BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

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HP 22-002

IN THE MATTER OF THE APPLICATION OF NAVIGATOR HEARTLAND GREENWAY, LLC FOR A PERMIT UNDER THE SOUTH DAKOTA ENERGY CONVERSION AND TRANSMISSION FACILITIES ACT TO CONSTRUCT THE HEARTLAND GREENWAY PIPELINE IN SOUTH DAKOTA,

DIRECT TESTIMONY OF JONATHON MULLER

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1. Please state your name and address for the record.

Answer: My name is Jonathon Muller. My business address is 5401 Welker Ave., Des Moines, IA 50312. I am the President of Muller Consulting.

2. Please state your position with Navigator and provide a description of your responsibilities.

Answer: I am not employed by Navigator, but contracted with Navigator to estimate the economic impact of the Pipeline on the states where it will be built.

3. Please describe your educational and professional background.

Answer: I graduated with a BS in Economics from the University of Iowa in 1991. I was employed as a tax analyst, revenue forecaster, and regional economist for Iowa General Assembly from 1993 to 1998. I was then employed as a public policy research analyst, regional economist, and business developer for trade associations through 2008. I formed and operated a school finance consulting firm through 2020, including producing enrollment forecasts and actuarial studies estimating cost of post-employment benefits. I have performed regional

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economic studies for various industries including insurance, utilities, and casinos. My full Curriculum Vitae is provided as Exhibit A, and a more extensive discussion of my experience is found in the report on the economic impact study I have performed regarding the Navigator Heartland Greenway project as described below.

4. Have you previously submitted testimony in this proceeding in South Dakota?

Answer: No.

5. Please state the subject of your testimony and identify the sections of the Application that has been filed with the South Dakota Public Utilities Commission for which you are responsible.

Answer: I will address the economic impact of the construction and operation of the Pipeline on the South Dakota economy, based on a study I performed to estimate the economic impact of the Pipeline. The full report of the Study is attached as Exhibit B. My testimony relates to the following sections of the Application:

Section 7.2—Employment

Section 7.3--Taxes

6. What are the economic impacts of the Pipeline that your Study estimated?

Answer: Muller Consulting examined the direct and dynamic (indirect/induced) impact of the NHG Pipeline on the regional economies of each of the five states through which the pipeline runs, disaggregated by the construction impacts, ongoing operations and maintenance, and the net impact on landowners/farmers. The study provided estimates of the impact on employment, population, economic output, personal income, and state and local taxes.

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7. What does the Study estimate will be the economic impact of the construction of the Pipeline in the State of South Dakota?

Answer: The study assumed an initial capital investment during phase 1 in the South Dakota pipeline counties of $142 million in pipeline construction and $37 million in capture facilities. Study results suggest total dynamic peak employment in 2024 of 1,020 jobs, and average employment during the 4-year construction period of 430 jobs. Average annualized wages during this period for the project are estimated to be $54,300. Total dynamic economic output is estimated to be $202 million in the peak year.

8. What does the Study estimate will be the economic impact of the ongoing operations and maintenance of the Pipeline in the State of South Dakota?

Answer: Ongoing operations and maintenance cost is expected to be approximately $5.9 million per year in South Dakota, employing 10 people at an average wage of $68,300. Total dynamic employment and economic output associated with the post-construction period are expected to yield 20 jobs and $9.7 million.

9. What does the Study estimate will be the fiscal impact for local governments in the state of South Dakota as a result of construction and operation of the Pipeline?

Answer: The Study reported estimated property taxes to state and local governments (or Payment in Lieu of Taxes if the Pipeline is not assessed real property taxes) of $3.1 million annually, based on the net acquisition cost of the Pipeline project multiplied times an average effective tax rate of 1.36%. Amounts for each county were assumed to be allocated in proportion to mile of pipeline. Actual property taxes assessed by the South Dakota Department of Revenue under SDCL Chapter 10-37 may vary. The State of South Dakota is expected to receive approximately $1.3 million from sales/gross receipts taxes and other fees/taxes in 2024, the peak

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year of construction. Post-construction, that amount will decline to $0.9 million per year by 2030.

10. Please describe how the Study was conducted.

Answer: The Study was conducted by using NHG data for investment and operations budgets, and disaggregated into 2 phases, with the South Dakota counties' investment occurring in both phases (construction period from 2023 to 2026) and additional investment occurring in other years in 4 other states. Some inputs were estimated independently, such as the various inputs into the impact on landowners (i.e. Commodity prices, average yields, acres in rights-of-way, and annual crop damage). Modeling was disaggregated by Pipeline project phase and type of investment, then output was apportioned across sub-regions based proportionally on investment shares or Pipeline mile shares, depending on which variable was more suitable. The sub-regions of Pipeline counties were then summed with the impacts in the respective states' non-Pipeline areas to estimate total impact by state and by phase. More detail is provided about the model itself and the Study's configuration in the Report, at pages 10-14.

11. Did you use a model to help determine the economic impacts of the construction and operation of the Pipeline? If so, please describe the model.

Answer: The REMI Model (Regional Economic Models, Inc.) was used to estimate the economic impacts of the Pipeline project investment and ongoing operations. The REMI model is a dynamic forecasting and policy analysis tool that incorporates various facets of econometric models and input-output models, and is generally described as a computable general equilibrium model. The Study used 9 regions to describe the areas impacted by the investment. One of those regions included the South Dakota counties through which the Pipeline would run, and another one of the regions modeled the rest of the State of South Dakota, which also gains some

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economic activity from investment outside these regions. More detail is provided about the model itself and the Study's configuration in the Report, at pages 10-14.

12. Does this conclude your prepared direct testimony?

Answer: Yes, it does.

Dated this 26th day of September, 2022.

/s/Jonathon Muller
Jonathon Muller

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Jonathon A. Muller

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WORK EXPERIENCE

Iowa School Finance Information Services, Inc., Des Moines, Iowa, July 2010 – December 2020
Partner

- One of three partners in a Subchapter S corporation specializing in providing finance tools and training principally to Iowa schools. Approximately 90% of Iowa school districts subscribe to our services.
- Responsible for financial, budgeting, and planning duties for company with peak employment of 8 full time employees and 5 contracted professional development trainers.
- Responsible for business development, contract negotiations, program development, and acquisitions. Projects include software development for background screening service, development of Tax and Revenue Anticipation Notes Program, Policy and Bargaining Services, Computer Data Investigations and Recovery, GASB 75 Actuarial Service, and a variety of software services adding value to local government financial data.
- Created a natural gas Local Government Risk Pool for Iowa school districts, providing services through a company co-owned with a natural gas supplier. In first three years, grew business over three years to more than $4 million in revenue and more than $1 million in net income.
- Negotiated sale of interest in company to other partners in January 2020, but remain employed on a part-time basis focusing on managing the natural gas pool and enrollment forecasting for Iowa school districts.

Community College Project – Massachusetts, November 2010 – June 2012
The Princeton Review, Framingham, Massachusetts, November 2010 – May 2011
Vice President, Operations
Higher Education Partners, LLC, New Bedford, Massachusetts, May 2011 – June 2012
Chief Financial Officer/LLC Partner:

- Responsible for all financial operations of for-profit venture that builds public private partnerships with community colleges to build and equip facilities for allied health programs, including accounting, payroll, creation of financials, and work with outside auditing firm.
- Developed financial models and made financial presentations to secure $8 million in private equity venture capital in a successful management buyout of a division of The Princeton Review, and a second round of financing to facilitate growth exceeding original projections.
- Negotiate revenue sharing agreements with community colleges.
- Develop financials and presentations to secure debt financing through local government aid programs and port authority financing.
- Work cooperatively with community colleges to develop budgets and facilities plans to achieve efficient capacity utilization.
- Responsible for facilities planning, financial oversight, and lease negotiations.

Muller Consulting, Inc., Des Moines, Iowa, March 2002 – January 2005, April 2009 – July 2010, January 2020-present
President - Self-employed public policy and business development consulting.
Clients have included:

- **Iowa Insurance Institute**– Conducted a regional economic impact study of the influence of the Insurance Industry on the State of Iowa, including output, personal income, employment, and population.

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- **Navigator CO2 Ventures**– Conducted a regional economic impact study of a proposed $4 billion carbon sequestration pipeline, measuring output, personal income, employment, and population impacts for 5 Midwestern states.
- **Alliant Energy Company** - Conducted a series of regional economic impact studies of proposed wind farms in Iowa.
- **LS2 Group** – Performed regional economic studies for public relations and public policy firm and its clients in various industries, including insurance, energy and utilities, and casinos.
- **The Princeton Review**– Business development consulting for college readiness and test prep company, identifying key education decision makers, establishing contact, and negotiating agreements.
- **Juan O'Sullivan's Gourmet Salsa** – Business plan development, feasibility study, and USDA grant writing for locally grown salsa production facility. Client awarded $120,000 stimulus grant to expand production.
- **Seminole Energy Services** – Consulted with natural gas pool operators to issue independent Requests for Proposal for natural gas supply.
- **IASB** – Business Development Chief (below)
- **Iowa Farm Bureau Federation** – Tax Research
    - Reported to Executive Director of the Iowa Farm Bureau Federation.
    - Independent authority to research apart from the direct authority of the public policy division.
    - Deliverable of a comprehensive three-year study of Iowa's tax structure; ***Iowa's State and Local Tax Structure Effects on Farm Families.*** Study covered virtually every aspect of Iowa's State and Local tax code, and provided recommendations for policies and reforms for the Federation's consideration.
- **Iowa Environmental Education Project** – Worked with federal DOE officials to approve $50 million grant for an indoor rainforest in Iowa. Provided economic impact analysis and financial information, worked with Fortune 500 companies to secure private funding, sponsorships, and partnerships. Assisted lobbying efforts at the state level. Reported to the Executive Director for the project.
- **Latham and Associates, Inc –** Worked with energy advisor firm to help cities understand the tax implications of municipalization of local utilities.

Iowa Association of School Boards (IASB), Des Moines, Iowa, October 2000 – June 2010 (Including consulting role with Muller Consulting, Inc. from March 2002-January 2005).

Chief Financial Officer/Business Development Director

- Managed the financial risks of a non-profit association representing Iowa's 360+ school districts.
- Oversaw all aspects of financial reporting, and presented all financial reports to the Board of Directors.
- Prepared budgets and worked closely with external auditors.
- Managed team of accounting staff to generate payroll, manage HR functions, analyze business functions, and prepare forecasts for all expenditures related to the Association and affiliated entities.
- Managed facilities and information technology operations and staff.
- Served on Management Team for the Association.
- Approved all contracts with vendors and customers.
- Created new business lines and business relationships.
- Negotiated and directed acquisition, financing, and build-out of 50,000 square foot facility in 2007.

Chief Financial Officer – Iowa School Employee Benefits Association (ISEBA)

- Managed the financial risks of an inter-local government health insurance consortium with $60 million in annual premium. Report to the Board of Directors.
- Developed regular financial board reports, including cash flow, loss ratios, and trending.
- Prepared budgets, worked closely with external auditors.
- Responsible for recommendation on appointment of Executive Director.

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- Negotiated with all vendors, including carrier, administration software developers, and banks.

Secretary/Treasurer – Iowa Joint Utility Management Inc. (IJUMP)

- Managed the financial risks of a non-profit natural gas pool for schools, cities, counties, and other non-profits, with annual sales in excess of $20 million. Duties similar to that of CFO. Reported to the Board of Directors.
- Developed regular financial reports for the board, including cash flow and hedging experience.
- Traded gas futures on the New York Mercantile Exchange to hedge price risk, and also responsible for hedging basis risk.
- Conceptualized, and worked with team to design and implement a billing system to internalize services resulting in improved cash flow for employer, improved financial oversight, and improved experience for customers.
- Negotiated tariff expansion with the Iowa Utilities Board and state utilities.
- Oversaw all aspects of daily activity including customer service, billing and accounting staff.
- ***Note:*** Upon successful expansion of pilot tariffs in 2008, determined that the mission of the company had been achieved, and the entity was no longer needed. Successfully negotiated and sold all assets of the entity to a third party, increasing local competition and raising approximately $2.0 million for non-profit educational services.

Leadership roles for other IASB-affiliated companies and services

- **Local Government Services, Inc.,** – President and CEO of wholly-owned for-profit subsidiary of the Iowa Association of School Boards. Reported to Board of Directors.
- **PaySchools.com** – Conceptualized, and worked with team to design and implement an aggregated web portal for parents to pay school lunches and fees online. Started with one school in Iowa in 2005. Grew to more than 500 schools in 37 States, with quarterly year-over-year growth rates exceeding 100% since inception. Directed marketing, customer service, software development, and accounting staff. Developed financial reports and analysis on trends.
- **ISJIT** (Iowa Schools Joint Investment Trust) - $350 million 28E Local Government Investment Pool, with peak balances exceeding $500 million. Negotiated all contracts with vendors, developed programs to enhance participation and increase balances, such as PaySchools.com, check-writing, online bill-payment, and payroll services. Directed marketing staff, prepared marketing and financial reports for Board of Directors, and worked closely with external auditors.
- **ISCAP** (Iowa School Cash Anticipation Program) – 28E Tax and revenue anticipation note program to pool cash flow bonds issued by Iowa schools. Responsible for issuing two series per year totaling more than $200 million annually. Designed and oversaw implementation of a web-based cash flow projection and bond sizing program and an online transaction program. More than doubled net revenue to employer while reducing fees to participating schools by nearly one-third.

Iowa Farm Bureau Federation, West Des Moines, Iowa, September 1997 – October 2000
Director of Research

Led research arm of the public policy division of 160,000 member association. Duties included:

- County government and school district budget analysis, with emphasis on tax and revenue effects on agricultural industry.
- Frequent contact with membership through budget workshops, including representing membership at community meetings, and serving as liaison to local governments. Worked with local farm groups and schools to facilitate processes for passing local school bond referendums.
- Farm Bureau PAC database processing, with an emphasis on identifying, categorizing, and targeting potential voters.

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- Responsible for importing and maintaining the following databases: school budget, county budget, taxing district key file, state voter, county/school district census, and Farm Bureau membership databases.
- Research projects included examinations of the residential rollback, Taxpayer's Rights Amendment, school aid formula alternatives, narrow exclusion of capital gains, local option sales tax, tax incidence of bonding proposals, and economic impact of various value-added agricultural enterprises on the state and local economy, and reports on the economics of county public safety expenditures and jail construction.

Legislative Fiscal Bureau, Des Moines, Iowa, October 1992 – September 1997

Tax Analyst

Fiscal staff to the House and Senate Ways and Means Standing Committees of the Iowa General Assembly. Duties included:

- Scored all significant bills affecting State tax law.
- Operated, maintained, and supported a multi-tax micro-simulation model and input-output econometric model (REAL and REMI).
- Testified before the Ways and Means, Economic Development, and Fiscal Committees on tax and economic development issues.
- Explained issues and estimates to the press.
- Formal research projects included: Tax increment financing, state/private sector employee wage comparison, the Iowa inheritance tax and its impact on elderly migration, county budgeting under the property tax limitation, tax simplification through adoption of the federal definition of taxable income; the deduction for federal income taxes; franchise tax; industrial new jobs training program; correlation between tax complexity and the use of paid preparers; legislative computer models; effect of federal Omnibus Budget Reconciliation Act of 1993 and Taxpayer Relief Act of 1997.
  (April 1993 – September 1997)

Revenue Forecaster

Directed a five person team that prepared fiscal year estimates of the General Fund of the State of Iowa for the Iowa General Assembly. Responsible for the estimation of the State personal income tax, use tax, inheritance tax, franchise tax, insurance premium tax, and various excise taxes and non-tax revenues. Duties as team leader included the coordination and assignment of team member estimates; composition of a monthly report to the General Assembly; and staff participation in the quarterly meetings of the Revenue Estimating Conference; Team member: October 1992 - May 1993. Team leader: June 1993 – September 1997.

Budget Analyst

Analyzed and presented a $40 million executive branch agency budget to the Joint Health and Human Rights Appropriations Subcommittee of the Iowa General Assembly. Duties included expenditure oversight, performance-based budgeting, legislative intent compliance reports, and issue analysis. Estimated and issued fiscal notes for all bills that affected the Iowa Department of Public Health for one Session of the General Assembly. October 1992 - April 1993.

EDUCATION

B.S., Economics, The University of Iowa, August 1991

OTHER SERVICES/HONORS

- Budget Director, State of Iowa, Transition Team – appointed by then Governor-elect Tom Vilsack to assemble $6 billion state budget over a 9-week period prior to inauguration.
- Economic Advisor - Governor's Council of Economic Advisors, appointed to serve under two Iowa Governors' administrations.

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- Board Member - Iowa Railway Finance Authority, appointed to serve under two Iowa Governors' administrations.
- Board Member - National School Foundation Association
- Youth Basketball Coach
- Literacy Army and PTA Volunteer
- Iowa High School Debate Coach and Judge
- Three Iowa Governor Volunteerism Awards
- Governmental Affairs Committee Member, Polk-Des Moines Taxpayers Association

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Heartland Greenway Pipeline

Regional Economic Impact Study

Jon Muller

Muller Consulting

August 19, 2022

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Executive Summary

Heartland Greenway Project
Regional Economic Impact Study

Jon Muller, Muller Consulting.

Study Overview

This study utilizes a dynamic microsimulation regional economic model to estimate the impact of a C02 carbon capture and sequestration pipeline, capturing carbon in Iowa, Nebraska, South Dakota, Minnesota, and Illinois, and transporting the gas to a sequestration site in Illinois. The model consists of 9 regions and 70 economic sectors, covering two construction phases. The 9 sectors are:

- Iowa Pipeline Counties (Regions 1-2), Phase 1 and Phase 2
- Pipeline Counties in Other States (Regions 3-4), Phase 1 and Phase 2
- A region for the portions of each of the 5 states excluding the pipeline counties (Regions 5-9)

The model enables shocking either employment or investment/spending variables. We chose the latter, as the initial data for investment and spending were better clarified. Thus, investment and spending policy variables were used, and predicted employment and indirect economic impacts were forecasted based on established multipliers and Trade Flows.

This study focuses on investment and operations associated capturing and transporting C02.

Economic Impact Summary

Total project and phasing impacts on Employment, Population, Income, and Output:

Chart 1 – Project Scale Economics

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Key project economic estimates include:

Employment:

Construction Effects:

- Direct employment: 9,200 peak in 2024, average direct employment over 4 years of about 3,925/year
- Dynamic (total) employment: 19,800 peak in 2024, average dynamic employment over 4 years of 8,450 jobs/year.
- Dynamic Employment Multiplier of 2.15

Operations Expenditures (Ongoing):

- Direct employment: 227 jobs/year
- Dynamic (total) employment: 735 jobs/year
- Employment Multiplier of 3.2

Economic Output:

Construction Effects:

- Direct Investment: $3.8 billion over 4 years (including $359 million in landowner payments).
- Dynamic (total) Output: $10.0 Billion over 4 years
- Dynamic Output Multiplier of 2.6

Operations Expenditures (Ongoing):

- Direct spending: $129 million/year
- Dynamic (total) Output: $253 million/year
- Dynamic Output Multiplier of 2.0

Net Agricultural Industry Impacts:

Direct Landowner Net Payments:

- Direct Row and Crop Damage payments of $359 million, estimated to average $10,200 per acre of easement (averaged across both permanent and temporary easements), offsets an estimated $61 million in crop loss.
- Total Net change in personal income from the payments less the crop loss estimated to be $530 million over a 10-year period (Dynamic Impact), with approximately $298 million of that being captured directly in Net Farm Income.

Indirect Payments from 45Q Credits, LCF Ethanol, and Carbon Credits:

- $92 million annually in marginal 45Q carbon credits to ethanol plants with an ownership structure within the regions.
- $40 million annually in carbon capture credit paid directly to regionally-owned ethanol plants
- $250 million in additional Ethanol production.
- The three Indirect benefits are estimated to yield $350 million in personal income annually, and 2,000 jobs.

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Model Selection Summary

The project was completed using a 70 sector Policy Insight dynamic model from Regional Economic Models, Inc (REMI) to measure the following economic outputs:

- Employment
- Population
- Personal Income
- Economic Output

The project required a series of 8 simulations, covering 4 impact scenarios across 2 phases. The simulations were then aggregated by project phase, and then summed to determine the entire economic impact. The simulation scenarios consisted of: *Construction, Landholder Impacts, Tax/carbon credits and Ethanol Industry Customer Sales, and Project Operations*. The inputs were apportioned according either total investment, carbon capture investment, or pipeline miles across the input regions, depending on the variable being addressed. The two primary input regions are *Iowa Pipeline Counties* and *Other Pipeline Counties*. The contributing simulations, and their inputs, are as follows:

Construction:

Pre-Construction efforts, defined as a shock to Final Demand for Professional, Scientific, and Technical Services: $279.8 million, spread across 2023 and 2024, including the costs associated with securing rights of way, apportioned across the regions by share of total project investment.

Construction, defined as a shock to Investment Spending for Nonresidential Structures: $3.127 billion, with 50% occurring in 2024, 33% in 2025, and 17% in 2026.

Landowner Payments:

Net project payments to landowners is a function of three components, apportioned across the regions by pipeline mile, and entered as a shock to Farm Proprietor's Income.

- $272.4 million Right of Way (ROW) Payments to landowners for access during construction and easement access for operations, paid from 2023 through 2025 as projects begin, *PLUS*

- $86.7 million in Damage Payments to landowners for lost production during the construction phase, and to reflect reduced yields in subsequent years, as estimated by Client to be negotiated with landowners. These are assumed to be paid from 2024 through 2026, as the projects are completed, *LESS*

- $61.2 million in Actual Crop Damage estimated to occur of over 10 years.

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Customer Credits and Industry Sales:

Customer Credits and Industry Sales, apportioned across the regions annually by share of total carbon capture investment, is a function of three components,

- $92.4 million for 45Q credits of $35/ton of C02 due to the Inflation Reduction Act of 2022 (in addition to $50/ton provided under prior law), applied to 11 million tons of annual storage, reduced for leakage outside the study's regions, entered as a shock to Farm Proprietor's Income, *PLUS*

- $39.6 million for Carbon Offset Credits traded on the open market, estimated by Client at $15/ton, reduced for leakage outside the study's regions, entered as a shock to Farm Proprietor's Income *PLUS*

- $250 million for additional 100 million gallons of Low Carbon Fuel (LCF) ethanol sold to the California market (and/or elsewhere), entered as a shock to Industry Sales of Other Basic Organic Chemical manufacturing.

Operating Expense:

Operating expense $125.4 million for Capture and Pipeline maintenance, assumed to scale up fully in 2026, and to grow at the rate of the PCE Price Deflator annually, and entered into the model as a shock to Pipeline Industry Sales. The investment response in the model was nullified to avoid double counting demand for actual pipeline construction.

State & Local Tax Impact

- The project is expected to result in direct property tax payments of $62.8 million annually once fully assessed. The study is reporting the amount attributable to property in the pipeline regions, though the effect of those tax payments will be shared to various degrees by the states in which those counties reside, consistent with each states property tax system, and will similarly be shared with other taxpayers in the form of lower tax rates on the margin. Additionally, this estimate assumes the Firm will remit a Payment in Lieu of Taxes (PILOT) in those jurisdictions that do not directly levy a property tax. Effective tax rates are based on work completed by the Client in 2021, and are not expected to have changed materially. Depending on the assessment standard used by taxing authorities for a C02 pipeline, these estimates may change materially in practice.

- There is an implicit assumption that no tax base will be change for agricultural land production. Sensitivity testing suggests an immaterial reduction that would be very short-lived. To the extent damage payments exceed lost production, there would almost certainly be no reduction in most cases.

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- The impact and rates by state are as follows:

Property Taxes (Millions of Current Dollars)

	Capture/ Pipeline	Sequest..*	Total	Effective Tax Rate
Iowa	$ 31.7	$ -	$ 31.7	1.53%
Illinois	12.2	1.3	13.5	2.31%
Minnesota	2.6	-	2.56	2.80%
Nebraska	5.6	-	5.63	1.47%
South Dakota	9.4	-	9.37	1.36%
Total	$ 61.5	$ 1.3	$ 62.8	1.70%

**Estimated by Strategic Economic Research, June 2022*

- State Tax Revenue was estimated outside the model using the ratio of State Taxes by source to Total State Personal Income. The estimates implicitly assume an elasticity of 1, meaning a 1% increase in personal income will result in a 1% increase in tax revenue by source, which probably serves to slightly overstate the gross receipts revenue and slightly understate the income tax revenue. But overall, it should give a good idea of how state revenue responds to changes in personal income. The following table demonstrates the impact in the peak construction year, 2024, of $72.5 million and an ongoing impact exceeding $20 million, rising over time compared to the baseline forecast.

Estimated Impact on Selected and Total State Tax Revenue ($m)

	2024			2030			2035			2040		
	Sales and Gross Receipts	Individual & Corporate Income Tax	Total (incl Other)	Sales and Gross Receipts	Individual & Corporate Income Tax	Total (incl Other)	Sales and Gross Receipts	Individual & Corporate Income Tax	Total (incl Other)	Sales and Gross Receipts	Individual & Corporate Income Tax	Total (incl Other)
Iowa	$ 22.2	$ 20.6	$ 47.8	$ 5.9	$ 5.5	$ 12.7	$ 7.1	$ 6.5	$ 15.2	$ 6.9	$ 6.4	$ 14.8
Illinois	5.7	6.6	13.3	0.8	0.9	1.8	1.3	1.5	3.1	1.0	1.1	2.3
Minnesota	0.9	1.1	2.2	0.0	0.1	0.1	0.9	1.2	2.3	0.1	0.1	0.2
Nebraska	2.4	2.7	5.3	0.8	1.0	1.9	1.2	1.4	2.6	1.0	1.2	2.2
South Dakota	3.2	0.1	3.9	2.4	0.0	2.8	2.6	0.1	3.2	2.7	0.1	3.3
Total	$ 34.4	$ 31.1	$ 72.5	$ 9.9	$ 7.4	$ 19.3	$ 13.1	$ 10.6	$ 26.4	$ 11.7	$ 8.8	$ 22.8

Economic Impact

Investment

- For modeling purposes, the project assumed captured an initial investment of $3.766 billion beginning in 2023 and continuing through 2026. This amount does not include another $350 million for work on the sequestration site. Small pre-construction costs in 2022 were rolled into the 2023 simulation year.

- Investments were disaggregated into three types: Pipeline and capture construction expense, Landowner/farmer inputs, and Operations. This study does not replicate the work of Strategic Economics Research, LLC, which published a study of the Sequestration construction and operations in June 2022.

- Ongoing operations expenditures are estimated to be $125.4 million as Industry Sales in Pipeline Transportation, once fully phased after 2026. For purposes of inputs, this number was deflated to 2020 price levels, and entered as a constant dollar input.

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Employment

- The project is expected to generate demand for 21,100 jobs at the peak of the construction phase, of which 9,200 are directly related to the project, for a dynamic employment multiplier of 2.28. (This number is higher than reported above, because it includes all investment, including ROW/damage payments).

- Total wages and salaries in 2024, the peak construction phase year, will reach approximately $1.15 billion, suggesting an average annual wage of $54,300.

- An estimated 227 jobs will be required for continuing operations, with another 1,203 indirect and induced jobs (including non-operations activity), for a total of nearly 2,800 peak jobs in 2027, declining over time as the real value of credits declines over time, and as labor productivity grows. Top employment impacts by industry during the post construction period are: Construction, Retail Trade, Retail Trade, and State and Local Government (followed by Utilities and Chemical Manufacturing, representing the direct ongoing impact from the project).

- Wages during the post-construction phase are estimated to be $188 million, suggesting an average wage of $68,314 by 2027.

Personal Income

- Personal Income is expected to increase $1.48 billion at the peak of the Construction Phase. Total Personal Income for the entire Construction Phase is estimated to increase by $3.56 billion, cumulatively through 2026.

- Net Farm Income is expected to increase by the direct impact of the ROW payments net of crop losses. The direct impact over the 10-year period of anticipated crop loss is expected to be a decrease in Farm Income of $62.1 million over that period.

- Personal Income in the post-construction phase, including the increase in ethanol sales, is expected to increase $410.0 million in 2027, the first full operational year, and reach $440 million in 2029, generally leveling off thereafter.

Output

- Total Output is expected to increase $4.4 billion in the peak year of construction. Total economic output in the Construction Phase is estimated to be $11.5 billion, cumulatively tively over the 4-year period, suggesting a dynamic multiplier of 2.6.

- REMI estimates Trade Flows to determine the extent to which a given level of investment is enjoyed by the region in which it occurs, or outside the region. Trade Flows are a function of its unique economic clusters as they relate to the type of investment undertaken, but also of its geographic size and the location of the project within that region. Insofar as the entire disaggregated region consists of 5 contiguous states, more of the demand can be sourced within the region. We estimate that approximately 64% of the ongoing economic activity will be sourced within the 9 regions, with the nation and the world supplying the remainder after the Construction Phase.

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- The following table summarizes Output and Employment direct and total estimates.

Construction Impacts

Direct		Total (Direct and Ir	(Peak)	Dynamic Multiplier	
Investment (incl Land Payments)	Employment (Peak)	Output	Employment	Output	Employment
$ 3,792	9,196	$ 9,971	19,791	2.6	2.2

Operations (Ongoing based on 2027)

Direct		Total (Direct and Indirect)		Dynamic Multiplier	
Operations Expenditures	Employment (2026)	Output	Employment	Output	Employment
$ 129	227	$ 253	735	2.0	3.2

*Millions of current dollars, and number of employed persons

- Both employment and output multipliers are within expected ranges.

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Project Overview

Muller consulting was retained by Navigator C02 Ventures, LLC (Client) to estimate the economic impact of a proposed pipeline project. The project would involve constructing a 1,937 mile pipeline running through Iowa, Illinois, Nebraska, Minnesota, and South Dakota.

The project provides for the capture of C02 at various industrial sites, principally ethanol plants for purposes of this study, compressing the gas and shipping it to a sequestration site in Central Illinois. The gas would there be released into deep wells where the C02 eventually mineralizes as part of the natural rock formation. (This study does not include any investigation of the viability of the technology or processes, which were provided by Client). Client provided estimates suggesting 11 million metric tons (MT) of C02 can be sequestered annually. Once fully built out, the system is projected to sequester 15 MT, but this initial 2-Phase estimate is used for purposes of this study. This study makes no estimates regarding any positive or negative externalities resulting from capturing carbon, transporting it, or sequestering it.

The economics of the project are driven largely by federal tax credits (26 U.S. Code § 45Q - Credit for carbon oxide sequestration), which provide a credit of $85 per sequestered ton of C02. While ethanol producers are expected to gain market share in California, which requires a lower carbon footprint than some Iowa producers have been able to achieve without carbon capture, those economics alone would not likely provide a sufficient internal rate of return to justify the $4.15 billion initial investment by Client.

After discussions regarding cost and benefits, Client accepted Muller's recommendation to configure a model created by Regional Economic Models, Inc (REMI). REMI is a dynamic model, rather than a static Input/Output model, and provides more robust results, in part because it can model the impact of the project over time, as it is phased into existence, and also has a population impact module. It is also easier to separate out the initial construction impacts (one

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time impacts) that diminish over time from the ongoing benefits from operations and new ethanol markets that go on for decades.

The selected REMI model was specified into nine regions:

- Phase 1: Iowa Pipeline Counties
- Phase 2: Iowa Pipeline Counties
- Phase 1: Pipeline Counties in Other States (aggregated into a single region)
- Phase 2: Pipeline Counties in Other States (aggregated into a single region)
- Rest of Iowa
- Rest of Illinois
- Rest of Minnesota
- Rest of Nebraska
- Rest of South Dakota

Additional information about the REMI model can be found on their website, www.remi.com. The following overview of the model is provided there:

The REMI model incorporates aspects of four major modeling approaches: Input-Output, General Equilibrium, Econometric, and Economic Geography. Each of these methodologies has distinct advantages as well as limitations when used alone. The REMI integrated modeling approach builds on the strengths of each of these approaches.

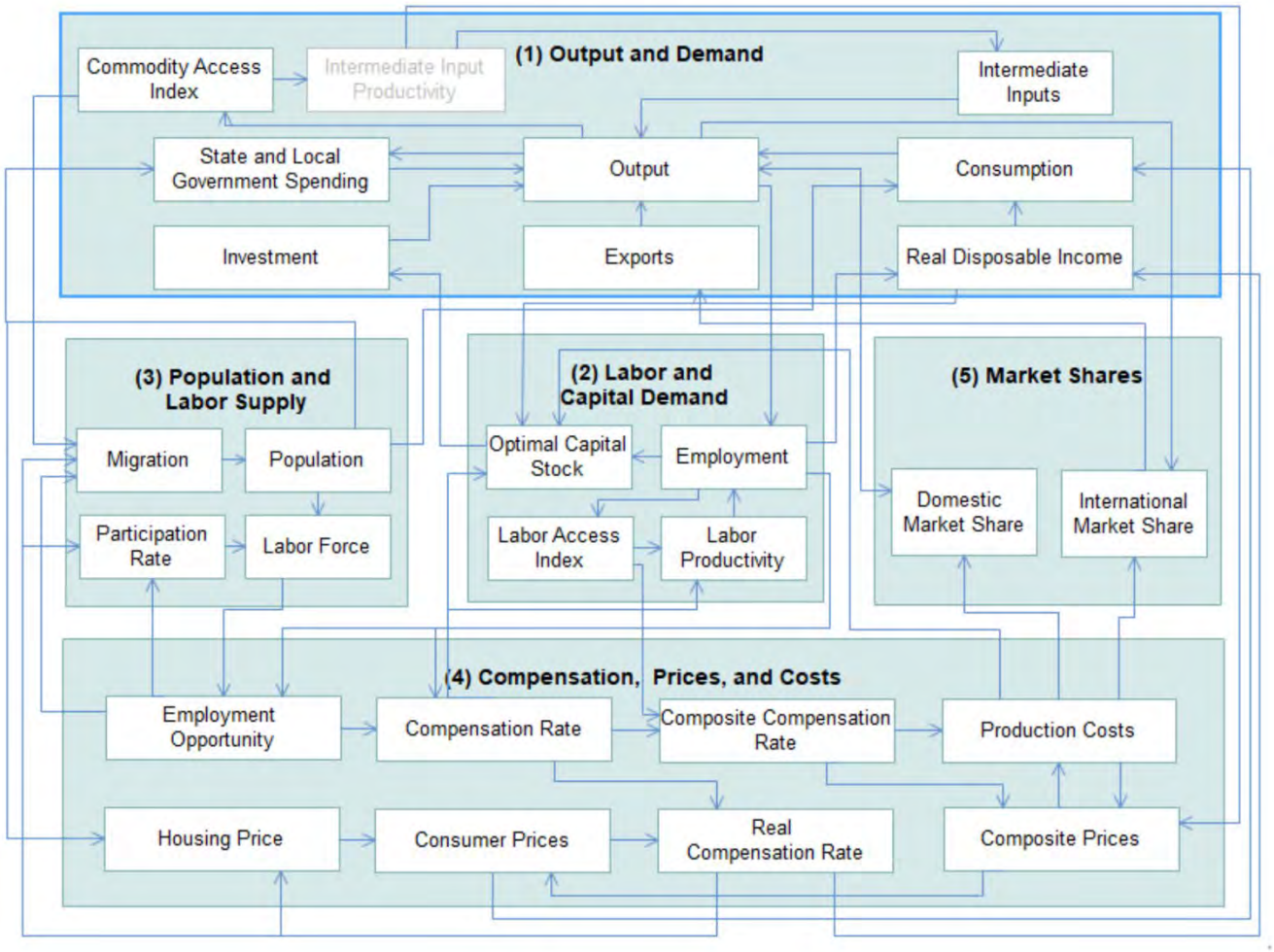
The REMI model at its core, has the inter-industry relationships found in Input-Output models. As a result, the industry structure of a particular region is captured within the model, as well as transactions between industries. Changes that affect industry sectors that are highly interconnected to the rest of the economy will often have a greater economic impact than those for industries that are not closely linked to the regional economy.

General Equilibrium is reached when supply and demand are balanced. This tends to occur in the long run, as prices, production, consumption, imports, exports, and other changes occur to stabilize the economic system. For example, if real wages in a region rise relative to the U.S., this will tend to attract economic migrants to the region until relative real wage rates equalize. The general equilibrium properties are necessary to evaluate changes such as tax policies that may have an effect on regional prices and competitiveness.

REMI is sometimes called an “Econometric model,” as the underlying equations and responses are estimated using advanced statistical techniques. The estimates are used to quantify the structural relationships in the model. The speed of economic responses is also estimated, since different adjustment periods will result in different policy recommendations and even different economic outcomes.

The New Economic Geography features represent the spatial dimension of the economy. Transportation costs and accessibility are important economic determinants of interregional trade and the productivity benefits that occur due to industry clustering and labor market access. Firms benefit from having access to a large, specialized labor pool and from having access to specialized intermediate inputs from supplying firms. The productivity and competitiveness benefits of labor and industry concentrations are called agglomeration economies, and are modeled in the economic geography equations.

The following is a high-level view of the model’s linkages


(1) Output and Demand
Commodity Access Index
Intermediate Input Productivity
Intermediate Inputs
State and Local Government Spending
Output
Consumption
Investment
Exports
Real Disposable Income
(3) Population and Labor Supply
Migration
Population
Participation Rate
Labor Force
(2) Labor and Capital Demand
Optimal Capital Stock
Employment
Labor Access Index
Labor Productivity
(5) Market Shares
Domestic Market Share
International Market Share
(4) Compensation, Prices, and Costs
Employment Opportunity
Compensation Rate
Composite Compensation Rate
Production Costs
Housing Price
Consumer Prices
Real Compensation Rate
Composite Prices

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Model Specification and Data Selection

Model Selection

Balancing the relative benefit vs. the relative cost of the type of model, Muller recommended a 9-Region model built on 70 Economic Sectors. The prospect of going to 160 sectors would have allowed for more specified inputs by direct type of expenditure, but the results would not be expected to be materially different.

While more granularity could have been obtained by making each county its own region, it would have been cost prohibitive. By assuming per mile construction costs, the results can be disaggregated to the county level, and then summed back up to provide an estimate of the impact for each State as a whole. Insofar as Iowa counties comprised about 55% of both the miles and the investment, we broke the out the Iowa Pipeline Counties as an aggregated region. While the State of Illinois generally has a higher Regional Purchase Coefficient (ie., is able to source more of its own output) than the other States, the characteristics of the largely rural Illinois counties doesn't suggest a strong reason to believe they would have profoundly different outcomes on a per mile basis than the other non-Iowa pipeline states.

	Phase 1		Phase 2		Total	
State	Pipeline Mileage By State	Percentage of Miles	Pipeline Mileage By State	Percentage of Miles	Pipeline Mileage By State	Percentage of Miles
Iowa	825.6	60.5%	240.2	42.0%	1,065.8	55.0%
Illinois	272.6	20.0%	-	0.0%	272.6	14.1%
Minnesota	47.0	3.4%	-	0.0%	47.0	2.4%
Nebraska	116.7	8.5%	80.4	14.1%	197.1	10.2%
South Dakota	103.7	7.6%	250.7	43.9%	354.4	18.3%
Total	1,365.6	100.0%	571.3	100.0%	1,936.9	100.0%

Regions	Pipeline Mileage by Region	Percentage of Miles
Region 1 - Phase 2 Iowa Pipeline Counties	825.6	42.6%
Region 2 - Phase 2 Iowa Pipeline Counties	240.2	12.4%
Region 3 - Phase 1 Other Pipeline Counties	540.0	27.9%
Region 4 - Phase 2 Other Pipeline Counties	331.1	17.1%
Region 5 - Rest of Iowa	-	0.0%
Region 6 - Rest of Illinois	-	0.0%
Region 7 - Rest of Minnesota	-	0.0%
Region 8 - Rest of Nebraska	-	0.0%
Region 9 - Rest of South Dakota	-	0.0%
Total	1,936.9	100.0%

Data Input Types

The REMI model provides the means of shocking a baseline forecast, or creating a simulation, through various economic handles. Using sound data retrieved prior to the simulation, one can shock employment and then the model will estimate the direct investment and spending that

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would be associated with that level of employment. Similarly, one can shock investment and spending, and the model will estimate the direct employment that would be associated with those levels. Muller determined the quality of the initial data for investment and spending was better clarified than the employment estimates. Thus, investment and spending policy variables were used, and predicted employment and indirect economic impacts were forecasted based on established multipliers and trade flows among and between the regions.

All of the model inputs for the construction and operations budgets were provided by the Client, with the exception of two input variables. Muller relied on outside sources to estimate the impact of crop loss to landowners, and the value of 100 million gallons of marginal ethanol sales.

While property taxes are included in the aggregate operating expense, we opted not to directly input these amounts as distinct expenses. Rather, we implicitly assume that the cost structure would be substantially similar to the cost of operating other pipelines. Depending on how this pipeline project is finally assessed, this implicit assumption may be somewhat over-estimating or under-estimating this expense, and by implication over- or under-estimating the other supply chain impacts. That said, property tax impacts are assumed to have a consistent rate by State, and individual taxing district rates were not researched. This will have the effect of somewhat inflating property tax rates in some counties relative to other counties.

The Client provided a budget for ROW payments and Crop Damage payments. The payments vary according to the land value in each county, but combined provide a payment of approximately $10,000 per acre affected. The cost of securing the easements was a budget item included in the Construction cost of the project. The Landowner Payments were input directly into Farm Income, a component of Proprietor's Income.

Lost production of farm ground is captured by assuming a 150 foot wide easement across 1,937 miles of farm ground. While not all of the ground is farm ground, the vast majority is, and we assumed that lost proprietor's income would be a sufficiently useful proxy for other parcels. The affected is 35,216 acres. We further assumed a mix of 57% corn acres and 43% soybean acres across all the counties, converted into a weighted average soy/corn price and yield (128 bushels/acre at $7.49/bushel) for a total impact of $33.9 million in 2024, assuming a 100% crop loss. Yields were assumed to grow 2% per year in the baseline forecast. For future years, a study by Iowa State University researchers Mehari Tekeste et al, originally published in 2020, *Pipeline right-of-way construction activities impact on deep soil compaction* estimated first year crop loss at a weighted average 19%, and that yields continue to recover over time. This study assumes a 15% crop loss in the 3rd year, and steady improvement thereafter over 10 years. The following table demonstrates the net impact to landowners from the ROW payments net of crop loss. By the 10th year, landowners should experience a net benefit of approximately $358 million, assuming a 2% real rate of return on invested cash. The Net Annual Impacts were used to increase the policy handle for Farm Income in the model, apportioned according to pipeline miles.

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Crop Loss and Landowner Payments

Year	Yield (weighted soy/corn avg bushels/acre)	% lost	Price (weighted soy/corn avg))	Crop Loss ($mil)	ROW/ Damage Payments ($mil)	Annual Impact ($mil)	Cumulative Payment Less Cumulative Loss	Net Cumulative Benefit at 2% Interest
2023				$ -	$ 96.0	$ 96.0	$ 96.0	$ 96.0
2024	128.5	100%	$ 7.49	$ 33.9	$ 166.8	$ 132.9	$ 228.9	$ 230.8
2025	131.0	20%	$ 7.49	$ 6.9	$ 83.5	$ 76.6	$ 305.5	$ 312.0
2026	133.7	15%	$ 7.49	$ 5.3	$ 12.8	$ 7.5	$ 313.0	$ 325.8
2027	136.3	10%	$ 7.49	$ 3.6		$ (3.6)	$ 309.4	$ 328.7
2028	139.1	5%	$ 7.49	$ 1.8		$ (1.8)	$ 307.6	$ 333.4
2029	141.9	5%	$ 7.49	$ 1.9		$ (1.9)	$ 305.7	$ 338.2
2030	144.7	5%	$ 7.49	$ 1.9		$ (1.9)	$ 303.8	$ 343.1
2031	147.6	5%	$ 7.49	$ 1.9		$ (1.9)	$ 301.8	$ 348.0
2032	150.5	5%	$ 7.49	$ 2.0		$ (2.0)	$ 299.9	$ 353.0
2033	153.5	5%	$ 7.49	$ 2.0		$ (2.0)	$ 297.8	$ 358.0
2034	156.6	0%	$ 7.49	$ -		$ -	$ 297.8	$ 365.2

By way of sensitivity testing, if we use a 5% discount rate rather than a 2% discount rate to simulate a rate closer to the landowners' cost of capital, the Net Cumulative Benefit by 2034 would nearly $500 million.

The Phasing of the project was another factor impacting both the construction phase impacts by year, and the onset of the ongoing operating expenses and ethanol sales going forward.

Construction phase expenses provided by Client were reduced by the ROW payments to landowners as described above, and also by the Pre-Construction costs, and entered as Non-Residential Construction for purposes of estimating impacts. The Pre-Construction costs were input as Professional, Scientific, and Technical services, and then summed back up with primary construction for an aggregated Construction Impact.

The Operations Phase budget provided by Client was entered into the model as a change in Industry Sales of Pipeline Transportation. As described earlier, the direct input was apportioned across the regions as estimated by Client. The pipeline associated expenses were apportioned across the regions by pipeline mile, and the capture site expenses were apportioned by initial investment by region. The sequestration operating expenses were removed from the simulation, as they are covered by a separate study.

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Model Inputs

Based on data specifications described above, the following table shows the data inputs by Phase and Year. The data inputs are run through 2045. LCF Ethanol and Operations inputs are expressed in constant 2020 dollars. All other inputs are nominal.

Construction Phase Inputs

Pre-Construction

	Region	Policy Handle	2023	2024	2025	2026	2027	2028	2029	2030	2031
Phase 1	Iowa Pipeline Counties	Demand -Prof, Sci, & Tech Ser	$ 150.9	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Phase 2	Iowa Pipeline Counties	Demand -Prof, Sci, & Tech Ser	$ -	$ 15.7	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Phase 1	Other Pipeline Counties	Demand -Prof, Sci, & Tech Ser	$ 92.4	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Phase 2	Other Pipeline Counties	Demand -Prof, Sci, & Tech Ser	$ -	$ 20.8	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Total		$ 243.3	$ 36.5	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Construction

	Region	Policy Handle	2023	2024	2025	2026	2027	2028	2029	2030	2031
Phase 1	Iowa Pipeline Counties	Invest Spend Nonres Structure	$ -	$ 994.4	$ 489.8	$ -	$ -	$ -	$ -	$ -	$ -
Phase 2	Iowa Pipeline Counties	Invest Spend Nonres Structure	$ -	$ -	$ 125.8	$ 255.4	$ -	$ -	$ -	$ -	$ -
Phase 1	Other Pipeline Counties	Invest Spend Nonres Structure	$ -	$ 569.8	$ 280.7	$ -	$ -	$ -	$ -	$ -	$ -
Phase 2	Other Pipeline Counties	Invest Spend Nonres Structure	$ -	$ -	$ 135.6	$ 275.2	$ -	$ -	$ -	$ -	$ -
	Total		$ -	$1,564.2	$1,031.8	$ 530.6	$ -	$ -	$ -	$ -	$ -

Total Construction Investment

	Region	2023	2024	2025	2026	2027	2028	2029	2030	2031
Phase 1	Iowa Pipeline Counties	$ 150.9	$ 994.4	$ 489.8	$ -	$ -	$ -	$ -	$ -	$ -
Phase 2	Iowa Pipeline Counties	$ -	$ 15.7	$ 125.8	$ 255.4	$ -	$ -	$ -	$ -	$ -
Phase 1	Other Pipeline Counties	$ 92.4	$ 569.8	$ 280.7	$ -	$ -	$ -	$ -	$ -	$ -
Phase 2	Other Pipeline Counties	$ -	$ 20.8	$ 135.6	$ 275.2	$ -	$ -	$ -	$ -	$ -
	Total Investment	$ 243.3	$1,600.7	$1,031.8	$ 530.6	$ -	$ -	$ -	$ -	$ -

Landowner/Farmer Inputs

Row Payments

	Region	Policy Handle	2023	2024	2025	2026	2027	2028	2029	2030	2031
Phase 1	Iowa Pipeline Counties	Prop Income - Farm Income	$ 58.1	$ 58.1	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Phase 2	Iowa Pipeline Counties	Prop Income - Farm Income	$ -	$ 16.9	$ 16.9	$ -	$ -	$ -	$ -	$ -	$ -
Phase 1	Other Pipeline Counties	Prop Income - Farm Income	$ 38.0	$ 38.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Phase 2	Other Pipeline Counties	Prop Income - Farm Income	$ -	$ 23.3	$ 23.3	$ -	$ -	$ -	$ -	$ -	$ -
	Total		$ 96.0	$ 136.2	$ 40.2	$ -	$ -	$ -	$ -	$ -	$ -

Damage Payments

	Region	Policy Handle	2023	2024	2025	2026	2027	2028	2029	2030	2031
Phase 1	Iowa Pipeline Counties	Prop Income - Farm Income	$ -	$ 18.5	$ 18.5	$ -	$ -	$ -	$ -	$ -	$ -
Phase 2	Iowa Pipeline Counties	Prop Income - Farm Income	$ -	$ -	$ 5.4	$ 5.4	$ -	$ -	$ -	$ -	$ -
Phase 1	Other Pipeline Counties	Prop Income - Farm Income	$ -	$ 12.1	$ 12.1	$ -	$ -	$ -	$ -	$ -	$ -
Phase 2	Other Pipeline Counties	Prop Income - Farm Income	$ -	$ -	$ 7.4	$ 7.4	$ -	$ -	$ -	$ -	$ -
	Total		$ -	$ 30.6	$ 43.3	$ 12.8	$ -	$ -	$ -	$ -	$ -

Crop Loss

	Region	Policy Handle	2023	2024	2025	2026	2027	2028	2029	2030	2031
Phase 1	Iowa Pipeline Counties	Prop Income - Farm Income	$ -	$ (14.4)	$ (2.9)	$ (2.3)	$ (1.5)	$ (0.8)	$ (0.8)	$ (0.8)	$ (0.8)
Phase 2	Iowa Pipeline Counties	Prop Income - Farm Income	$ -	$ -	$ (4.2)	$ (0.9)	$ (0.7)	$ (0.4)	$ (0.2)	$ (0.2)	$ (0.2)
Phase 1	Other Pipeline Counties	Prop Income - Farm Income	$ -	$ (9.4)	$ (1.9)	$ (1.5)	$ (1.0)	$ (0.5)	$ (0.5)	$ (0.5)	$ (0.5)
Phase 2	Other Pipeline Counties	Prop Income - Farm Income	$ -	$ -	$ (5.8)	$ (1.2)	$ (0.9)	$ (0.6)	$ (0.3)	$ (0.3)	$ (0.3)
	Total		$ -	$ (23.9)	$ (14.9)	$ (5.8)	$ (4.1)	$ (2.4)	$ (1.9)	$ (1.9)	$ (1.9)

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Landowner/Farmer Inputs (cont)

LCF Ethanol Production

	Region	Policy Handle	2023	2024	2025	2026	2027	2028	2029	2030	2031
Phase 1	Iowa Pipeline Counties	Prop Income - Farm Income	$ -	$ -	$ 52.0	$ 104.0	$ 104.0	$ 104.0	$ 104.0	$ 104.0	$ 104.0
Phase 2	Iowa Pipeline Counties	Prop Income - Farm Income	$ -	$ -	$ -	$ 31.6	$ 63.3	$ 63.3	$ 63.3	$ 63.3	$ 63.3
Phase 1	Other Pipeline Counties	Prop Income - Farm Income	$ -	$ -	$ 20.9	$ 41.8	$ 41.8	$ 41.8	$ 41.8	$ 41.8	$ 41.8
Phase 2	Other Pipeline Counties	Prop Income - Farm Income	$ -	$ -	$ -	$ 20.5	$ 41.0	$ 41.0	$ 41.0	$ 41.0	$ 41.0
	Total		$ -	$ -	$ 72.9	$ 197.9	$ 250.0	$ 250.0	$ 250.0	$ 250.0	$ 250.0

45Q Federal Credits

	Region	Policy Handle	2023	2024	2025	2026	2027	2028	2029	2030	2031
Phase 1	Iowa Pipeline Counties	Prop Income - Farm Income	$ -	$ -	$ 19.2	$ 38.4	$ 38.4	$ 38.4	$ 38.4	$ 38.4	$ 38.4
Phase 2	Iowa Pipeline Counties	Prop Income - Farm Income	$ -	$ -	$ -	$ 11.7	$ 23.4	$ 23.4	$ 23.4	$ 23.4	$ 23.4
Phase 1	Other Pipeline Counties	Prop Income - Farm Income	$ -	$ -	$ 7.7	$ 15.4	$ 15.4	$ 15.4	$ 15.4	$ 15.4	$ 15.4
Phase 2	Other Pipeline Counties	Prop Income - Farm Income	$ -	$ -	$ -	$ 7.6	$ 15.1	$ 15.1	$ 15.1	$ 15.1	$ 15.1
	Total		$ -	$ -	$ 26.9	$ 73.1	$ 92.4	$ 92.4	$ 92.4	$ 92.4	$ 92.4

Carbon Capture Credits

	Region	Policy Handle	2023	2024	2025	2026	2027	2028	2029	2030	2031
Phase 1	Iowa Pipeline Counties	Prop Income - Farm Income	$ -	$ -	$ 8.2	$ 16.5	$ 16.5	$ 16.5	$ 16.5	$ 16.5	$ 16.5
Phase 2	Iowa Pipeline Counties	Prop Income - Farm Income	$ -	$ -	$ -	$ 5.0	$ 10.0	$ 10.0	$ 10.0	$ 10.0	$ 10.0
Phase 1	Other Pipeline Counties	Prop Income - Farm Income	$ -	$ -	$ 3.3	$ 6.6	$ 6.6	$ 6.6	$ 6.6	$ 6.6	$ 6.6
Phase 2	Other Pipeline Counties	Prop Income - Farm Income	$ -	$ -	$ -	$ 3.2	$ 6.5	$ 6.5	$ 6.5	$ 6.5	$ 6.5
	Total		$ -	$ -	$ 11.5	$ 31.3	$ 39.6	$ 39.6	$ 39.6	$ 39.6	$ 39.6

Total Landowner/Farmer Inputs

	Region	2023	2024	2025	2026	2027	2028	2029	2030	2031
Phase 1	Iowa Pipeline Counties	$ 58.1	$ 62.1	$ 95.0	$ 156.7	$ 157.4	$ 158.1	$ 158.1	$ 158.1	$ 158.1
Phase 2	Iowa Pipeline Counties	$ -	$ 16.9	$ 18.1	$ 52.9	$ 96.0	$ 96.2	$ 96.4	$ 96.4	$ 96.4
Phase 1	Other Pipeline Counties	$ 38.0	$ 40.6	$ 42.1	$ 62.3	$ 62.8	$ 63.3	$ 63.3	$ 63.3	$ 63.3
Phase 2	Other Pipeline Counties	$ -	$ 23.3	$ 24.9	$ 37.5	$ 61.7	$ 62.0	$ 62.3	$ 62.3	$ 62.3
	Total Investment	$ 96.0	$ 142.9	$ 180.0	$ 309.4	$ 377.9	$ 379.6	$ 380.1	$ 380.1	$ 380.1

Operations

	Region	Policy Handle	2023	2024	2025	2026	2027	2028	2029	2030	2031
Phase 1	Iowa Pipeline Counties	Exog Ind Sales - Pipeline Trans	$ -	$ -	$ 39.1	$ 50.0	$ 50.0	$ 50.0	$ 50.0	$ 50.0	$ 50.0
Phase 2	Iowa Pipeline Counties	Exog Ind Sales - Pipeline Trans	$ -	$ -	$ -	$ 14.9	$ 14.9	$ 14.9	$ 14.9	$ 14.9	$ 14.9
Phase 1	Other Pipeline Counties	Exog Ind Sales - Pipeline Trans	$ -	$ -	$ 21.4	$ 27.8	$ 27.8	$ 27.8	$ 27.8	$ 27.8	$ 27.8
Phase 2	Other Pipeline Counties	Exog Ind Sales - Pipeline Trans	$ -	$ -	$ -	$ 14.6	$ 14.6	$ 14.6	$ 14.6	$ 14.6	$ 14.6
Phase 1	Iowa Pipeline Counties	Nullify Investment- Pipeline Tr	$ -	$ -	$ 39.1	$ 50.0	$ 50.0	$ 50.0	$ 50.0	$ 50.0	$ 50.0
Phase 2	Iowa Pipeline Counties	Nullify Investment- Pipeline Tr	$ -	$ -	$ -	$ 14.9	$ 14.9	$ 14.9	$ 14.9	$ 14.9	$ 14.9
Phase 1	Other Pipeline Counties	Nullify Investment- Pipeline Tr	$ -	$ -	$ 21.4	$ 27.8	$ 27.8	$ 27.8	$ 27.8	$ 27.8	$ 27.8
Phase 2	Other Pipeline Counties	Nullify Investment- Pipeline Tr	$ -	$ -	$ -	$ 14.6	$ 14.6	$ 14.6	$ 14.6	$ 14.6	$ 14.6
	Total (Includes only industry sales)		$ -	$ -	$ 60.4	$ 107.4	$ 107.4	$ 107.4	$ 107.4	$ 107.4	$ 107.4

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Economic Impact Results

A 10-year breakdown of the economic impacts, by Phase and major input category area as follows.

Construction

Phase 1 **Employment**

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	1,086	444	171	128	91	1,920
2024	11,800	3,802	1,481	1,514	1,020	19,618
2025	6,552	2,082	849	833	553	10,869
2026	784	258	183	103	55	1,383

Output ($mil)

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	$ 192.0	$ 83.1	$ 34.5	$ 22.6	$ 15.6	$ 347.9
2024	$ 2,438.4	$ 801.6	$ 350.7	$ 310.3	$ 202.3	$ 4,103.4
2025	$ 1,581.6	$ 531.0	$ 243.2	$ 204.1	$ 128.8	$ 2,688.7
2026	$ 308.3	$ 121.6	$ 73.5	$ 44.4	$ 23.6	$ 571.4

Phase 2 **Employment**

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	-	-	-	-	-	-
2024	63	12	32	21	45	173
2025	1,300	69	235	466	929	2,999
2026	2,615	139	482	947	1,875	6,058

Output ($mil)

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	$ -	$ -	$ -	$ -	$ -	$ -
2024	$ 8.5	$ 2.6	$ 6.5	$ 3.4	$ 6.9	$ 27.9
2025	$ 241.9	$ 18.8	$ 59.4	$ 98.5	$ 189.0	$ 607.5
2026	$ 518.6	$ 41.5	$ 130.1	$ 213.1	$ 402.3	$ 1,305.6

Total **Employment**

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	1,086	444	171	128	91	1,920
2024	11,863	3,814	1,513	1,535	1,066	19,791
2025	7,853	2,151	1,084	1,298	1,482	13,868
2026	3,399	398	666	1,050	1,929	7,442

Output ($mil)

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	$ 192.0	$ 83.1	$ 34.5	$ 22.6	$ 15.6	$ 347.9
2024	$ 2,447.0	$ 804.2	$ 357.3	$ 313.7	$ 209.2	$ 4,131.3
2025	$ 1,823.5	$ 549.8	$ 302.6	$ 302.5	$ 317.8	$ 3,296.2
2026	$ 826.9	$ 163.1	$ 203.6	$ 257.4	$ 426.0	$ 1,877.1

Landowner/Farmer Impacts (easement, credits, ethanol)

Phase 1 **Employment**

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	464	176	75	72	54	842
2024	557	209	89	86	64	1,005
2025	572	156	77	77	93	975
2026	756	164	90	95	145	1,250
2027	744	152	87	93	147	1,222
2028	710	141	83	88	142	1,164
2029	668	131	78	83	135	1,096
2030	619	121	73	77	126	1,017
2031	577	114	69	72	117	949
2032	541	108	66	68	110	893

Output ($mil)

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	$ 83.8	$ 33.5	$ 15.7	$ 13.2	$ 9.6	$ 155.8
2024	$ 112.6	$ 44.9	$ 21.0	$ 17.6	$ 12.6	$ 208.7
2025	$ 183.7	$ 45.9	$ 20.9	$ 23.2	$ 31.0	$ 304.7
2026	$ 289.4	$ 57.7	$ 26.1	$ 33.8	$ 55.0	$ 462.0
2027	$ 298.3	$ 57.5	$ 26.7	$ 34.7	$ 57.9	$ 475.0
2028	$ 298.0	$ 56.3	$ 26.3	$ 34.6	$ 58.5	$ 473.8
2029	$ 295.1	$ 55.2	$ 25.8	$ 34.2	$ 58.4	$ 468.7
2030	$ 289.8	$ 53.7	$ 24.9	$ 33.6	$ 57.6	$ 459.6
2031	$ 285.7	$ 52.7	$ 24.1	$ 33.1	$ 56.8	$ 452.4
2032	$ 282.9	$ 52.2	$ 23.6	$ 32.8	$ 56.3	$ 447.8

Phase 2 **Employment**

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	-	-	-	-	-	-
2024	111	9	32	57	105	313
2025	136	12	44	93	174	459
2026	222	18	57	101	157	554
2027	356	28	86	143	202	816
2028	363	28	87	141	195	813
2029	356	27	86	135	184	788
2030	334	26	82	126	171	739
2031	311	24	77	117	159	689
2032	288	22	73	109	149	641

Output ($mil)

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	$ -	$ -	$ -	$ -	$ -	$ -
2024	$ 18.9	$ 2.2	$ 7.1	$ 10.7	$ 19.0	$ 58.0
2025	$ 25.8	$ 3.5	$ 11.0	$ 19.0	$ 33.9	$ 93.1
2026	$ 80.7	$ 5.8	$ 15.6	$ 29.6	$ 47.6	$ 179.3
2027	$ 148.4	$ 9.5	$ 24.6	$ 47.2	$ 73.0	$ 302.7
2028	$ 155.9	$ 10.2	$ 26.2	$ 48.9	$ 73.9	$ 315.2
2029	$ 158.4	$ 10.5	$ 26.9	$ 49.0	$ 73.3	$ 318.1
2030	$ 157.5	$ 10.4	$ 26.6	$ 48.1	$ 72.1	$ 314.7
2031	$ 155.8	$ 10.1	$ 26.1	$ 47.0	$ 71.1	$ 310.0
2032	$ 154.0	$ 9.8	$ 25.5	$ 46.0	$ 70.3	$ 305.5

Total **Employment**

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	464	176	75	72	54	842
2024	668	218	120	142	169	1,317
2025	708	168	120	170	268	1,434
2026	978	182	147	196	302	1,805
2027	1,100	180	173	235	349	2,038
2028	1,073	169	169	229	337	1,977
2029	1,024	159	164	219	319	1,885
2030	953	147	155	204	297	1,756
2031	887	138	146	190	277	1,638
2032	829	130	139	177	259	1,535

Output ($mil)

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	$ 83.8	$ 33.5	$ 15.7	$ 13.2	$ 9.6	$ 155.8
2024	$ 131.5	$ 47.1	$ 28.1	$ 28.3	$ 31.6	$ 266.7
2025	$ 209.5	$ 49.4	$ 31.9	$ 42.2	$ 64.9	$ 397.8
2026	$ 370.1	$ 63.5	$ 41.8	$ 63.4	$ 102.5	$ 641.3
2027	$ 446.7	$ 67.0	$ 51.2	$ 81.9	$ 130.8	$ 777.6
2028	$ 453.9	$ 66.6	$ 52.6	$ 83.5	$ 132.4	$ 788.9
2029	$ 453.5	$ 65.7	$ 52.7	$ 83.2	$ 131.7	$ 786.8
2030	$ 447.4	$ 64.0	$ 51.5	$ 81.6	$ 129.7	$ 774.3
2031	$ 441.5	$ 62.8	$ 50.2	$ 80.1	$ 127.9	$ 762.5
2032	$ 436.9	$ 61.9	$ 49.1	$ 78.8	$ 126.6	$ 753.3

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Operations Expenditures

Phase 1 **Employment**

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	-	-	-	-	-	-
2024	-	-	-	-	-	-
2025	215	76	21	29	21	363
2026	292	106	29	41	29	497
2027	308	112	31	44	30	525
2028	311	112	31	44	30	529
2029	309	110	31	44	30	523
2030	302	105	30	42	29	507
2031	292	99	28	40	27	487
2032	283	94	27	38	26	468

Output ($mil)

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	$ -	$ -	$ -	$ -	$ -	$ -
2024	$ -	$ -	$ -	$ -	$ -	$ -
2025	$ 67.9	$ 27.5	$ 6.1	$ 10.6	$ 7.7	$ 119.9
2026	$ 97.6	$ 40.4	$ 9.2	$ 15.6	$ 11.2	$ 174.0
2027	$ 105.4	$ 43.8	$ 10.3	$ 17.0	$ 12.0	$ 188.5
2028	$ 109.2	$ 45.2	$ 10.8	$ 17.7	$ 12.4	$ 195.3
2029	$ 111.5	$ 46.0	$ 11.1	$ 18.1	$ 12.6	$ 199.2
2030	$ 112.5	$ 45.9	$ 11.1	$ 18.2	$ 12.6	$ 200.3
2031	$ 112.8	$ 45.5	$ 10.9	$ 18.2	$ 12.6	$ 200.0
2032	$ 113.0	$ 45.2	$ 10.8	$ 18.1	$ 12.5	$ 199.6

Phase 2 **Employment**

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	-	-	-	-	-	-
2024	-	-	-	-	-	-
2025	-	-	-	-	-	-
2026	130	4	11	17	33	195
2027	138	4	11	19	38	210
2028	141	4	12	20	40	217
2029	141	4	13	21	40	219
2030	138	4	13	20	39	214
2031	134	4	12	20	37	208
2032	130	4	12	19	36	200

Output ($mil)

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	$ -	$ -	$ -	$ -	$ -	$ -
2024	$ -	$ -	$ -	$ -	$ -	$ -
2025	$ -	$ -	$ -	$ -	$ -	$ -
2026	$ 27.7	$ 1.0	$ 2.5	$ 7.0	$ 17.8	$ 56.1
2027	$ 32.2	$ 1.3	$ 3.1	$ 8.2	$ 19.8	$ 64.6
2028	$ 34.1	$ 1.5	$ 3.5	$ 8.7	$ 20.7	$ 68.6
2029	$ 35.2	$ 1.6	$ 3.8	$ 9.1	$ 21.3	$ 71.0
2030	$ 35.7	$ 1.7	$ 4.0	$ 9.2	$ 21.5	$ 72.2
2031	$ 35.7	$ 1.7	$ 4.1	$ 9.3	$ 21.6	$ 72.5
2032	$ 35.6	$ 1.7	$ 4.2	$ 9.3	$ 21.7	$ 72.5

Total **Employment**

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	-	-	-	-	-	-
2024	-	-	-	-	-	-
2025	215	76	21	29	21	363
2026	422	110	39	58	62	692
2027	445	116	42	63	68	735
2028	452	117	43	65	70	747
2029	450	114	44	64	70	742
2030	440	109	42	62	68	721
2031	426	103	41	60	65	695
2032	413	98	39	57	62	668

Output ($mil)

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	$ -	$ -	$ -	$ -	$ -	$ -
2024	$ -	$ -	$ -	$ -	$ -	$ -
2025	$ 67.9	$ 27.5	$ 6.1	$ 10.6	$ 7.7	$ 119.9
2026	$ 125.3	$ 41.4	$ 11.7	$ 22.6	$ 29.0	$ 230.0
2027	$ 137.6	$ 45.1	$ 13.4	$ 25.2	$ 31.9	$ 253.1
2028	$ 143.3	$ 46.8	$ 14.3	$ 26.4	$ 33.1	$ 263.8
2029	$ 146.7	$ 47.6	$ 14.9	$ 27.1	$ 33.8	$ 270.2
2030	$ 148.2	$ 47.6	$ 15.1	$ 27.5	$ 34.1	$ 272.4
2031	$ 148.6	$ 47.2	$ 15.1	$ 27.5	$ 34.2	$ 272.5
2032	$ 148.6	$ 46.9	$ 15.0	$ 27.4	$ 34.2	$ 272.1

Total Project

Phase 1 **Employment**

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	1,550	620	246	200	146	2,762
2024	12,358	4,011	1,570	1,600	1,085	20,623
2025	7,340	2,314	946	939	667	12,206
2026	1,833	528	303	239	228	3,131
2027	1,052	264	118	136	177	1,747
2028	1,021	253	114	132	173	1,693
2029	977	241	110	127	165	1,620
2030	921	226	103	119	154	1,523
2031	869	213	97	112	144	1,436
2032	824	202	93	106	136	1,361

Output ($mil)

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	$ 275.9	$ 116.6	$ 50.2	$ 35.8	$ 25.2	$ 503.7
2024	$ 2,551.0	$ 846.5	$ 371.8	$ 327.8	$ 214.9	$ 4,312.1
2025	$ 1,833.2	$ 604.5	$ 270.2	$ 237.9	$ 167.5	$ 3,113.3
2026	$ 695.4	$ 219.7	$ 108.8	$ 93.8	$ 89.8	$ 1,207.4
2027	$ 403.7	$ 101.3	$ 36.9	$ 51.7	$ 69.9	$ 663.5
2028	$ 407.2	$ 101.6	$ 37.1	$ 52.2	$ 70.9	$ 669.1
2029	$ 406.6	$ 101.1	$ 36.9	$ 52.3	$ 70.9	$ 667.9
2030	$ 402.4	$ 99.6	$ 36.0	$ 51.8	$ 70.2	$ 659.9
2031	$ 398.5	$ 98.2	$ 35.1	$ 51.3	$ 69.4	$ 652.5
2032	$ 395.9	$ 97.4	$ 34.4	$ 50.9	$ 68.8	$ 647.4

Phase 2 **Employment**

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	-	-	-	-	-	-
2024	174	21	64	77	150	485
2025	1,436	81	279	559	1,104	3,458
2026	2,966	161	550	1,065	2,065	6,807
2027	494	32	98	162	240	1,026
2028	504	32	99	161	234	1,031
2029	497	32	98	156	224	1,007
2030	472	30	94	147	210	954
2031	445	28	90	137	197	896
2032	417	26	86	128	185	842

Output ($mil)

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	$ -	$ -	$ -	$ -	$ -	$ -
2024	$ 27.5	$ 4.8	$ 13.6	$ 14.1	$ 25.9	$ 85.9
2025	$ 267.7	$ 22.2	$ 70.4	$ 117.5	$ 222.8	$ 700.6
2026	$ 627.0	$ 48.3	$ 148.3	$ 249.7	$ 467.7	$ 1,541.1
2027	$ 180.6	$ 10.8	$ 27.7	$ 55.4	$ 92.8	$ 367.3
2028	$ 190.0	$ 11.7	$ 29.8	$ 57.6	$ 94.6	$ 383.7
2029	$ 193.6	$ 12.1	$ 30.8	$ 58.0	$ 94.6	$ 389.1
2030	$ 193.2	$ 12.0	$ 30.6	$ 57.3	$ 93.7	$ 386.8
2031	$ 191.6	$ 11.8	$ 30.2	$ 56.3	$ 92.7	$ 382.5
2032	$ 189.6	$ 11.4	$ 29.7	$ 55.3	$ 92.0	$ 378.0

Total **Employment**

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	1,550	620	246	200	146	2,762
2024	12,531	4,032	1,633	1,677	1,235	21,108
2025	8,776	2,395	1,225	1,498	1,771	15,664
2026	4,800	689	852	1,304	2,293	9,938
2027	1,546	296	215	298	417	2,773
2028	1,525	285	213	294	407	2,724
2029	1,474	273	208	283	389	2,627
2030	1,393	256	197	266	364	2,477
2031	1,314	241	187	249	341	2,332
2032	1,241	228	178	234	321	2,203

Output ($mil)

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	$ 275.9	$ 116.6	$ 50.2	$ 35.8	$ 25.2	$ 503.7
2024	$ 2,578.5	$ 851.3	$ 385.4	$ 342.0	$ 240.8	$ 4,398.0
2025	$ 2,101.0	$ 626.7	$ 340.6	$ 355.3	$ 390.4	$ 3,813.9
2026	$ 1,322.4	$ 268.0	$ 257.1	$ 343.5	$ 557.5	$ 2,748.4
2027	$ 584.3	$ 112.1	$ 64.6	$ 107.0	$ 162.7	$ 1,030.8
2028	$ 597.2	$ 113.3	$ 66.9	$ 109.8	$ 165.5	$ 1,052.8
2029	$ 600.2	$ 113.3	$ 67.6	$ 110.3	$ 165.5	$ 1,057.0
2030	$ 595.6	$ 111.6	$ 66.6	$ 109.1	$ 163.8	$ 1,046.7
2031	$ 590.1	$ 110.0	$ 65.3	$ 107.6	$ 162.1	$ 1,035.0
2032	$ 585.5	$ 108.8	$ 64.1	$ 106.2	$ 160.8	$ 1,025.4

EXHIBIT
N4

Key Impacts by County

We attempted to provide an estimate of key impacts by county, both in the peak construction phase year and in 2030 with Consolidated Impacts, sorted by the Phase in which each county is brought on board. These estimates are not a product of the REMI model, but rather allocated from data aggregated across the regions. Thus, Iowa Pipeline County impacts are the proportional share of the total economic impacts across the Iowa Pipeline Counties Region, based on miles of Pipeline.

The one exception is Christian County, the sequestration site. The full $1.3 million in property taxes anticipated for the Sequestration site is allocated to Christian County, IL. Additionally, data was taken from the Strategic Economics, LLC study to increase the amounts for income, employment, and output. This report applies the sequestration construction impacts from that study to 2024, and the ongoing economic impacts to the 2030 reported numbers. Thus, Christian County shows impacts from all aspects of the project.

Again, with the exception of Christian County, there are no dynamic effects associated with the property tax estimates for all the counties in the pipeline path, and the presentation is more of an accounting exercise to give a sense of the scale of impact rather than a specific county by county rigorous estimate. Those counties with participating ethanol plants or other industrial customers will clearly be under-represented in these estimates, and those without any capture sites will experience less of an impact. With that in mind, the following table lists these impacts for those counties included in the pipeline regions, with an adjustment for Christian County to reflect the previous discussion.

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Pipeline Counties Impact Data

Phase	State	County	Est Annual Prop Taxes ($)	2024 Employment (Individuals)	2030 Employment (Individuals)	2024 Population (Individuals)	2030 Population (Individuals)	2024 Income ($Mil)	2030 Income ($Mil)	2024 Output ($Mil)	2030 Output ($Mil)
1	Iowa	Boone	164,867	65.17	7.25	5.12	13.20	13.41	1.26	13.41	3.10
1	Iowa	Bremer	877,864	347.01	38.58	27.29	70.30	71.40	6.72	71.40	16.49
1	Iowa	Buchanan	717,892	283.78	31.55	22.31	57.49	58.39	5.50	58.39	13.49
1	Iowa	Buena Vista	517,997	204.76	22.76	16.10	41.48	42.13	3.97	42.13	9.73
1	Iowa	Butler	1,314,691	519.68	57.78	40.87	105.28	106.93	10.07	106.93	24.70
1	Iowa	Cherokee	169,288	66.92	7.44	5.26	13.56	13.77	1.30	13.77	3.18
1	Iowa	Clay	996,582	393.94	43.80	30.98	79.80	81.06	7.63	81.06	18.72
1	Iowa	Delaware	743,004	293.70	32.65	23.10	59.50	60.43	5.69	60.43	13.96
1	Iowa	Des Moines	284,024	112.27	12.48	8.83	22.74	23.10	2.17	23.10	5.34
1	Iowa	Dickinson	428,944	169.56	18.85	13.33	34.35	34.89	3.28	34.89	8.06
1	Iowa	Emmet	1,056,205	417.51	46.42	32.83	84.58	85.91	8.09	85.91	19.84
1	Iowa	Fayette	186,835	73.85	8.21	5.81	14.96	15.20	1.43	15.20	3.51
1	Iowa	Floyd	413,200	163.33	18.16	12.84	33.09	33.61	3.16	33.61	7.76
1	Iowa	Franklin	216,992	85.77	9.54	6.74	17.38	17.65	1.66	17.65	4.08
1	Iowa	Hamilton	483,045	190.94	21.23	15.01	38.68	39.29	3.70	39.29	9.07
1	Iowa	Hardin	1,105,887	437.15	48.60	34.38	88.56	89.95	8.47	89.95	20.78
1	Iowa	Jasper	1,099,970	434.81	48.34	34.19	88.08	89.47	8.42	89.47	20.66
1	Iowa	Jefferson	497,645	196.71	21.87	15.47	39.85	40.48	3.81	40.48	9.35
1	Iowa	Keokuk	187,096	73.96	8.22	5.82	14.98	15.22	1.43	15.22	3.51
1	Iowa	Kossuth	459,572	181.66	20.20	14.29	36.80	37.38	3.52	37.38	8.63
1	Iowa	Lee	1,751,309	692.28	76.96	54.44	140.24	142.45	13.41	142.45	32.90
1	Iowa	Lyon	1,347,410	532.62	59.21	41.88	107.90	109.59	10.32	109.59	25.31
1	Iowa	Mahaska	1,048,481	414.45	46.08	32.59	83.96	85.28	8.03	85.28	19.70
1	Iowa	O'Brien	1,875,395	741.33	82.42	58.29	150.18	152.54	14.36	152.54	35.23
1	Iowa	Osceola	104,997	41.50	4.61	3.26	8.41	8.54	0.80	8.54	1.97
1	Iowa	Plymouth	744,848	294.43	32.73	23.15	59.65	60.58	5.70	60.58	13.99
1	Iowa	Pocahontas	877,906	347.03	38.58	27.29	70.30	71.41	6.72	71.41	16.49
1	Iowa	Polk	246,207	97.32	10.82	7.65	19.72	20.03	1.88	20.03	4.63
1	Iowa	Story	1,157,345	457.49	50.86	35.97	92.68	94.14	8.86	94.14	21.74
1	Iowa	Van Buren	514,257	203.28	22.60	15.99	41.18	41.83	3.94	41.83	9.66
1	Iowa	Wapello	338,191	133.68	14.86	10.51	27.08	27.51	2.59	27.51	6.35
1	Iowa	Webster	1,855,440	733.44	81.54	57.67	148.58	150.92	14.21	150.92	34.86
1	Iowa	Woodbury	854,541	337.79	37.55	26.56	68.43	69.51	6.54	69.51	16.05
2	Iowa	Adair	892,324	352.73	39.21	27.74	71.45	72.58	6.83	72.58	16.76
2	Iowa	Adam	541,343	213.99	23.79	16.83	43.35	44.03	4.14	44.03	10.17
2	Iowa	Buena Vista	734,680	290.41	32.29	22.84	58.83	59.76	5.62	59.76	13.80
2	Iowa	Cerro Gordo	419,392	165.78	18.43	13.04	33.58	34.11	3.21	34.11	7.88
2	Iowa	Floyd	523,497	206.93	23.01	16.27	41.92	42.58	4.01	42.58	9.83
2	Iowa	Greene	957,761	378.59	42.09	29.77	76.69	77.90	7.33	77.90	17.99
2	Iowa	Guthrie	936,941	370.36	41.17	29.12	75.03	76.21	7.17	76.21	17.60
2	Iowa	Ida	80,309	31.75	3.53	2.50	6.43	6.53	0.61	6.53	1.51
2	Iowa	Palo Alto	553,241	218.69	24.31	17.20	44.30	45.00	4.24	45.00	10.39
2	Iowa	Pocahontas	154,670	61.14	6.80	4.81	12.39	12.58	1.18	12.58	2.91
2	Iowa	Sac	571,088	225.75	25.10	17.75	45.73	46.45	4.37	46.45	10.73
2	Iowa	Webster	279,595	110.52	12.29	8.69	22.39	22.74	2.14	22.74	5.25
2	Iowa	Worth	267,697	105.82	11.76	8.32	21.44	21.77	2.05	21.77	5.03

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Phase	State	County	Est Annual Prop Taxes ($)	2024 Employment (Individuals)	2030 Employment (Individuals)	2024 Population (Individuals)	2030 Population (Individuals)	2024 Income ($Mil)	2030 Income ($Mil)	2024 Output ($Mil)	2030 Output ($Mil)
1	Illinois	Adams	344,443	113.44	7.20	9.59	19.76	23.95	1.40	23.95	3.14
1	Illinois	Brown	1,251,084	412.03	26.15	34.83	71.78	87.00	5.09	87.00	11.41
1	Illinois	Christian	553,300	182.22	11.57	15.41	31.75	38.48	2.25	38.48	5.04
1	Illinois	Fulton	672,422	221.45	14.05	18.72	38.58	46.76	2.74	46.76	6.13
1	Illinois	Hancock	1,415,311	466.12	29.58	39.41	81.20	98.42	5.76	98.42	12.90
1	Illinois	Henry	69,980	23.05	1.46	1.95	4.02	4.87	0.28	4.87	0.64
1	Illinois	Knox	1,787,298	588.62	37.36	49.76	102.55	124.29	7.28	124.29	16.29
1	Illinois	McDonough	1,402,193	461.79	29.31	39.04	80.45	97.51	5.71	97.51	12.78
1	Illinois	Morgan	1,402,053	461.75	29.31	39.04	80.44	97.50	5.71	97.50	12.78
1	Illinois	Pike	103,195	33.99	2.16	2.87	5.92	7.18	0.42	7.18	0.94
1	Illinois	Sangamon	1,403,809	462.33	29.34	39.09	80.54	97.62	5.72	97.62	12.80
1	Illinois	Schuyler	481,861	158.69	10.07	13.42	27.65	33.51	1.96	33.51	4.39
1	Illinois	Scott	223,853	73.72	4.68	6.23	12.84	15.57	0.91	15.57	2.04
1	Minnesota	Martin	671,168	428.49	51.77	36.49	116.69	101.11	6.99	101.11	17.47
1	Minnesota	Faribault	1,887,217	1,204.84	145.56	102.61	328.11	284.29	19.65	284.29	49.12
1	Nebraska	Boone	388,483	115.65	18.35	9.31	31.20	23.59	3.31	23.59	7.53
1	Nebraska	Dakota	685,046	203.94	32.36	16.42	55.02	41.59	5.84	41.59	13.27
1	Nebraska	Dixon	489,453	145.71	23.12	11.73	39.31	29.72	4.17	29.72	9.48
1	Nebraska	Madison	1,057,499	314.82	49.95	25.34	84.93	64.21	9.02	64.21	20.48
1	Nebraska	Pierce	-	-	-	-	-	-	-	-	-
1	Nebraska	Stanton	5,588	1.66	0.26	0.13	0.45	0.34	0.05	0.34	0.11
1	Nebraska	Wayne	713,289	212.35	33.69	17.09	57.29	43.31	6.08	43.31	13.82
2	Nebraska	Boone	371,510	110.60	17.55	8.90	29.84	22.56	3.17	22.56	7.20
2	Nebraska	Fillmore	174,324	51.90	8.23	4.18	14.00	10.58	1.49	10.58	3.38
2	Nebraska	Merrick	231,479	68.91	10.93	5.55	18.59	14.05	1.97	14.05	4.48
2	Nebraska	Nance	445,812	132.72	21.06	10.68	35.80	27.07	3.80	27.07	8.64
2	Nebraska	Polk	354,364	105.49	16.74	8.49	28.46	21.51	3.02	21.51	6.86
2	Nebraska	York	760,167	226.30	35.91	18.22	61.05	46.15	6.48	46.15	14.73
1	South Dakota	Brookings	216,273	28.50	8.41	2.65	12.17	5.56	1.77	5.56	3.78
1	South Dakota	Lincoln	1,222,815	161.16	47.56	14.98	68.80	31.43	9.99	31.43	21.38
1	South Dakota	Minnehaha	758,806	100.01	29.52	9.30	42.69	19.50	6.20	19.50	13.27
1	South Dakota	Moody	721,262	95.06	28.05	8.84	40.58	18.54	5.89	18.54	12.61
1	South Dakota	Turner	51,292	6.76	2.00	0.63	2.89	1.32	0.42	1.32	0.90
2	South Dakota	Brookings	549,936	72.48	21.39	6.74	30.94	14.13	4.49	14.13	9.61
2	South Dakota	Brown	264,392	34.85	10.28	3.24	14.88	6.79	2.16	6.79	4.62
2	South Dakota	Davison	193,006	25.44	7.51	2.36	10.86	4.96	1.58	4.96	3.37
2	South Dakota	Day	1,284,947	169.35	49.98	15.74	72.30	33.02	10.50	33.02	22.46
2	South Dakota	Deuel	859,275	113.25	33.42	10.53	48.35	22.08	7.02	22.08	15.02
2	South Dakota	Grant	658,337	86.77	25.61	8.06	37.04	16.92	5.38	16.92	11.51
2	South Dakota	Grant	917,442	120.92	35.69	11.24	51.62	23.58	7.50	23.58	16.04
2	South Dakota	Hanson	520,853	68.65	20.26	6.38	29.31	13.39	4.26	13.39	9.11
2	South Dakota	McCook	650,405	85.72	25.30	7.97	36.59	16.72	5.32	16.72	11.37
2	South Dakota	Minnehaha	774,670	102.10	30.13	9.49	43.59	19.91	6.33	19.91	13.54

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Discussion and Limitations

Carbon capture, transport, and sequestration has become viable in light of federal tax credits that drive sufficient cash flow to finance large projects. The Heartland Greenway project would be by far the largest ever built. This study did not address the cost-effectiveness with respect to Federal, State, or even Global policy. Rather, this study attempted to simply measure the economic impact of the construction of the project, the ongoing operations and maintenance, the impact on affected property owners, and the effect on state and local taxes.

The results do seem more robust than what we have seen with other pipeline projects. The principal reason for this, it appears, is the nature of the use of this pipeline relative to other projects. Iowa and surrounding states are not simply a conduit through which a commodity is captured 1,000 miles away or even 1,500. The pipeline services industrial customers on its route, so economic benefits are reaped that far outweigh the economic activity associated with operations and maintenance.

With respect to affected landowners in the rights-of-way, the recent work of researchers at Iowa State University suggests the effects of soil compaction do not appear to be as dire as some had feared. If the input assumptions regarding crop loss are reasonably accurate, the benefits of anticipated ROW payments vastly exceed any crop damage, and likely more than what was presented in this report. The assumption of 100% crop loss in the first year is almost certainly way overstated. There will be pipeline projects finished outside the crop season. To the extent land doesn't get planted at all, there would be a savings from inputs into the crop cycle that are not captured in this study.

The additional 45Q carbon capture and sequestration credits in the Inflation Reduction Act signed into law on August 16 provides a substantial change in the regional economic impact of the project prior to its passage, and provides additional marginal benefit of as much as $350 million annually, all on the margin, much of which is shared within the affected regions.

Lastly, while accuracy and clarity would have improved with a more detailed model, the overall scale of the impact in the aggregate would not likely materially change. There could have been much better color into the impacts on individual counties based on the characteristics of local economies and assigning likely end-use customers to those areas. With some economics work, it's just about getting the sign right. Is the project net beneficial or not? That issue is not in question in any of the regions we studied. The positive economic benefits are material.

The Author

Jon Muller brings nearly 30 years of analytical and management experience since earning his degree in Economics from the University of Iowa. Jon worked for five years at the Legislative Fiscal Bureau, specializing in economic modeling, state and local tax analysis, and revenue estimating. Jon was then named Director of Research for the Iowa Farm Bureau Federation, again focusing on local tax issues and economic development, regional economic modeling related to value-added agriculture, and completion of a comprehensive study of the impact of all State and local taxes on Iowa farm families. In 1998, Governor-Elect Tom Vilsack appointed Jon to serve as Transition Team Budget Director to lead the creation of the administration's first budget. Starting in 2001, Jon created Muller Consulting, a public policy and business development consulting firm, covering issues such as health insurance, energy, education, and finance for various not-for profits. The Iowa Association of School Boards hired Jon full-time starting in 2004, where he served in various roles from developing assessment analysis software to business development and school energy issues to finally serving as Chief Financial Officer of the Association and President of its for-profit subsidiary. In 2009, Jon was selected as a VP of Operations for The Princeton Review in Framingham, MA. In 2010, Jon worked with a group of executives to buy out a division of The Princeton Review, and was a founding Partner and CFO of Higher Education Partners, LLC, where he worked with Community Colleges across the country to expand facilities and online offerings, principally in socio-economically disadvantaged communities. Jon has served on various boards and commissions in Iowa, including the Iowa Railway Finance Authority, and the Governor's Council of Economic Advisers under two administrations. Jon moved home to Iowa in 2012, and joined Iowa School Finance Information Services (ISFIS) as a full-time Partner, focusing on business development and leading the company's outside policy and economics consulting business. Jon retired from his full-time role as ISFIS partner during 2020, but continues to lend his expertise in a consulting role on various projects inside and outside the company.

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BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

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HP 22-002

IN THE MATTER OF THE APPLICATION OF NAVIGATOR HEARTLAND GREENWAY, LLC FOR A PERMIT UNDER THE SOUTH DAKOTA ENERGY CONVERSION AND TRANSMISSION FACILITIES ACT TO CONSTRUCT THE HEARTLAND GREENWAY PIPELINE IN SOUTH DAKOTA,

AMENDED DIRECT TESTIMONY OF JONATHON MULLER

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1. Please state your name and address for the record.

Answer: My name is Jonathon Muller. My business address is 5401 Welker Ave., Des Moines, IA 50312. I am the President of Muller Consulting.

2. Please state your position with Navigator and provide a description of your responsibilities.

Answer: I am not employed by Navigator, but contracted with Navigator to estimate the economic impact of the Pipeline on the states where it will be built.

3. Please describe your educational and professional background.

Answer: I graduated with a BS in Economics from the University of Iowa in 1991. I was employed as a tax analyst, revenue forecaster, and regional economist for Iowa General Assembly from 1993 to 1998. I was then employed as a public policy research analyst, regional economist, and business developer for trade associations through 2008. I formed and operated a school finance consulting firm through 2020, including producing enrollment forecasts and actuarial studies estimating cost of post-employment benefits. I have performed regional

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economic studies for various industries including insurance, utilities, and casinos. My full Curriculum Vitae is provided as Exhibit A, and a more extensive discussion of my experience is found in the report on the economic impact study I have performed regarding the Navigator Heartland Greenway project as described below.

4. Have you previously submitted testimony in this proceeding in South Dakota?

Answer: No.

5. Please state the subject of your testimony and identify the sections of the Application that has been filed with the South Dakota Public Utilities Commission for which you are responsible.

Answer: I will address the economic impact of the construction and operation of the Pipeline on the South Dakota economy, based on a study I performed to estimate the economic impact of the Pipeline. The full report of the Study is attached as Exhibit B. My testimony relates to the following sections of the Application:

Section 7.2—Employment

Section 7.3--Taxes

6. What are the economic impacts of the Pipeline that your Study estimated?

Answer: Muller Consulting examined the direct and dynamic (indirect/induced) impact of the NHG Pipeline on the regional economies of each of the five states through which the pipeline runs, disaggregated by the construction impacts, ongoing operations and maintenance, and the net impact on landowners/farmers. The study provided estimates of the impact on employment, population, economic output, personal income, and state and local taxes.

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7. What does the Study estimate will be the economic impact of the construction of the Pipeline in the State of South Dakota?

Answer: The study assumed an initial capital investment in South Dakota pipeline counties of $142 million in pipeline construction and $37 million in capture facilities. Study results suggest total dynamic peak employment in 2024 of 1,020 jobs, and average employment during the 4-year construction period of 430 jobs. Average annualized wages during this period for the project are estimated to be $54,300. Total dynamic economic output is estimated to be $202 million in the peak year.

8. What does the Study estimate will be the economic impact of the ongoing operations and maintenance of the Pipeline in the State of South Dakota?

Answer: Ongoing operations and maintenance cost is expected to be approximately $5.9 million per year in South Dakota, employing 10 people at an average wage of $68,300. Total dynamic employment and economic output associated with the post-construction period are expected to yield 20 jobs and $9.7 million.

9. What does the Study estimate will be the fiscal impact for local governments in the state of South Dakota as a result of construction and operation of the Pipeline?

Answer: The Study reported estimated property taxes to state and local governments (or Payment in Lieu of Taxes if the Pipeline is not assessed real property taxes) of $3.0 million annually, based on the net acquisition cost of the Pipeline project multiplied times an average effective tax rate of 1.36%. Amounts for each county were assumed to be allocated in proportion to mile of pipeline. Actual property taxes assessed by the South Dakota Department of Revenue under SDCL Chapter 10-37 may vary. The State of South Dakota is expected to receive approximately $3.6 million from sales/gross receipts taxes and other fees/taxes in 2024, the peak

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year of construction. Post-construction, that amount will decline to $1.4 million per year by 2030.

10. Please describe how the Study was conducted.

Answer: The Study was conducted by using NHG data for investment and operations budgets with South Dakota counties' investment occurring from 2023 to 2026 and additional investment occurring in other years in 4 other states. Some inputs were estimated independently, such as the various inputs into the impact on landowners (i.e. Commodity prices, average yields, acres in rights-of-way, and annual crop damage). Modeling was disaggregated by type of investment, then output was apportioned across sub-regions based proportionally on investment shares or Pipeline mile shares, depending on which variable was more suitable. The sub-regions of Pipeline counties were then summed with the impacts in the respective states' non-Pipeline areas to estimate total impact by state. More detail is provided about the model itself and the Study's configuration in the Report, at pages 10-14.

11. Did you use a model to help determine the economic impacts of the construction and operation of the Pipeline? If so, please describe the model.

Answer: The REMI Model (Regional Economic Models, Inc.) was used to estimate the economic impacts of the Pipeline project investment and ongoing operations. The REMI model is a dynamic forecasting and policy analysis tool that incorporates various facets of econometric models and input-output models, and is generally described as a computable general equilibrium model. The Study used 7 regions to describe the areas impacted by the investment. One of those regions included the South Dakota counties through which the Pipeline would run, and another one of the regions modeled the rest of the State of South Dakota, which also gains some

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economic activity from investment outside these regions. More detail is provided about the model itself and the Study's configuration in the Report, at pages 10-14.

12. Does this conclude your prepared direct testimony?

Answer: Yes, it does.

Dated this 25th day of May, 2023.

/s/Jonathon Muller
Jonathon Muller

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BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

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HP 22-002

IN THE MATTER OF THE APPLICATION OF NAVIGATOR HEARTLAND GREENWAY, LLC FOR A PERMIT UNDER THE SOUTH DAKOTA ENERGY CONVERSION AND TRANSMISSION FACILITIES ACT TO CONSTRUCT THE HEARTLAND GREENWAY PIPELINE IN SOUTH DAKOTA,

SUPPLEMENTAL DIRECT TESTIMONY OF JONATHON MULLER

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1. Please state your name and business address.

Answer: My name is Jonathon Muller. My business address is 5401 Welker Ave., Des Moines, IA, 50312. I am the President of Muller Consulting.

2. Have you previously submitted testimony in this matter?

Answer: Yes. I submitted prefiled testimony dated September 26, 2022.

3. What is the purpose of your supplemental testimony?

Answer: My prefiled testimony addresses the economic impact of the construction and operation of the proposed Navigator Heartland Greenway Pipeline on the South Dakota economy, based on a study I performed to estimate the economic impact of the Pipeline. The full report of the study was attached to my prefiled testimony as Exhibit B. I have revised the report of my study. A copy of the revised report is attached as Exhibit A.

4. Why did you revise the report?

Answer: I revised the report at Navigator's request to eliminate references to Phase II of Navigator's proposed project. Because the scope of this permit proceeding concerns only Phase

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I of the project, the report was revised to tailor it to the scope of the proceeding and thereby make it easier to understand. In the process of removing references to Phase II, some of the numbers have changed, and I corrected a few typos, corrected a reference. I did not perform any additional analysis, so the substance of the report is otherwise the same.

5. Are there any clarifications to provide on the numbers that changed aside from the removal of the potential second phase of the pipeline project?

Answer: An incorrect cell reference misallocated the economic impact across the individual counties being studied on page 18 of the study. That error has been corrected.

6. Does the revised report change any of your previous testimony?

Answer: Yes, slightly. The answers to paragraphs 9 – 11 of my direct testimony dated September 26, 2022, have been revised. My amended direct testimony will be separately filed in the docket.

7. Does this conclude your supplemental testimony?

Answer: Yes.

Dated this 25th day of May, 2023.

/s/ Jonathon Muller
Jonathon Muller

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A

Heartland Greenway Pipeline

Regional Economic Impact Study

Jon Muller

Muller Consulting

May 19, 2023

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Executive Summary

Heartland Greenway Project
Regional Economic Impact Study

Jon Muller, Muller Consulting.

Study Overview

This study utilizes a dynamic microsimulation regional economic model to estimate the impact of a CO_2 carbon capture and sequestration pipeline, capturing carbon dioxide in Iowa, Nebraska, South Dakota, Minnesota, and Illinois, and transporting it to one or more sequestration sites in Illinois. For purposes of this report, the model consists of 7 regions and 70 economic sectors. The 7 regions are:

- Iowa Pipeline Counties
- Pipeline Counties in Other States
- A region for the portions of each of the 5 states excluding the pipeline counties (5 regions)

The model enables shocking either employment or investment/spending variables. We chose the latter, as the initial data for investment and spending were better clarified. Thus, investment and spending policy variables were used, and predicted employment and indirect economic impacts were forecasted based on established multipliers and trade flows.

This study focuses on investment and operations associated capturing and transporting CO_2.

Economic Impact Summary

Total project impacts on Employment, Population, Income, and Output are as follows:

Chart 1 – Project Scale Economics

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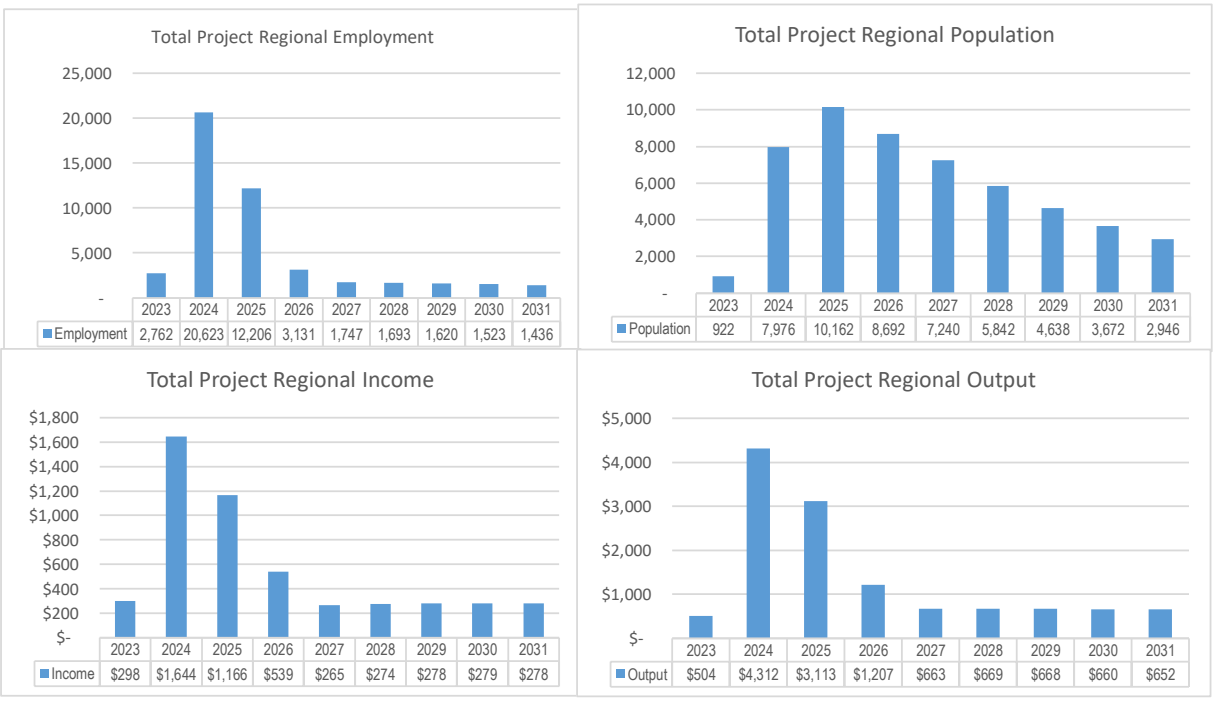

Key project economic estimates include:

Employment:

Construction Effects:

- Direct employment: 9,100 peak in 2024, average direct employment over 4 years of about 3,925/year
- Dynamic (total) employment: 19,600 peak in 2024, average dynamic employment over 4 years of 8,450 jobs/year.
- Dynamic Employment Multiplier of 2.15

Operations Expenditures (Ongoing):

- Direct employment: 154 jobs/year
- Dynamic (total) employment: 492 jobs/year
- Employment Multiplier of 3.2

Economic Output:

Construction Effects:

- Direct investment: $2.8 billion over 4 years (including $253 million in landowner payments).
- Dynamic (total) Output: $7.7 Billion over 4 years
- Dynamic output multiplier of 2.6

Operations Expenditures (Ongoing):

- Direct spending: $94 million/year
- Dynamic (total) output: $200 million/year
- Dynamic output multiplier of 2.1

Net Agricultural Industry Impacts:

Direct Landowner Net Payments:

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- Direct ROW (Right of Way) and crop damage payments of $253 million, estimated to average $10,200 per acre of easement (averaged across both permanent and temporary easements), offset an estimated $40 million in crop loss.
- Total net change in personal income from the payments less the crop loss estimated to be $371 million over a 10-year period (dynamic impact), with approximately $209 million of that being captured directly in Net Farm Income.

Indirect Payments from 45Q Credits, LCF Ethanol, and Carbon Credits:

- $54 million annually in marginal 45Q carbon credits to ethanol plants with an ownership structure within the regions.
- $23 million annually in carbon capture credit paid directly to regionally-owned ethanol plants
- $146 million in additional ethanol production.
- The three indirect benefits are estimated to yield approximately $215 million in personal income annually, and 1,200 jobs.

Model Selection Summary

The project was completed using a 70 sector Policy Insight dynamic model from Regional Economic Models, Inc (REMI) to measure the following economic outputs:

- Employment
- Population
- Personal Income
- Economic Output

The project required a simulation of four impact scenarios across two regions. The four impact scenarios are described as follows: *Construction*, *Landholder Impacts, Tax/carbon credits and Ethanol Industry Customer Sales, and Project Operations*. The inputs were apportioned according to either total investment, carbon capture investment, or pipeline miles across the input regions, depending on the variable being addressed. The two primary input regions are *Iowa Pipeline Counties* and *Other Pipeline Counties*. The contributing simulations, and their inputs, are as follows:

Construction:

Pre-Construction efforts, defined as a shock to Final Demand for Professional, Scientific, and Technical Services: $243.3 million, spread across 2023 and 2024, including the costs associated with securing rights of way, apportioned across the regions by share of total project investment.

Construction, defined as a shock to Investment Spending for Nonresidential Structures: $2.335 billion, with 67% occurring in 2024 and 33% in 2025.

Landowner Payments:

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Net project payments to landowners is a function of three components, apportioned across the regions by pipeline mile, and entered as a shock to Farm Proprietor's Income.

- $192.1 million Right of Way (ROW) Payments to landowners for access during construction and easement access for operations, paid half in 2023 and half in 2024, *PLUS*

- $61.1 million in Damage Payments to landowners for lost production during the construction phase, and to reflect reduced yields in subsequent years, as estimated by Client to be negotiated with landowners. These are assumed to be paid half in 2024 and half in 2025, *LESS*

- $40.4 million in actual crop damage estimated to occur over 10 years.

Customer Credits and Industry Sales:

Customer Credits and Industry Sales, apportioned across the regions annually by share of total carbon capture investment, is a function of three components,

- $53.9 million for 45Q credits of $35/ton of CO_2 due to the Inflation Reduction Act of 2022 (in addition to $50/ton provided under prior law), applied to 6.4 million tons of annual storage, reduced for economic leakage outside the study's regions, entered as a shock to Farm Proprietor's Income, *PLUS*

- $23.1 million for Carbon Offset Credits traded on the open market, estimated by Client at $15/ton, reduced for economic leakage outside the study's regions, entered as a shock to Farm Proprietor's Income *PLUS*

- $145.8 million for approximately 60 million gallons of Low Carbon Fuel (LCF) ethanol sold to the California market (and/or elsewhere), entered as a shock to Industry Sales of Other Basic Organic Chemical manufacturing.

Operating Expense:

Operating expense $94 million for capture facility and pipeline maintenance, assumed to scale up fully in 2026, and to grow at the rate of the PCE Price Deflator annually, and entered into the model as a shock to Pipeline Industry Sales. The investment response in the model was nullified to avoid double counting demand for actual pipeline construction.

State & Local Tax Impact

- The project is expected to result in direct property tax payments of $45.3 million annually once fully assessed. The study is reporting the amount attributable to property in the pipeline regions, though the effect of those tax payments will be shared to various degrees by the states in which those counties reside, consistent with each states property

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tax system, and will similarly be shared with other taxpayers in the form of lower tax rates on the margin. Additionally, this estimate assumes the Firm will remit a Payment in Lieu of Taxes (PILOT) in those jurisdictions that do not directly levy a property tax. Effective tax rates are based on work completed by the Client in 2021, and are not expected to have changed materially. Depending on the assessment standard used by taxing authorities for a CO_2 pipeline, these estimates may change materially in practice.

- There is an implicit assumption that no tax base will be change for agricultural land production. Sensitivity testing suggests an immaterial reduction that would be very short-lived. To the extent damage payments exceed lost production, there would be no reduction in most cases.

- The impact and rates by state are as follows:

Property Taxes (Millions of Current Dollars)

	Capture/ Pipeline	Sequest..*	Total	Effective Tax Rate
Iowa	$ 24.6	$ -	$ 24.6	1.53%
Illinois	12.4	1.3	13.7	2.31%
Minnesota	0.7	-	0.67	2.80%
Nebraska	3.3	-	3.34	1.47%
South Dakota	3.0	-	2.97	1.36%
Total	$ 44.0	$ 1.3	$ 45.3	1.70%

**Estimated by Strategic Economic Research, June 2022*

- State Tax Revenue was estimated outside the model using the ratio of State Taxes by source to Total State Personal Income. The estimates implicitly assume an elasticity of 1, meaning a 1% increase in personal income will result in a 1% increase in tax revenue by source, which probably serves to slightly overstate the gross receipts revenue and slightly understate the income tax revenue. But overall, it should give a good idea of how state revenue responds to changes in personal income. The following table demonstrates the impact in the peak construction year, 2024, of $102.4 million and an ongoing impact of approximately $17 million, rising over time compared to the baseline forecast.

Estimated Impact on Selected and Total State Tax Revenue ($m)

	2024			2030			2035			2040		
	Sales and Gross Receipts	Individual & Corporate Income Tax	Total (incl Other)	Sales and Gross Receipts	Individual & Corporate Income Tax	Total (incl Other)	Sales and Gross Receipts	Individual & Corporate Income Tax	Total (incl Other)	Sales and Gross Receipts	Individual & Corporate Income Tax	Total (incl Other)
Iowa	$ 27.7	$ 25.7	$ 59.7	$ 4.7	$ 4.3	$ 10.0	$ 4.7	$ 4.4	$ 10.2	$ 5.0	$ 4.7	$ 10.9
Illinois	8.9	10.3	20.8	1.2	1.4	2.8	1.2	1.4	2.8	1.3	1.5	3.1
Minnesota	4.5	5.7	11.4	0.5	0.6	1.2	0.5	0.6	1.3	0.6	0.7	1.4
Nebraska	3.1	3.5	6.9	0.6	0.7	1.3	0.6	0.7	1.3	0.6	0.7	1.4
South Dakota	3.0	0.1	3.6	1.2	0.0	1.4	1.2	0.0	1.4	1.2	0.0	1.5
Total	$ 47.3	$ 45.3	$ 102.4	$ 8.1	$ 7.0	$ 16.7	$ 8.2	$ 7.1	$ 17.0	$ 8.8	$ 7.7	$ 18.3

Economic Impact

Investment

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- For modeling purposes, the project assumed an initial investment of $2.831 billion beginning in 2023 and continuing through 2025. This amount does not include another $350 million for work on the sequestration site. Small pre-construction costs in 2022 were rolled into the 2023 simulation year.

- Investments were disaggregated into three types: Pipeline and capture construction expense, Landowner/farmer inputs, and Operations. This study does not replicate the work of Strategic Economics Research, LLC, which published a study of the Sequestration construction and operations in June 2022.

- Ongoing operations expenditures are estimated to be $94.0 million as Industry Sales in Pipeline Transportation, once fully phased after 2025. For purposes of inputs, this number was deflated to 2020 price levels, and entered as a constant dollar input.

Employment

- The project is expected to generate demand for 20,600 jobs at the peak of the construction phase, of which 9,050 are directly related to the project, for a dynamic employment multiplier of 2.28. (This number is higher than reported above, because it includes all investment, including ROW/damage payments).

- Total wages and salaries in 2024, the peak construction phase year, will reach approximately $1.2 billion, with an average annual wage of $54,300.

- An estimated 154 jobs will be required for continuing operations, with another 1,593 indirect and induced jobs (including non-operations activity), for a total of nearly 1,750 peak jobs in 2027, declining over time as the real value of credits declines over time, and as labor productivity grows. Top employment impacts by industry during the post construction period are: Construction, Retail Trade, Retail Trade, and State and Local Government (followed by Utilities and Chemical Manufacturing, representing the direct ongoing impact from the project).

- Wages during the post-construction phase are estimated to be $119 million, suggesting an average wage of $68,314 by 2027.

Personal Income

- Personal Income is expected to increase $1.64 billion at the peak of the Construction Phase. Total Personal Income for the entire Construction Phase is estimated to increase by $3.1 billion, cumulatively through 2025.

- Net Farm Income is expected to increase by the direct impact of the ROW and crop payments, net of crop losses, by $253.2 million.

- Personal Income in the post-construction phase, including the increase in ethanol sales, is expected to increase $264.7 million in 2027, the first full operational year, and reach $277.7 million in 2029, generally leveling off thereafter.

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Output

- Total Output from construction is expected to increase $4.1 billion in the peak year of construction. Total economic output from Construction Phase is estimated to be $7.7 billion, cumulatively over the 4-year period, suggesting a dynamic multiplier of 2.7.

- REMI estimates Trade Flows to determine the extent to which a given level of investment is enjoyed by the region in which it occurs, or outside the region. Trade Flows are a function of its unique economic clusters as they relate to the type of investment undertaken, but also of its geographic size and the location of the project within that region. Insofar as the entire disaggregated region consists of 5 contiguous states, more of the demand can be sourced within the region. We estimate that approximately 64% of the ongoing economic activity will be sourced within the 7 regions, with the nation and the world supplying the remainder after the Construction Phase.

- The following table summarizes Output and Employment direct and total estimates.

Construction Impacts

Direct		Total (Direct and Indirect)		Dynamic Multiplier	
Investment (incl Land Payments)	Employment (Peak)	Output	Employment	Output	Employment
$ 2,831	6,437	$ 9,971	19,618	3.5	3.0

Operations (Ongoing based on 2027)

Direct		Total (Direct and Indirect)		Dynamic Multiplier	
Operations Expenditures	Employment (2026)	Output	Employment	Output	Employment
$ 94	155	$ 188	497	2.0	3.2

- Both employment and output multipliers are within expected ranges.

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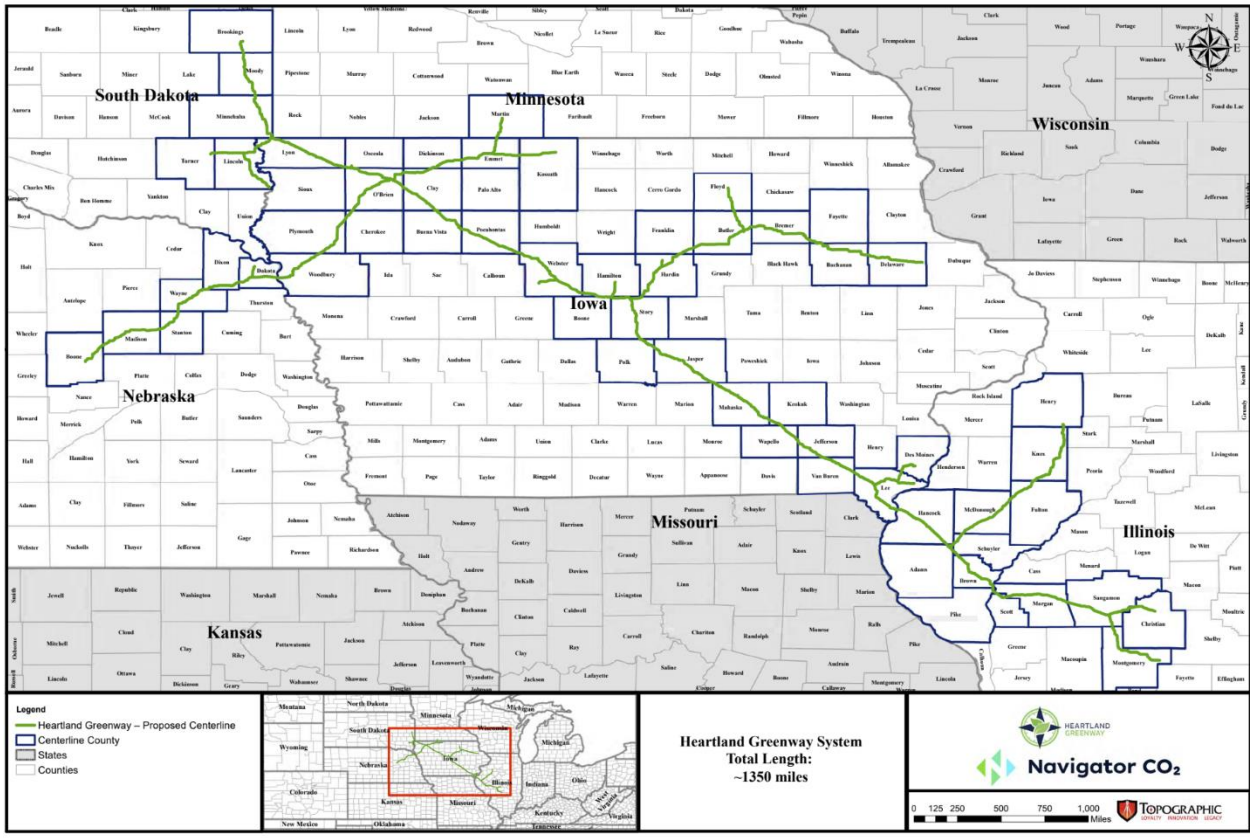
Project Overview

Muller Consulting was retained by Navigator CO_2 Ventures, LLC (Client) to estimate the economic impact of a proposed pipeline project. The project would involve constructing a pipeline running through Iowa, Illinois, Nebraska, Minnesota, and South Dakota.



The project provides for the capture of CO_2 at various industrial sites, principally ethanol plants for purposes of this study, compressing the gas and shipping it to sequestration sites in Central Illinois. There, the gas would there be injected into and stored in deep wells where the CO_2 eventually mineralizes as part of the natural rock formation. (This study does not include any investigation of the viability of the technology or processes, which were provided by Client). Client provided estimates suggesting 7.7 million metric tons (MT) of CO_2 can be sequestered annually. This study makes no estimates regarding any positive or negative externalities resulting from capturing, transporting, or sequestering CO_2.

The economics of the project are driven largely by federal tax credits (26 U.S. Code § 45Q - Credit for carbon dioxide sequestration), which provide a credit to shippers of $85 per sequestered ton of CO_2. Ethanol producers are expected to gain market share in California, which requires a lower carbon footprint than some Iowa producers have been able to achieve without carbon capture and storage.

After discussions regarding cost and benefits, Client accepted Muller's recommendation to configure a model created by Regional Economic Models, Inc (REMI). REMI is a dynamic

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model, rather than a static Input/Output model, and provides more robust results, in part because it can model the impact of the project over time, as it is phased into existence, and also has a population impact module. It is also easier to separate out the initial construction impacts (one time impacts) that diminish over time from the ongoing benefits from operations and new ethanol markets that go on for decades.

The selected REMI model was specified into seven regions:

- Iowa Pipeline Counties
- Pipeline Counties in Other States (aggregated into a single region)
- Rest of Iowa
- Rest of Illinois
- Rest of Minnesota
- Rest of Nebraska
- Rest of South Dakota

Additional information about the REMI model can be found on their website, www.remi.com. The following overview of the model is provided there:

The REMI model incorporates aspects of four major modeling approaches: Input-Output, General Equilibrium, Econometric, and Economic Geography. Each of these methodologies has distinct advantages as well as limitations when used alone. The REMI integrated modeling approach builds on the strengths of each of these approaches.

The REMI model at its core, has the inter-industry relationships found in Input-Output models. As a result, the industry structure of a particular region is captured within the model, as well as transactions between industries. Changes that affect industry sectors that are highly interconnected to the rest of the economy will often have a greater economic impact than those for industries that are not closely linked to the regional economy.

General Equilibrium is reached when supply and demand are balanced. This tends to occur in the long run, as prices, production, consumption, imports, exports, and other changes occur to stabilize the economic system. For example, if real wages in a region rise relative to the U.S., this will tend to attract economic migrants to the region until relative real wage rates equalize. The general equilibrium properties are necessary to evaluate changes such as tax policies that may have an effect on regional prices and competitiveness.

REMI is sometimes called an "Econometric model," as the underlying equations and responses are estimated using advanced statistical techniques. The estimates are used to quantify the structural relationships in the model. The speed of economic responses is also estimated, since different adjustment periods will result in different policy recommendations and even different economic outcomes.

The New Economic Geography features represent the spatial dimension of the economy. Transportation costs and accessibility are important economic determinants of interregional trade and the productivity benefits that occur due to industry clustering and labor market access. Firms benefit from having access to a large, specialized labor pool and from having access to specialized intermediate inputs from supplying firms. The productivity and competitiveness benefits of labor and industry concentrations are called agglomeration economies, and are modeled in the economic geography equations.

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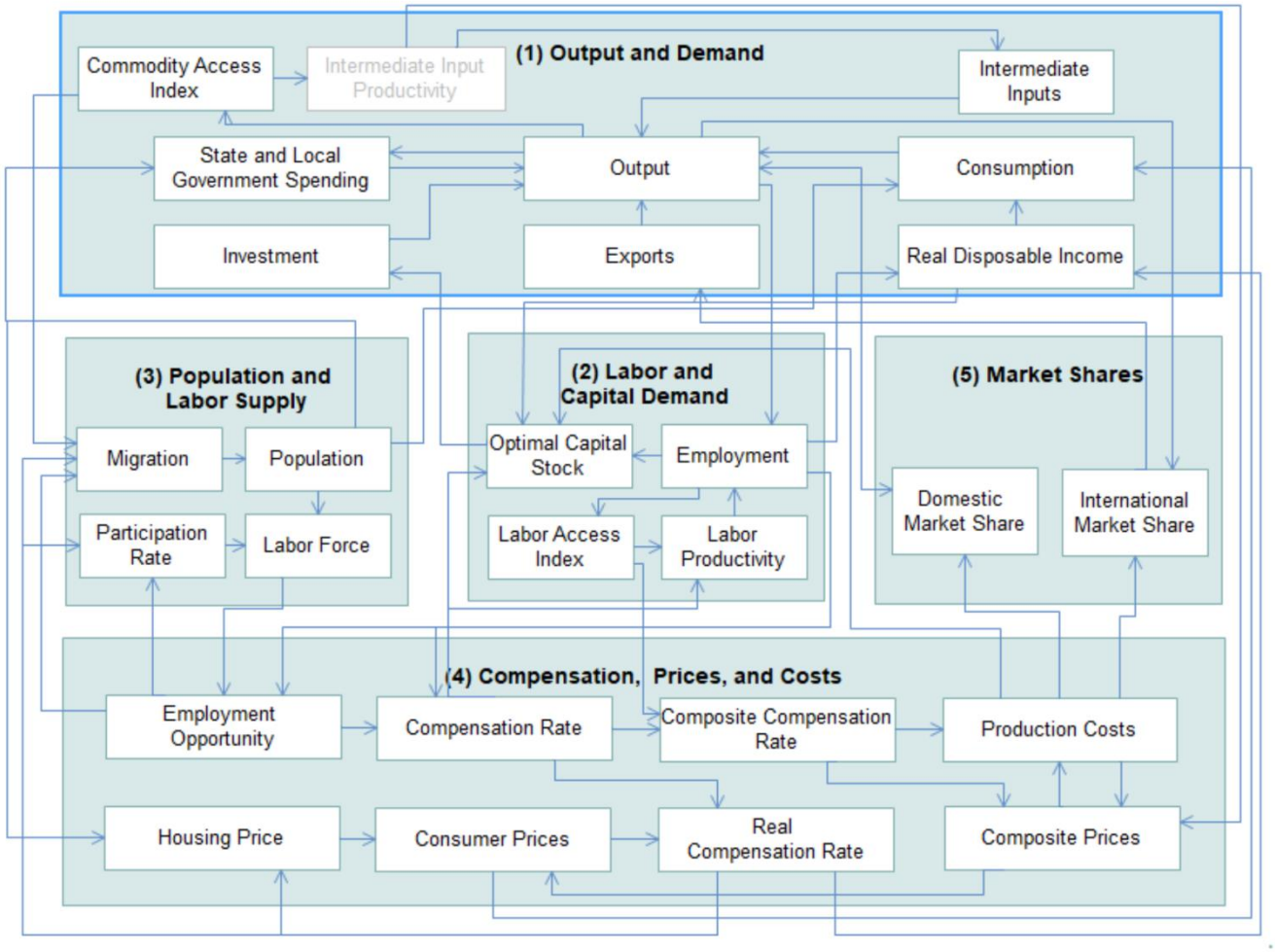
The following is a high-level view of the model's linkages



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Model Specification and Data Selection

Model Selection

Balancing the relative benefit vs. the relative cost of the type of model, Muller recommended a 7-Region model built on 70 Economic Sectors. The prospect of going to 160 sectors would have allowed for more specified inputs by direct type of expenditure, but the results would not be expected to be materially different.

While more granularity could have been obtained by making each county its own region, it would have been cost prohibitive. By assuming per mile construction costs, the results can be disaggregated to the county level, and then summed back up to provide an estimate of the impact for each State as a whole. Insofar as Iowa counties comprised about 60% of pipeline miles, we broke the out the Iowa Pipeline Counties as an aggregated region. While the State of Illinois generally has a higher Regional Purchase Coefficient (i.e., is able to source more of its own output) than the other States, the characteristics of the largely rural Illinois counties doesn't suggest a strong reason to believe they would have profoundly different outcomes on a per mile basis than the other non-Iowa pipeline states.

State	Pipeline Mileage By State	Percentage of Miles
Iowa	825.6	60.5%
Illinois	272.6	20.0%
Minnesota	47.0	3.4%
Nebraska	116.7	8.5%
South Dakota	103.7	7.6%
Total	1,365.6	100.0%

Pipeline Regions		Pipeline Mileage by Region	Percentage of Miles
Region 1	Iowa Counties	825.6	60.5%
Region 2	Other Counties	540.0	39.5%
Total		1,365.6	100.0%

Data Input Types

The REMI model provides the means of shocking a baseline forecast, or creating a simulation, through various economic handles. Using sound data retrieved prior to the simulation, one can shock employment and then the model will estimate the direct investment and spending that would be associated with that level of employment. Similarly, one can shock investment and spending, and the model will estimate the direct employment that would be associated with those levels. Muller determined the quality of the initial data for investment and spending was better clarified than the employment estimates. Thus, investment and spending policy variables were used, and predicted employment and indirect economic impacts were forecasted based on established multipliers and trade flows among and between the regions.

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All of the model inputs for the construction and operations budgets were provided by the Client, with the exception of two input variables. Muller relied on outside sources to estimate the impact of crop loss to landowners and the value of marginal ethanol sales.

While property taxes are included in the aggregate operating expense, we opted not to directly input these amounts as distinct expenses. Rather, we implicitly assume that the cost structure would be substantially similar to the cost of operating other pipelines. Depending on how this pipeline project is finally assessed, this implicit assumption may be somewhat over-estimating or under-estimating this expense, and by implication over- or under-estimating the other supply chain impacts. That said, property tax impacts are assumed to have a consistent rate by State, and individual taxing district rates were not researched. This will have the effect of somewhat inflating property tax rates in some counties relative to other counties.

The Client provided a budget for ROW payments and Crop Damage payments. The payments vary according to the land value in each county, but combined provide a payment of approximately $10,200 per acre affected. The cost of securing the easements was a budget item included in the Construction cost of the project. The Landowner Payments were input directly into Farm Income, a component of Proprietor's Income.

Lost production of farm ground is captured by assuming a 150-foot wide easement across 1,356 miles of farm ground. While not all of the ground is farm ground, the vast majority is, and we assumed that lost proprietor's income would be a sufficiently useful proxy for other parcels. The affected is 24,651 acres. We further assumed a mix of 57% corn acres and 43% soybean acres across all the counties, converted into a weighted average soy/corn price and yield (128 bushels/acre at $7.49/bushel) for a total impact of $33.9 million in 2024, assuming a 100% crop loss. Yields were assumed to grow 2% per year in the baseline forecast. For future years, a study by Iowa State University researchers Mehari Tekeste et al, originally published in 2020, *Pipeline right-of-way construction activities impact on deep soil compaction* estimated first year crop loss at a weighted average 19%, and that yields continue to recover over time. This study assumes a 15% crop loss in the 3rd year, and steady improvement thereafter over 10 years. The following table demonstrates the net impact to landowners from the ROW payments net of crop loss. By the 10th year, landowners should experience a net benefit of approximately $358 million, assuming a 4% real rate of return on invested cash. The Net Annual Impacts were used to increase the policy handle for Farm Income in the model, apportioned according to pipeline miles.

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Crop Loss and Landowner Payments

Year	Yield (weighted soy/corn avg bushels/acre)	% lost	Price (weighted soy/corn avg))	Crop Loss ($mil)	ROW/ Damage Payments ($mil)	Annual Impact ($mil)	Cumulative Payment Less Cumulative Loss	Net Cumulative Benefit at 4% Interest
2023				$ -	$ 67.2	$ 67.2	$ 67.2	$ 67.2
2024	128.5	100%	$ 7.49	$ 23.9	$ 116.7	$ 92.8	$ 160.1	$ 162.7
2025	131.0	20%	$ 7.49	$ 4.9	$ 58.5	$ 53.6	$ 213.6	$ 222.8
2026	133.7	15%	$ 7.49	$ 3.7	$ 8.9	$ 5.2	$ 218.9	$ 237.0
2027	136.3	10%	$ 7.49	$ 2.5		$ (2.5)	$ 216.3	$ 243.9
2028	139.1	5%	$ 7.49	$ 1.3		$ (1.3)	$ 215.0	$ 252.4
2029	141.9	5%	$ 7.49	$ 1.3		$ (1.3)	$ 213.7	$ 261.2
2030	144.7	5%	$ 7.49	$ 1.3		$ (1.3)	$ 212.4	$ 270.3
2031	147.6	5%	$ 7.49	$ 1.4		$ (1.4)	$ 211.0	$ 279.7
2032	150.5	5%	$ 7.49	$ 1.4		$ (1.4)	$ 209.6	$ 289.5
2033	153.5	5%	$ 7.49	$ 1.4		$ (1.4)	$ 208.2	$ 299.6
2034	156.6	0%	$ 7.49	$ -		$ -	$ 208.2	$ 311.6

The Phasing of the project was another factor impacting both the construction phase impacts by year, and the onset of the ongoing operating expenses and ethanol sales going forward.

Construction phase expenses provided by Client were reduced by the ROW payments to landowners as described above, and also by the Pre-Construction costs, and entered as Non-Residential Construction for purposes of estimating impacts. The Pre-Construction costs were input as Professional, Scientific, and Technical services, and then summed back up with primary construction for an aggregated Construction Impact.

The Operations budget provided by Client was entered into the model as a change in Industry Sales of Pipeline Transportation. As described earlier, the direct input was apportioned across the regions as estimated by Client. The pipeline associated expenses were apportioned across the regions by pipeline mile, and the capture site expenses were apportioned by initial investment by region. The sequestration operating expenses were removed from the simulation, as they are covered by a separate study.

Model Inputs

Based on data specifications described above, the following table shows the data inputs by year. The data inputs are run through 2045. LCF Ethanol and Operations inputs are expressed in constant 2020 dollars. All other inputs are nominal.

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Economic Impact Results

A 10-year breakdown of the economic impact categories by state.

Construction

Employment

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	1,086	444	171	128	91	1,920
2024	11,800	3,802	1,481	1,514	1,020	19,618
2025	6,552	2,082	849	833	553	10,869
2026	784	258	183	103	55	1,383

Output ($mil)

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	$ 192.0	$ 83.1	$ 34.5	$ 22.6	$ 15.6	$ 347.9
2024	$ 2,438.4	$ 801.6	$ 350.7	$ 310.3	$ 202.3	$ 4,103.4
2025	$ 1,581.6	$ 531.0	$ 243.2	$ 204.1	$ 128.8	$ 2,688.7
2026	$ 308.3	$ 121.6	$ 73.5	$ 44.4	$ 23.6	$ 571.4
		$ 1,537.4				

Landowner/Farmer Impacts (easement, credits, ethanol)

Employment

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	464	176	75	72	54	842
2024	557	209	89	86	64	1,005
2025	572	156	77	77	93	975
2026	756	164	90	95	145	1,250
2027	744	152	87	93	147	1,222
2028	710	141	83	88	142	1,164
2029	668	131	78	83	135	1,096
2030	619	121	73	77	126	1,017
2031	577	114	69	72	117	949
2032	541	108	66	68	110	893

Output ($mil)

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	$ 83.8	$ 33.5	$ 15.7	$ 13.2	$ 9.6	$ 155.8
2024	$ 112.6	$ 44.9	$ 21.0	$ 17.6	$ 12.6	$ 208.7
2025	$ 183.7	$ 45.9	$ 20.9	$ 23.2	$ 31.0	$ 304.7
2026	$ 289.4	$ 57.7	$ 26.1	$ 33.8	$ 55.0	$ 462.0
2027	$ 298.3	$ 57.5	$ 26.7	$ 34.7	$ 57.9	$ 475.0
2028	$ 298.0	$ 56.3	$ 26.3	$ 34.6	$ 58.5	$ 473.8
2029	$ 295.1	$ 55.2	$ 25.8	$ 34.2	$ 58.4	$ 468.7
2030	$ 289.8	$ 53.7	$ 24.9	$ 33.6	$ 57.6	$ 459.6
2031	$ 285.7	$ 52.7	$ 24.1	$ 33.1	$ 56.8	$ 452.4
2032	$ 282.9	$ 52.2	$ 23.6	$ 32.8	$ 56.3	$ 447.8

Operations Expenditures

Employment

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	-	-	-	-	-	-
2024	-	-	-	-	-	-
2025	215	76	21	29	21	363
2026	292	106	29	41	29	497
2027	308	112	31	44	30	525
2028	311	112	31	44	30	529
2029	309	110	31	44	30	523
2030	302	105	30	42	29	507
2031	292	99	28	40	27	487
2032	283	94	27	38	26	468

Output ($mil)

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	$ -	$ -	$ -	$ -	$ -	$ -
2024	$ -	$ -	$ -	$ -	$ -	$ -
2025	$ 67.9	$ 27.5	$ 6.1	$ 10.6	$ 7.7	$ 119.9
2026	$ 97.6	$ 40.4	$ 9.2	$ 15.6	$ 11.2	$ 174.0
2027	$ 105.4	$ 43.8	$ 10.3	$ 17.0	$ 12.0	$ 188.5
2028	$ 109.2	$ 45.2	$ 10.8	$ 17.7	$ 12.4	$ 195.3
2029	$ 111.5	$ 46.0	$ 11.1	$ 18.1	$ 12.6	$ 199.2
2030	$ 112.5	$ 45.9	$ 11.1	$ 18.2	$ 12.6	$ 200.3
2031	$ 112.8	$ 45.5	$ 10.9	$ 18.2	$ 12.6	$ 200.0
2032	$ 113.0	$ 45.2	$ 10.8	$ 18.1	$ 12.5	$ 199.6

Total Project

Employment

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	1,550	620	246	200	146	2,762
2024	12,358	4,011	1,570	1,600	1,085	20,623
2025	7,340	2,314	946	939	667	12,206
2026	1,833	528	303	239	228	3,131
2027	1,052	264	118	136	177	1,747
2028	1,021	253	114	132	173	1,693
2029	977	241	110	127	165	1,620
2030	921	226	103	119	154	1,523
2031	869	213	97	112	144	1,436
2032	824	202	93	106	136	1,361

Output ($mil)

	Iowa	Illinois	Minnesota	Nebraska	South Dakota	Total
2023	$ 275.9	$ 116.6	$ 50.2	$ 35.8	$ 25.2	$ 503.7
2024	$ 2,551.0	$ 846.5	$ 371.8	$ 327.8	$ 214.9	$ 4,312.1
2025	$ 1,833.2	$ 604.5	$ 270.2	$ 237.9	$ 167.5	$ 3,113.3
2026	$ 695.4	$ 219.7	$ 108.8	$ 93.8	$ 89.8	$ 1,207.4
2027	$ 403.7	$ 101.3	$ 36.9	$ 51.7	$ 69.9	$ 663.5
2028	$ 407.2	$ 101.6	$ 37.1	$ 52.2	$ 70.9	$ 669.1
2029	$ 406.6	$ 101.1	$ 36.9	$ 52.3	$ 70.9	$ 667.9
2030	$ 402.4	$ 99.6	$ 36.0	$ 51.8	$ 70.2	$ 659.9
2031	$ 398.5	$ 98.2	$ 35.1	$ 51.3	$ 69.4	$ 652.5
2032	$ 395.9	$ 97.4	$ 34.4	$ 50.9	$ 68.8	$ 647.4

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Key Impacts by County

We attempted to provide an estimate of key impacts by county, both in the peak construction phase year and in 2030 with Consolidated Impacts. These estimates are not a product of the REMI model, but rather allocated from data aggregated across the regions. Thus, Iowa Pipeline County impacts are the proportional share of the total economic impacts across the Iowa Pipeline Counties Region, based on miles of Pipeline.

The one exception is Christian County, the sequestration site. The full $1.3 million in property taxes anticipated for the Sequestration site is allocated to Christian County, IL. Additionally, data was taken from the Strategic Economics, LLC study to increase the amounts for income, employment, and output. This report applies the sequestration construction impacts from that study to 2024, and the ongoing economic impacts to the 2030 reported numbers. Thus, Christian County shows impacts from all aspects of the project.

Again, with the exception of Christian County, there are no dynamic effects associated with the property tax estimates for all the counties in the pipeline path, and the presentation is more of an accounting exercise to give a sense of the scale of impact rather than a specific county by county rigorous estimate. Those counties with participating ethanol plants or other industrial customers will clearly be under-represented in these estimates, and those without any capture sites will experience less of an impact. With that in mind, the following table lists these impacts for those counties included in the pipeline regions, with an adjustment for Christian County to reflect the previous discussion.

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Pipeline Counties Impact Data

State	County	Est Annual Prop Taxes ($)	2024 Employment (Individuals)	2030 Employment (Individuals)	2024 Population (Individuals)	2030 Population (Individuals)	2024 Income ($Mil)	2030 Income ($Mil)	2024 Output ($Mil)	2030 Output ($Mil)
Iowa	Boone	175,808	82.96	6.18	34.16	14.04	6.44	1.08	17.13	2.70
Iowa	Bremer	936,124	441.76	32.92	181.87	74.76	34.27	5.77	91.19	14.38
Iowa	Buchanan	765,536	361.26	26.92	148.73	61.13	28.03	4.71	74.58	11.76
Iowa	Buena Vista	552,375	260.67	19.42	107.31	44.11	20.22	3.40	53.81	8.49
Iowa	Butler	1,401,942	661.58	49.29	272.37	111.96	51.32	8.63	136.57	21.54
Iowa	Cherokee	180,523	85.19	6.35	35.07	14.42	6.61	1.11	17.59	2.77
Iowa	Clay	1,062,721	501.50	37.37	206.46	84.87	38.90	6.55	103.53	16.33
Iowa	Delaware	792,315	373.90	27.86	153.93	63.27	29.01	4.88	77.19	12.17
Iowa	Des Moines	302,874	142.93	10.65	58.84	24.19	11.09	1.87	29.51	4.65
Iowa	Dickinson	457,412	215.85	16.08	88.87	36.53	16.75	2.82	44.56	7.03
Iowa	Emmet	1,126,301	531.51	39.60	218.82	89.94	41.23	6.94	109.72	17.31
Iowa	Fayette	199,235	94.02	7.01	38.71	15.91	7.29	1.23	19.41	3.06
Iowa	Floyd	440,622	207.93	15.49	85.60	35.19	16.13	2.71	42.92	6.77
Iowa	Franklin	231,393	109.20	8.14	44.95	18.48	8.47	1.43	22.54	3.56
Iowa	Hamilton	515,103	243.08	18.11	100.07	41.14	18.86	3.17	50.18	7.91
Iowa	Hardin	1,179,281	556.51	41.46	229.11	94.18	43.17	7.26	114.88	18.12
Iowa	Jasper	1,172,971	553.53	41.24	227.88	93.67	42.94	7.22	114.27	18.02
Iowa	Jefferson	530,672	250.43	18.66	103.10	42.38	19.43	3.27	51.70	8.15
Iowa	Keokuk	199,513	94.15	7.02	38.76	15.93	7.30	1.23	19.44	3.07
Iowa	Kossuth	490,072	231.27	17.23	95.21	39.14	17.94	3.02	47.74	7.53
Iowa	Lee	1,867,537	881.30	65.66	362.82	149.14	68.37	11.50	181.93	28.69
Iowa	Lyon	1,436,832	678.05	50.52	279.15	114.74	52.60	8.85	139.97	22.08
Iowa	Mahaska	1,118,065	527.62	39.31	217.22	89.29	40.93	6.89	108.92	17.18
Iowa	O'Brien	1,999,858	943.74	70.32	388.53	159.71	73.21	12.32	194.82	30.73
Iowa	Osceola	111,965	52.84	3.94	21.75	8.94	4.10	0.69	10.91	1.72
Iowa	Plymouth	794,281	374.83	27.93	154.31	63.43	29.08	4.89	77.38	12.20
Iowa	Pocahontas	936,169	441.78	32.92	181.88	74.76	34.27	5.77	91.20	14.38
Iowa	Polk	262,546	123.90	9.23	51.01	20.97	9.61	1.62	25.58	4.03
Iowa	Story	1,234,153	582.40	43.39	239.77	98.56	45.18	7.60	120.23	18.96
Iowa	Van Buren	548,386	258.79	19.28	106.54	43.79	20.08	3.38	53.42	8.43
Iowa	Wapello	360,635	170.19	12.68	70.06	28.80	13.20	2.22	35.13	5.54
Iowa	Webster	1,978,578	933.70	69.57	384.39	158.01	72.43	12.19	192.75	30.40
Iowa	Woodbury	911,254	430.03	32.04	177.04	72.77	33.36	5.61	88.77	14.00
Illinois	Adams	367,302	112.85	6.36	38.45	19.22	9.53	1.28	23.82	2.80
Illinois	Brown	1,334,113	409.89	23.10	139.66	69.81	34.63	4.65	86.51	10.18
Illinois	Christian	1,890,021	181.28	10.22	61.77	30.87	15.32	2.06	38.26	4.50
Illinois	Fulton	717,048	220.30	12.41	75.06	37.52	18.61	2.50	46.50	5.47
Illinois	Hancock	1,509,239	463.69	26.13	157.99	78.97	39.18	5.26	97.87	11.51
Illinois	Henry	74,624	22.93	1.29	7.81	3.90	1.94	0.26	4.84	0.57
Illinois	Knox	1,905,914	585.57	33.00	199.52	99.73	49.48	6.65	123.59	14.54
Illinois	McDonough	1,495,251	459.40	25.89	156.53	78.24	38.82	5.21	96.96	11.41
Illinois	Morgan	1,495,102	459.35	25.89	156.51	78.23	38.81	5.21	96.95	11.40
Illinois	Pike	110,044	33.81	1.91	11.52	5.76	2.86	0.38	7.14	0.84
Illinois	Sangamon	1,496,974	459.92	25.92	156.71	78.33	38.86	5.22	97.07	11.42
Illinois	Schuyler	513,840	157.87	8.90	53.79	26.89	13.34	1.79	33.32	3.92
Illinois	Scott	238,709	73.34	4.13	24.99	12.49	6.20	0.83	15.48	1.82
Minnesota	Martin	715,711	411.82	27.02	132.95	89.71	35.08	3.79	97.53	9.43
Minnesota	Rock	-	-	-	-	-	-	-	-	-
Nebraska	Boone	414,266	186.33	13.89	68.17	32.69	14.47	2.70	38.19	6.03
Nebraska	Dakota	730,510	328.58	24.50	120.21	57.65	25.52	4.77	67.34	10.64
Nebraska	Dixon	521,936	234.76	17.51	85.89	41.19	18.23	3.41	48.11	7.60
Nebraska	Madison	1,127,681	507.22	37.82	185.57	88.99	39.40	7.36	103.95	16.43
Nebraska	Pierce	-	-	-	-	-	-	-	-	-
Nebraska	Stanton	5,959	2.68	0.20	0.98	0.47	0.21	0.04	0.55	0.09
Nebraska	Wayne	760,627	342.12	25.51	125.17	60.02	26.57	4.97	70.12	11.08
South Dakota	Brookings	230,626	85.58	12.17	33.93	21.69	6.96	2.69	16.95	5.53
South Dakota	Lincoln	1,303,968	483.85	68.82	191.85	122.66	39.35	15.23	95.85	31.29
South Dakota	Minnehaha	809,165	300.25	42.71	119.05	76.12	24.42	9.45	59.48	19.42
South Dakota	Moody	769,130	285.39	40.59	113.16	72.35	23.21	8.98	56.54	18.46
South Dakota	Turner	54,696	20.30	2.89	8.05	5.15	1.65	0.64	4.02	1.31

EXHIBIT
N4

Discussion and Limitations

Carbon capture, transport, and sequestration has become more economically viable in light of federal tax credits that drive sufficient cash flow to finance large projects. The Heartland Greenway project would be among the largest projects ever built. This study did not address the cost-effectiveness with respect to federal, state, or global policy. Rather, this study attempted to simply measure the economic impact of the construction of the project, the ongoing operations and maintenance, the impact on affected property owners, and the effect on state and local taxes.

The results seem more robust than what we have seen with other pipeline projects. The principal reason for this, it appears, is the nature of the use of this pipeline relative to other projects. Iowa and surrounding states are not simply a conduit through which a commodity is captured 1,000 miles away or even 1,500. The pipeline services industrial customers on its route, so economic benefits are reaped that far outweigh the economic activity associated with operations and maintenance.

With respect to affected landowners in the rights-of-way, the recent work of researchers at Iowa State University suggests the effects of soil compaction do not appear to be as dire as some had feared. If the input assumptions regarding crop loss are reasonably accurate, the benefits of anticipated ROW payments vastly exceed any crop damage, and likely more than what was presented in this report. The assumption of 100% crop loss in the first year is almost certainly overstated. There will be pipeline projects finished outside the crop season. To the extent land doesn't get planted at all, there would be a savings from inputs into the crop cycle that are not captured in this study.

The additional 45Q carbon capture and sequestration credit in the Inflation Reduction Act signed into law on August 16, 2022 provides a substantial change in the regional economic impact of the project prior to its passage, and provides additional benefit greater than $250 million annually, much of which is shared within the affected regions.

Lastly, while accuracy and clarity would have improved with a more detailed model, the overall scale of the impact in the aggregate would not likely materially change. There could have been much better color into the impacts on individual counties based on the characteristics of local economies and assigning likely end-use customers to those areas. With some economics work, it's just about getting the sign right. Is the project net beneficial or not? That issue is not in question in any of the regions we studied. The positive economic benefits are material.

EXHIBIT
N4

The Author

Jon Muller brings nearly 30 years of analytical and management experience since earning his degree in Economics from the University of Iowa. Muller worked for five years at the Legislative Fiscal Bureau, specializing in economic modeling, state and local tax analysis, and revenue estimating. Muller was then named Director of Research for the Iowa Farm Bureau Federation, again focusing on local tax issues and economic development, regional economic modeling related to value-added agriculture, and completion of a comprehensive study of the impact of all State and local taxes on Iowa farm families. In 1998, Governor-Elect Tom Vilsack appointed Muller to serve as Transition Team Budget Director to lead the creation of the administration's first budget. Starting in 2001, Muller created Muller Consulting, a public policy and business development consulting firm, covering issues such as health insurance, energy, education, and finance for various not-for profits. The Iowa Association of School Boards hired Muller full-time starting in 2004, where he served in various roles from developing assessment analysis software to business development and school energy issues, to finally serving as Chief Financial Officer of the Association and President of its for-profit subsidiary. In 2009, Muller was selected as a VP of Operations for The Princeton Review in Framingham, MA. In 2010, Muller worked with a group of executives to buy out a division of The Princeton Review, and was a founding Partner and CFO of Higher Education Partners, LLC, where he worked with Community Colleges across the country to expand facilities and online offerings, principally in socio-economically disadvantaged communities. Muller moved home to Iowa in 2012, and joined Iowa School Finance Information Services (ISFIS) as a full-time Partner, focusing on business development and leading the company's outside policy and economics consulting business. Jon retired from his full-time role as ISFIS partner during 2020, but continues to lend his expertise in a consulting role on various projects inside and outside the company. Muller has served on various boards and commissions in Iowa, including the Iowa Railway Finance Authority and the Governor's Council of Economic Advisers under two administrations.

EXHIBIT
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