastern Montana is a critical component of the broader Williston Basin gas system (Figure 6). The Baker Storage Field provides total working gas capacity of 164 billion cubic feet (Bcf). This storage system is directly interconnected with regional transmission infrastructure serving North Dakota production as well as downstream markets.

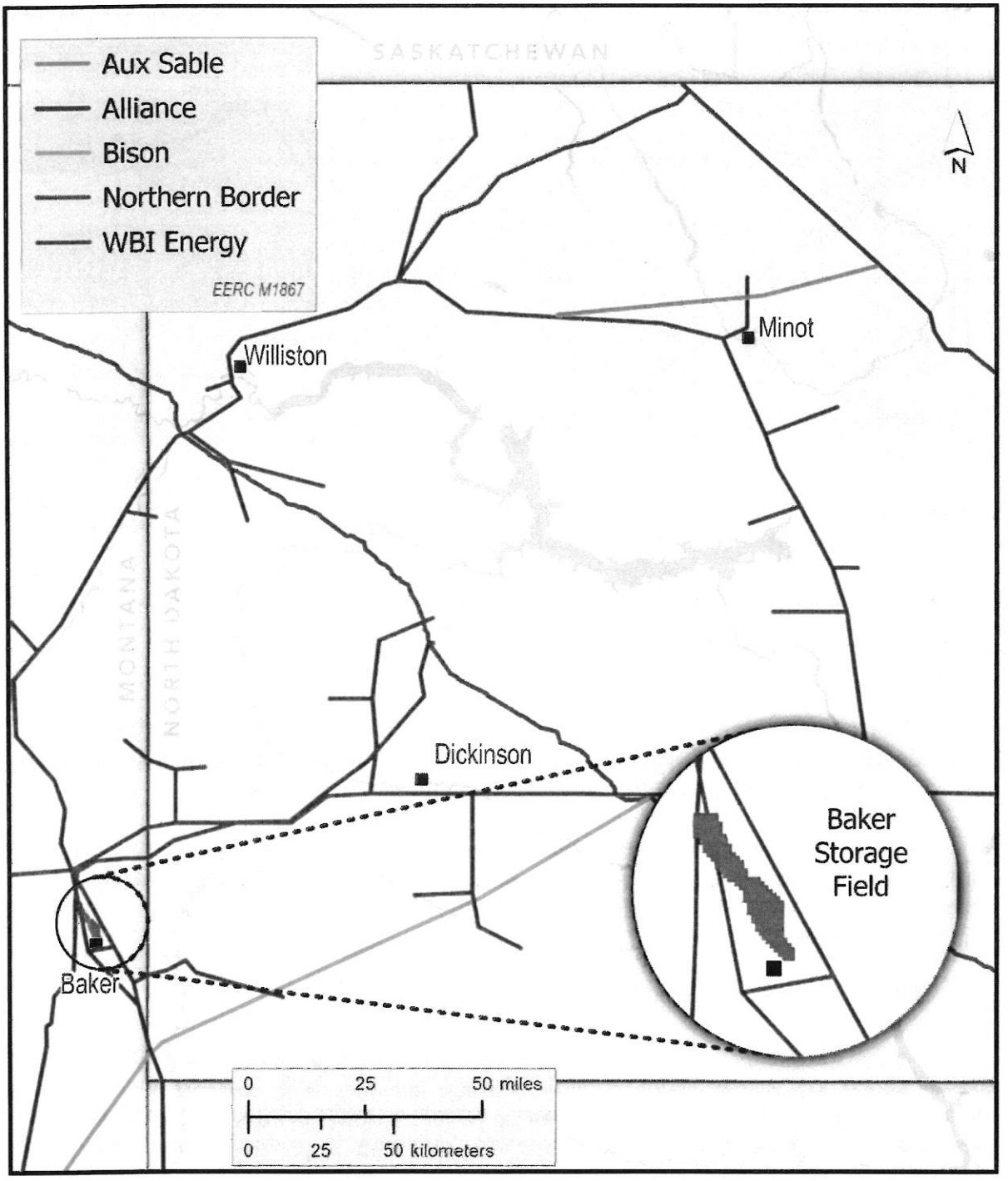

Figure 6. Interstate transmission natural gas pipelines in relation to the Baker Storage Field in eastern Montana.

The WBI Energy storage network supports the Williston Basin system by:

- Providing seasonal balancing for production-driven gas flows.
- Enhancing operational flexibility for interstate and regional transmission pipelines.
- Supporting winter reliability for downstream markets.
- Improving overall system efficiency by smoothing short-term supply and demand mismatches.

From a system perspective, WBI Energy's storage functions as an extension of the Williston Basin gas transportation network rather than a stand-alone regional asset. Its availability reduces stress on transmission infrastructure during peak demand periods and enhances the ability of pipelines and shippers to manage variability inherent in oil-driven associated gas production.

Storage enhances system reliability and efficiency but does not substitute for adequate pipeline deliverability into constrained markets, particularly in eastern North Dakota.

3.5 End Use of Natural Gas

Natural gas consumption in North Dakota includes residential and commercial heating, industrial and agricultural operations, electric power generation, and institutional and public sector facilities (Figure 7). Residential and commercial demand are highly seasonal, with peak consumption occurring during winter months and driven by space-heating requirements, while industrial and power generation demand tends to be more stable throughout the year.

Data from the U.S. Energy Information Administration indicates pronounced seasonal demand swings in North Dakota, with winter consumption levels significantly exceeding summer usage. Figure 8 highlights the seasonal demand swings for non-oilfield and midstream-related consumption. These seasonal patterns place added importance on firm transportation, system balancing, and access to storage to maintain reliable service during peak demand periods, particularly for local distribution companies and large institutional users.

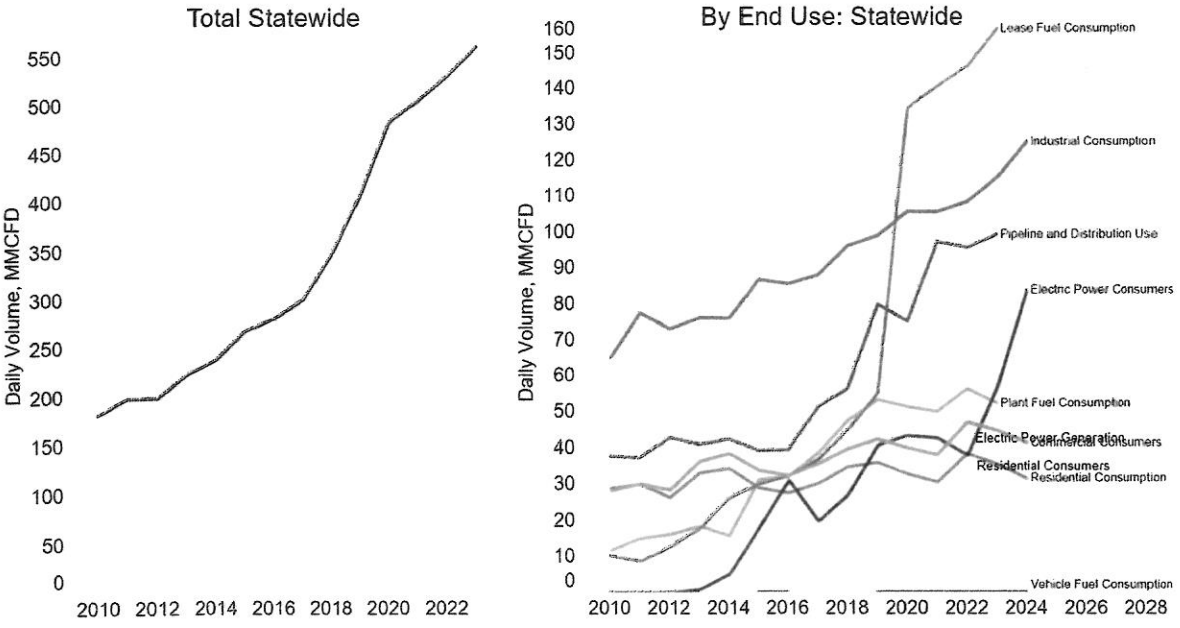

Figure 7. Annual North Dakota natural gas consumption.

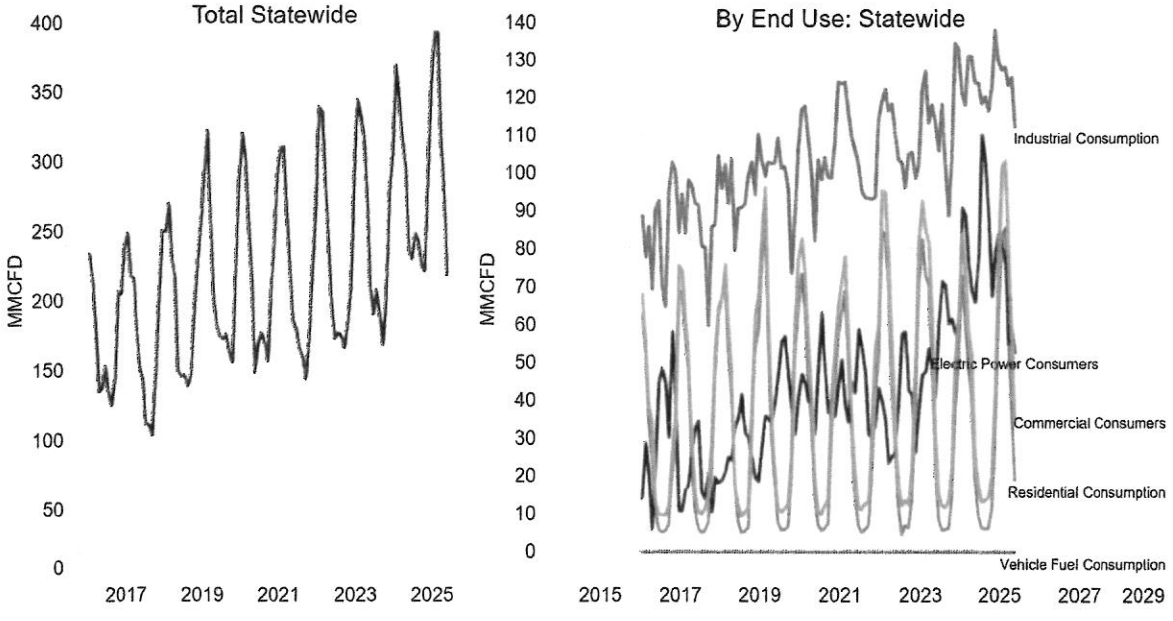

Figure 8. Natural gas consumption with oilfield and midstream consumption removed.