



Regional Economic Models, Inc.

**The Potential Economic Impact of the Innovation
Technology Loan Fund**

January 12, 2021

Prepared by

North Dakota Department of Commerce

Using

Regional Economic Model Policy Insight

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Executive Summary

This report contains an economic impact analysis of the Innovation Technology Loan Fund (LIFT) on the North Dakota economy. As of August 2020, the LIFT initiative has disbursed \$14.05 million in the 2019-2020 biennium year. The North Dakota Department of Commerce utilized the Regional Economic Model Policy Insight (REMI PI*) to forecast the state level's economic impacts over the next five years, beginning in 2020. The economic impacts include increases in the state economy size (as measured by the state gross domestic product (GDP) and output); payroll creation (as measured by wages and salaries); and new jobs created (as measured by employment). The estimated impacts are substantial, and the findings of this analysis are outlined below.

The analysis projected that from 2020-2024, the average annual economic impacts from the increase in LIFT funding for North Dakota in a given year would be:

- An annual average increase of 748 jobs across all industries, with 698 jobs occurring in the private non-farm industries, and 60% of the 698 jobs occurring in the technology industry.
- The annual average impact on the state economy is projected to increase by \$151 million in economic output and \$92 million in the GDP.
- The annual average impact on the state employee compensation is estimated to increase by \$49 million in personal income and \$56 million in earnings by place of work.

Introduction

The LIFT initiative has approved 94 percent (\$14.05 million) of the appropriated funds (\$15 million). The program has also provided funding for 18 North Dakota businesses in specific sectors outlined in House Bill 1333¹. The following table illustrates the dollar amount funded in 2020, the remaining dollar commitment in 2021, and the number of employees reported by the sub-sector.

Table 1: The Disbursement of the LIFT Funds by Sub-sector

Sub-Sector	Dollar Amount Awarded	Dollars Funded in 2020	Remaining Commitment	Direct Jobs Reported	Projected Direct Jobs
Agriculture Technology	\$6,100,000	\$5,312,500	\$787,500	257	317
Healthcare Technology	\$3,100,000	\$2,238,240	\$861,760	61	118
Unmanned Aerial Systems	\$2,350,000	\$1,611,321	\$738,679	9	0
Advanced Computing and Data Management	\$2,000,000	\$2,000,000	\$0	3	8
Value Added Agriculture	\$500,000	\$200,000	\$300,000	0	6

Source: Economic Development and Finance, North Dakota Department of Commerce

The REMI PI+ model requires that the investment spending (i.e., the dollar amount funded) and direct jobs reported are entered as input variables during the years that investment occurs. As such, the analysis applies three different assumptions about the effect that the dollar amount funded, investment expenditure schedule, and the projected direct jobs at the application time would have on the investment capital spending across three categories; (i) the non-residential structures, (ii) non-residential equipment, and (iii) non-residential intellectual property products in North Dakota.

Assumption 1: The LIFT program contributed \$11.4 million in 2020 and \$2.7 million in 2021 to the investment capital spending and as a result:

- Investment spending increased due to increased LIFT funding. This increase was split proportionally between three investment spending categories: (i) the non-residential structures, (ii) non-residential equipment, and (iii) non-residential intellectual property products.

Assumption 2: The LIFT awardees expended \$11.4 million in 2020 and \$2.7 million in 2021 on investment expenditures and as a result:

- Investment capital spending increased by \$11.4 million in 2020 and \$2.7 million in 2021. That is the amount funded in 2020 and the remaining dollar commitment in 2021. The investment expenditure amount was split proportionally between three investment spending categories: (i) the non-residential structures, (ii) non-residential equipment, and (iii) non-residential intellectual property products.

Assumption 3: The LIFT awardees expended \$11.4 million in 2020 and \$2.7 million in 2021 on investment expenditures and as a result:

- The LIFT awardees met their projected direct employment after 24 months in 2021 which remained the same through 2024.

¹More info can be found by visiting [House Bill 1333](#)

Methodology

The main idea behind economic impact analysis is that one more (or less) dollar spent in a local or regional economy results in a greater than one dollar change in economic activity in the area. The most common and widely respected method of examining such changes involves using economic models called input-output models. A key feature of input-output models is that they are ideally suited to capture the interdependence among different industries. That is, input-output models are designed to capture the effects of a change in one industry on other industries and households. The Department of Commerce utilized version 2.4 of the REMI PI+ model. Briefly, the REMI PI+ model is a sophisticated regional economic model that dynamically simulates the year-by-year economic effects of public policy initiatives and is widely used by state agencies and legislatures, universities, and other organizations and experts. The REMI model is also tailored to North Dakota using data from the Bureau of Census, the Bureau of Economic Analysis, the Bureau of Labor Statistics, the Energy Information Administration, and other reliable data sources².

Economic Impact Results

This section presents the estimated economic impacts on the state GDP, employee compensation/payroll creation across all private non-farm industries (personal income, earnings by place of work, wages, and salaries), new jobs created in private non-farm industries, and sales tax revenue from private non-farm industries for the five year projection period. The Glossary section in Appendix B provides definitions of these economic performance measures.

Gross Domestic Product

Table 1 shows the economic impacts on state GDP and output. During 2020-2024, on average, the state GDP is projected to increase by \$92 million. This increase is related to a rise in the total output of \$151 million. While the REMI model lacks customization that allows the projection of state revenues, this increase in the output mostly represents taxable sales for North Dakota.

Table 1: Economic Impacts on the State Gross Domestic Product

Economic Performance Measure	Units	2020	2021	2022	2023	2024	Average
Gross Domestic Product	Millions of Current Dollars	\$68	\$72	\$101	\$108	\$112	\$92
Output	Millions of Current Dollars	\$110	\$117	\$167	\$177	\$184	\$151

Source: REMI PI+ and author's calculations

Employment

Table 2 depicts the employment impacts in private non-farm industries. During 2020-2024, the average annual total employment impact across all industries increases by 748 jobs, with an annual average of 425 direct jobs and 323 indirect jobs. This estimate consists of full- and part-time workers.

²A more detailed discussion of the methodology framework applied to this study is provided in Appendix I.

Table 2: Economic Impacts on the State Employment

Economic Performance Measure	Units	2020	2021	2022	2023	2024	Average
Total Employment	Individuals (Jobs)	620	598	830	843	850	748
Private Non-Farm Employment	Individuals (Jobs)	593	560	\$777	780	781	698

Source: REMI PI+ and author’s calculations

Payroll Creation

Table 3 demonstrates the economic impacts on the state payroll creation. Earnings, wages, and salaries also increase noticeably, representing additional wealth created for the state's citizens. During 2020-2024, the projected average impact on wages and salaries is \$41 million, driven almost entirely by the growth in labor income derived from the jobs created across all industries. These results suggest wages per job of \$54,800, including both the direct and multiplier employment.

Table 3: Economic Impacts on the State Payroll Creation

Economic Performance Measure	Units	2020	2021	2022	2023	2024	Average
Personal Income	Millions of Current Dollars	\$35	\$37	\$53	\$57	\$62	\$49
Wages and Salaries	Millions of Current Dollars	\$31	\$31	\$45	\$48	\$50	\$41
Earnings by Place of Work	Millions of Current Dollars	\$43	\$43	\$61	\$65	\$68	\$56

Source: REMI PI+ and author’s calculations

Conclusion

This study provides an economic impact assessment of the LIFT initiative. Specifically, the study summarizes the potential economic impact of the \$14.05 million loans disbursed in the 2019-2020 biennium year. The study also examines employment growth at 18 businesses that received funding from the LIFT program and the annual personal income associated with these new jobs. The growth of these businesses and the resulting increase in direct annual economic activity is the basis for estimating the economic impact. Multiplier impacts are also assessed and added to the direct impacts to estimate the total annual economic impact. The 18 businesses will also have a significant total economic impact. The annual average total impact on the state GDP is projected to be \$92 million and \$41 million in wages and salaries. The annual average employment impact is estimated to be 748 jobs. This finding implies that the innovative, growing businesses supported by the LIFT program provide high wage employment.

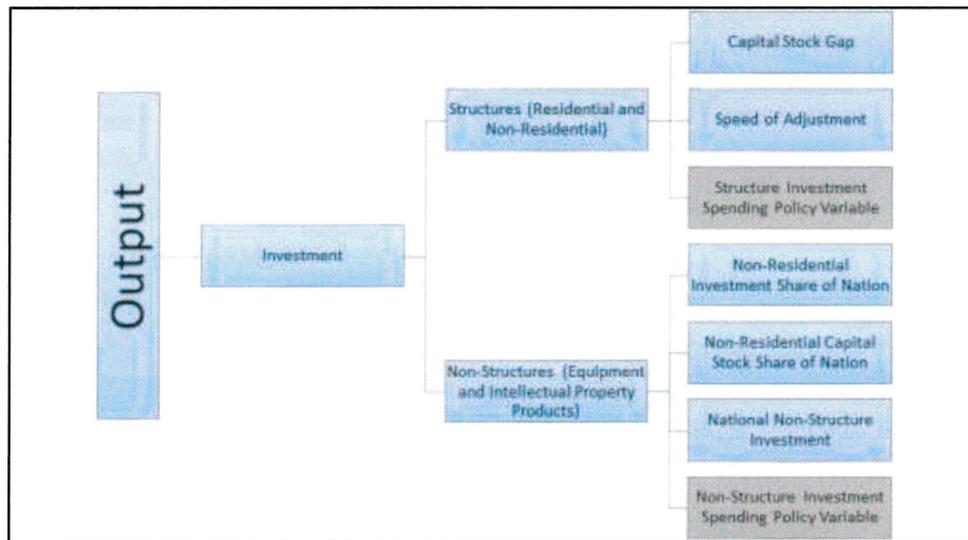
Appendices

Appendix A - Overview of the REMI PI+ Model

REMI’s PI+ software is a regional simulation of the North Dakota economy. The model is tailored to North Dakota using data from the Bureau of Census, the Bureau of Economic Analysis, the Bureau of Labor Statistics, and the Energy Information Administration. The model is a regionalized version of a benchmarked national model. The REMI PI+ model is a general equilibrium model with feedback, and thus, the model describes the entire economy as it changes over time. For example, changes in population, demographics, and wages each influence the labor supply at any moment in time. Still, they are themselves affected in the future by the changes in the labor supply. These adjustments happen gradually, so the economy does not statically jump from one equilibrium to another.

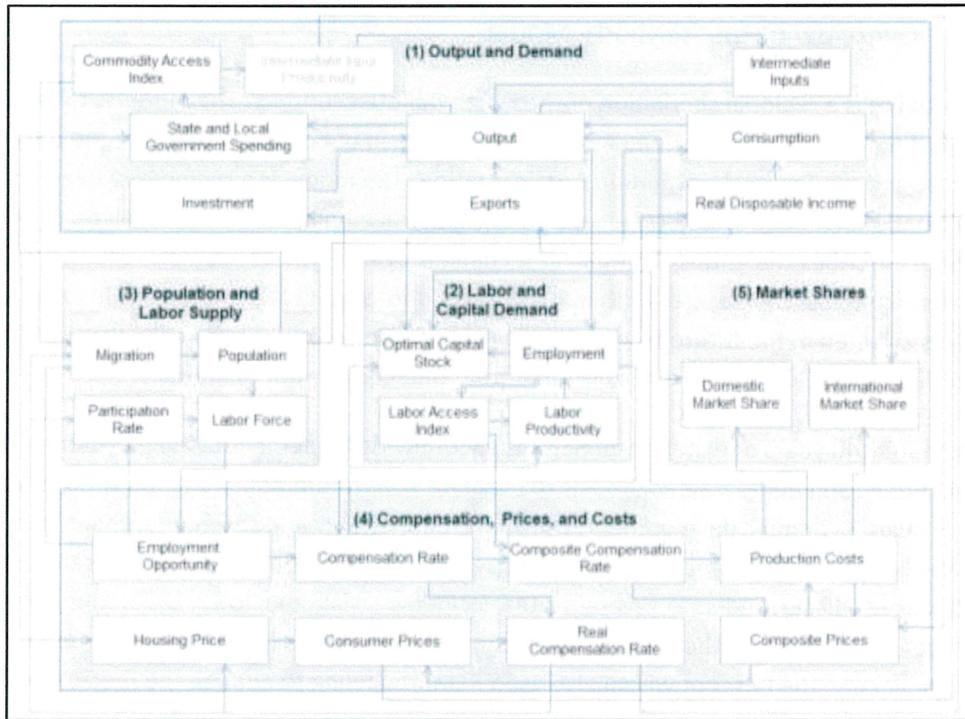
With approximately 40 years of experience, REMI is a worldwide leader in providing dynamic regional U.S. macroeconomic and demographic models to evaluate health care policy and many other policy issues such as taxes, economic development, transportation, energy and the environment, and trade. REMI consultative services and modeling software have been utilized on several health care policy studies, including Medicaid studies in several states, including Oklahoma, Iowa, Ohio, Maryland, and North Carolina. Our partners on those included the American Hospital Association and George Washington University, the latter of whom also used REMI modeling to analyze the impacts of repealing the Affordable Care Act.

Figure 1
REMI Model Linkages for Investment Spending



Source: REMI PI+ Model Equations 2020

Figure 2
REMI Model Linkages (Excluding Economic Geography Linkages)



Source: REMI PI+ Model Equations 2020

Appendix B - Glossary

Employment:

Employment comprises estimates of the number of jobs, full-time plus part-time, by place of work for all industries. Full-time and part-time jobs are counted at equal weight. Employees, sole proprietors, and active partners are included, but unpaid family workers and volunteers are not included.

Gross Domestic Product:

GDP is the market value of goods and services produced by labor and property in the United States, regardless of nationality.

Output:

The amount of production, including all intermediate goods purchased and value added (compensation and profit). It can also be thought of as sales or supply. Output components are Self Supply and Exports (Multi regions, Rest of Nation, and Rest of World).

Personal Income:

This is income received by persons from all sources. It includes income received from participation in production as well as from government and business transfer payments. It is the sum of compensation of employees (received), supplements to wages and salaries, proprietors' income with inventory valuation adjustment (IVA) and capital consumption adjustment (CCAdj), rental income of persons with CCAdj, personal income receipts on assets, and personal current transfer receipts, less contributions for government social insurance.

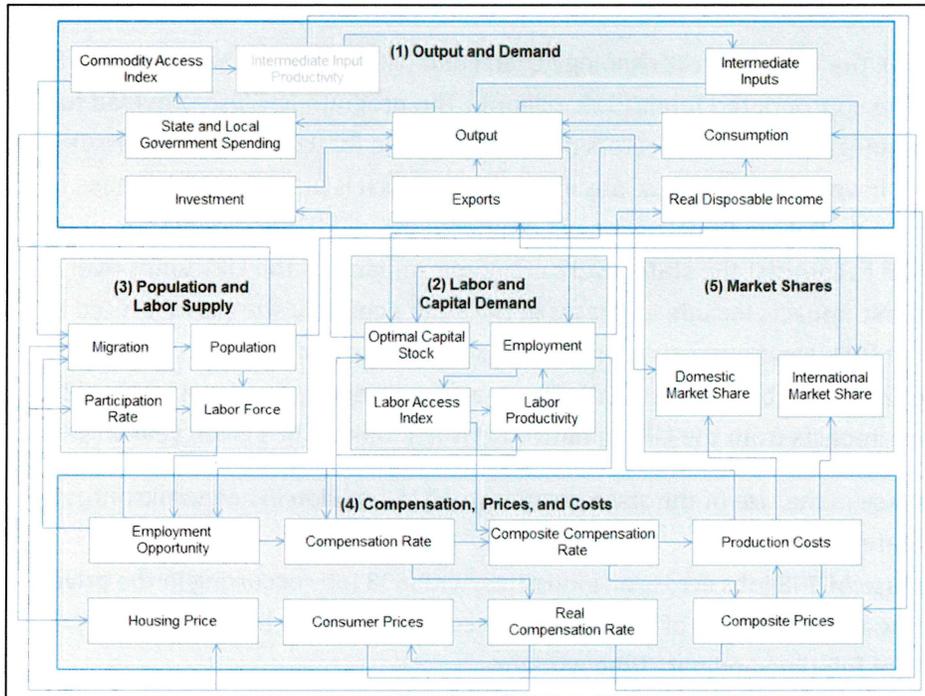
Wages and Salaries:

The monetary remuneration of employees, including the compensation of corporate officers; commissions, tips, and bonuses; voluntary employee contributions to certain deferred compensation plans, such as 401(k) plans; and receipts in kind that represent income.

Earnings by Place of Work:

The sum of Wages and Salaries, Supplements to Wages and Salaries, and Proprietors' Income.

Figure 1: REMI Model Linkages (Excluding Economic Geography Linkages)



Source: REMI PI+ Model Equations 2020

Assumptions

Assumption 1: The LIFT program contributed \$11.4 million in 2020 and \$2.7 million in 2021 to the investment capital spending and as a result:

- Investment spending increased due to increased LIFT funding. This increase was split proportionally between three investment spending categories: (i) the non-residential structures, (ii) non-residential equipment, and (iii) non-residential intellectual property products.

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- The LIFT awardees met their projected direct employment after 24 months in 2021 which remained the same through 2024.

Economic Impacts from the Innovation Technology Loan Fund

As of August 2020, the Innovation Technology Loan Fund (LIFT) initiative has approved \$14.05 million (94 percent) of the appropriated funds (\$15 million)¹. The program has also provided funding for 18 North Dakota businesses in specific sectors outlined in House Bill 1333. The businesses participating in the LIFT program have added 330 new jobs in the state, which is projected to increase by 36 percent in 24 months. The North Dakota Department of Commerce utilized the Regional Economic Model Policy Insight (REMI PI+)² to forecast the state level's economic impacts of the LIFT funds over 2020-2024. The projected economic impacts include increases in the state economy size (as measured by the state gross domestic product (GDP) and output); payroll creation (as measured by wages and salaries); and new jobs created (as measured by employment). The analysis projected that from 2022-2026, the average annual economic impacts from the LIFT initiative for North Dakota in a given year would be:

- An increase in the size of the state economy of \$151 million in economic output and \$92 million in the State GDP.
- An increase of 748 jobs across all industries, with 698 jobs occurring in the private non-farm industries and 60 percent of the 698 jobs occurring in the technology industry. This estimate consists of full-time and part-time workers.
- An increase of \$49 million in personal income and \$41 million in wages and salaries, driven almost entirely by the growth in labor income derived from the jobs created across all industries. These results suggest wages per job of \$54,800, including both direct and indirect employment.

Methodology

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¹For more information, contact Carla Valentine at crvalentine@nd.gov

²Regional Economic Models, Inc. (REMI) is an independent company with offices in Amherst, MA and Washington, D.C. that provides non-partisan economic analysis and modeling software to its clients, who include federal, state, and local government agencies, non-profit organizations, universities, and private companies.