EXHIBIT
A

Heartland Greenway Pipeline

Regional Economic Impact Study

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Executive Summary

Heartland Greenway Project
Regional Economic Impact Study

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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)

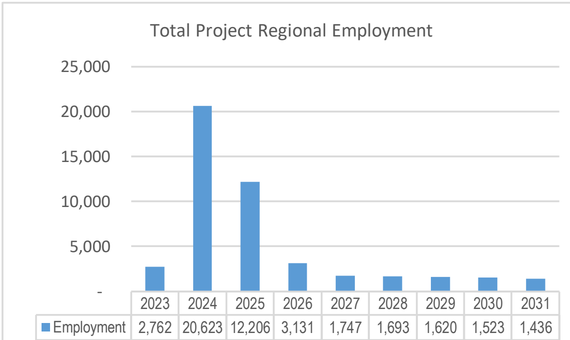
The model enables shocking either employment or investment/spending variables. We chose the latter, as the initial data for investment and spending were better clarified. Thus, investment and spending policy variables were used, and predicted employment and indirect economic impacts were forecasted based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

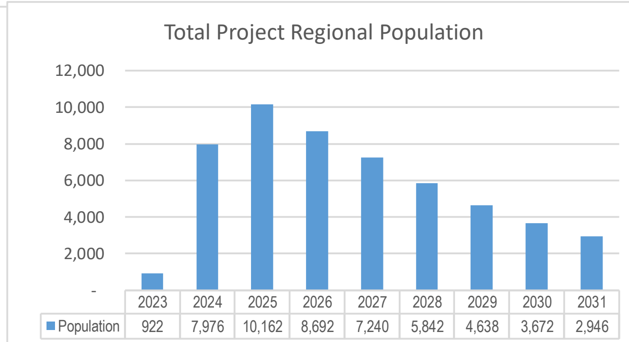
This study focuses on investment and operations associated capturing and transporting CO_2.

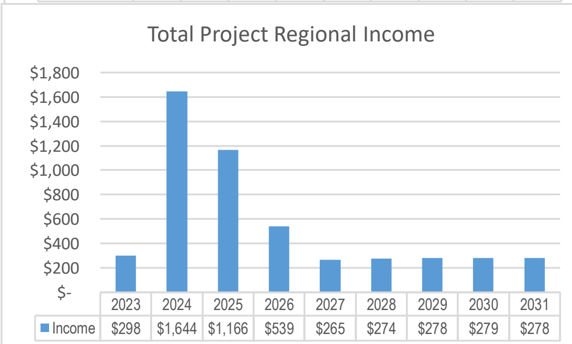
Economic Impact Summary

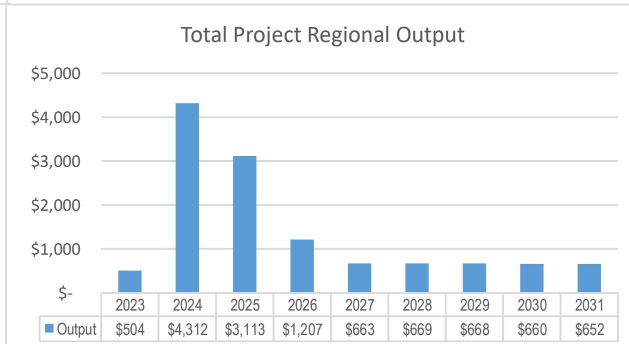
Total project impacts on Employment, Population, Income, and Output are as follows:

Chart 1 – Project Scale Economics









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:

- 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:

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 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

- 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.

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

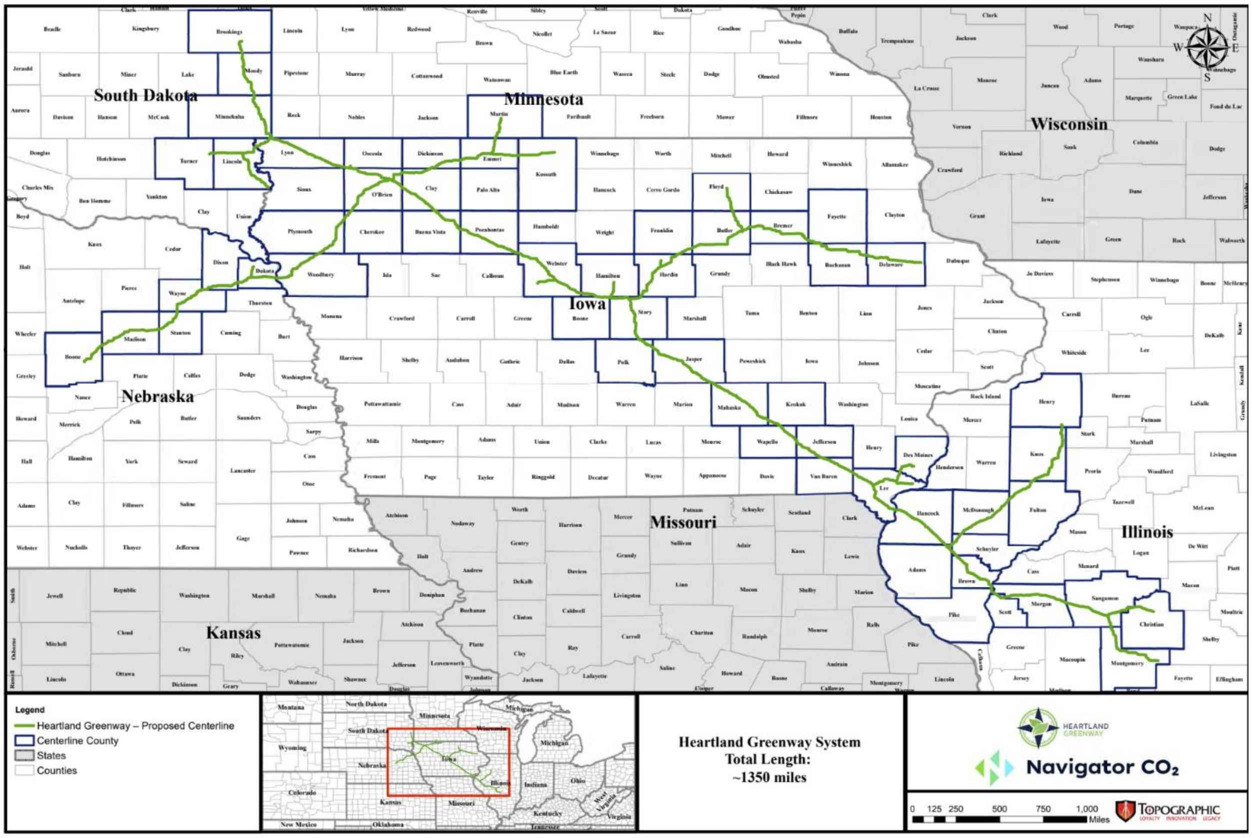
Operations (Ongoing based on 2027)

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.

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 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.

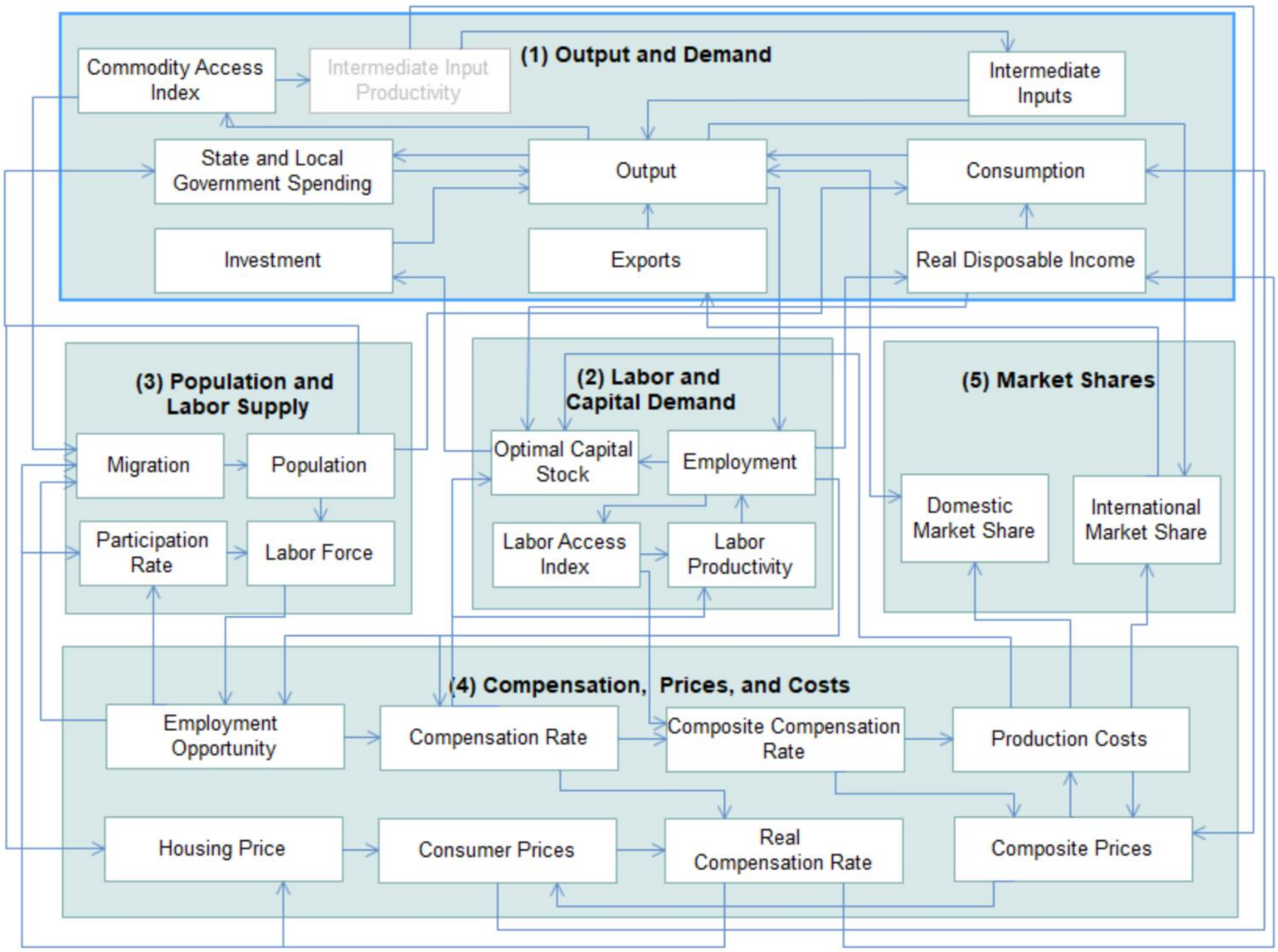
The REMI model at its core, has the inter-industry relationships found in Input-Output models. As a result, the industry structure of a particular region is captured within the model, as well as transactions between industries. Changes that affect industry sectors that are highly interconnected to the 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.

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



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.

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.

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.

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
$ 192.0	$ 83.1	$ 34.5	$ 22.6	$ 15.6	$ 347.9
$ 2,438.4	$ 801.6	$ 350.7	$ 310.3	$ 202.3	$ 4,103.4
$ 1,581.6	$ 531.0	$ 243.2	$ 204.1	$ 128.8	$ 2,688.7
$ 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
$ 83.8	$ 33.5	$ 15.7	$ 13.2	$ 9.6	$ 155.8
$ 112.6	$ 44.9	$ 21.0	$ 17.6	$ 12.6	$ 208.7
$ 183.7	$ 45.9	$ 20.9	$ 23.2	$ 31.0	$ 304.7
$ 289.4	$ 57.7	$ 26.1	$ 33.8	$ 55.0	$ 462.0
$ 298.3	$ 57.5	$ 26.7	$ 34.7	$ 57.9	$ 475.0
$ 298.0	$ 56.3	$ 26.3	$ 34.6	$ 58.5	$ 473.8
$ 295.1	$ 55.2	$ 25.8	$ 34.2	$ 58.4	$ 468.7
$ 289.8	$ 53.7	$ 24.9	$ 33.6	$ 57.6	$ 459.6
$ 285.7	$ 52.7	$ 24.1	$ 33.1	$ 56.8	$ 452.4
$ 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
$ -	$ -	$ -	$ -	$ -	$ -
$ -	$ -	$ -	$ -	$ -	$ -
$ 67.9	$ 27.5	$ 6.1	$ 10.6	$ 7.7	$ 119.9
$ 97.6	$ 40.4	$ 9.2	$ 15.6	$ 11.2	$ 174.0
$ 105.4	$ 43.8	$ 10.3	$ 17.0	$ 12.0	$ 188.5
$ 109.2	$ 45.2	$ 10.8	$ 17.7	$ 12.4	$ 195.3
$ 111.5	$ 46.0	$ 11.1	$ 18.1	$ 12.6	$ 199.2
$ 112.5	$ 45.9	$ 11.1	$ 18.2	$ 12.6	$ 200.3
$ 112.8	$ 45.5	$ 10.9	$ 18.2	$ 12.6	$ 200.0
$ 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
$ 275.9	$ 116.6	$ 50.2	$ 35.8	$ 25.2	$ 503.7
$ 2,551.0	$ 846.5	$ 371.8	$ 327.8	$ 214.9	$ 4,312.1
$ 1,833.2	$ 604.5	$ 270.2	$ 237.9	$ 167.5	$ 3,113.3
$ 695.4	$ 219.7	$ 108.8	$ 93.8	$ 89.8	$ 1,207.4
$ 403.7	$ 101.3	$ 36.9	$ 51.7	$ 69.9	$ 663.5
$ 407.2	$ 101.6	$ 37.1	$ 52.2	$ 70.9	$ 669.1
$ 406.6	$ 101.1	$ 36.9	$ 52.3	$ 70.9	$ 667.9
$ 402.4	$ 99.6	$ 36.0	$ 51.8	$ 70.2	$ 659.9
$ 398.5	$ 98.2	$ 35.1	$ 51.3	$ 69.4	$ 652.5
$ 395.9	$ 97.4	$ 34.4	$ 50.9	$ 68.8	$ 647.4

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.

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

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.

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.