

The Economic Contribution of Maine's Heating Fuel Industry: 2018

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With economic modeling by
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Summary of Findings

Almost 400,000 Maine households (73%) use fuel oil, kerosene, or propane as their primary source of heat.ⁱ In a typical year, over two-hundred and fifty million gallons of heating fuel and kerosene, and over 140 million gallons of propane are delivered to Maine residential homes and commercial businesses.ⁱⁱ In 2017, the delivery of fuel products and the maintenance of heating equipment at Maine homes and businesses directly supported almost 5,000 jobs and over \$250 million in annual payroll in Maine’s heating fuel industry.ⁱⁱⁱ In addition, Maine’s heating fuel companies purchased supplies and equipment from local vendors and employees spent their wages in the local economy, supporting additional jobs and earnings. In total, the economic activity associated with Maine’s heating fuel industry supported over 9,500 jobs and \$440 million in earnings to the Maine economy. This income resulted in an estimated \$25 million in state tax revenue and \$11 million in property tax revenue.

Economic Contribution of Maine’s Heating Fuel Industry

	Jobs	Earnings
Direct Contribution	4,960	\$255m
Indirect Contribution	1,470	\$57m
Inducted Contribution	3,080	\$132m
Total Contribution	9,510	\$443m
Multiplier	1.9	1.7

Introduction and Methodology

In Fall 2018, the Maine Energy Marketers Association (MEMA) asked Stepwise Data Research to quantify the economic footprint of Maine’s heating fuel industry. This report answers two primary questions:

1. How many jobs are in Maine’s heating fuel industry?
2. What is the overall economic contribution of Maine’s heating fuel industry, in terms of employment and wages?

To answer these questions, Stepwise relied on a range of specialized public and proprietary secondary data sources, a survey and selected interviews of MEMA members, and customized economic models of Maine’s economy maintained by the Center for Business and Economic Research (CBER) at the University of Southern Maine (USM). A discussion of the estimation procedures, surveys and interviews, and economic models are provided in the Appendices.

Definitions

Maine’s Heating Fuel Industry: Maine’s heating fuel industry encompasses all of the companies that deliver heating oil, kerosene, or propane to Maine homes and businesses and/or sell and maintain the equipment used to heat these homes and businesses. Some companies are “full-service,” meaning they sell and deliver the heating fuel as well as maintain the heating equipment; other companies only deliver fuel or only service equipment. This definition excludes companies in the business of bulk fuel storage.^{iv}

Region: Maine’s heating fuel industry includes companies and employees statewide, in each of Maine’s sixteen counties. Likewise, the economic model used to quantify the total economic contribution of the industry is a statewide model that reflects the overall Maine economy.

Economic Contribution: The total economic contribution of the heating fuel industry is the sum of the direct, indirect, and induced economic activities associated with the heating fuel industry. The economic contribution can also be thought of as the economic “footprint” of the industry in the Maine economy.

- The “direct economic contribution” reflects all employees and earnings for those workers who are directly employed by companies within the industry;
- The “indirect economic contribution” captures the economic activity that occurs when heating fuel companies purchase intermediate goods and services from local vendors and suppliers, who in turn purchase goods and services from other suppliers, all in support of final sales in the heating fuel industry;
- The “induced economic contribution” accounts for spending in the local economy as employees of the heating fuel industry and their suppliers spend a portion of their paychecks on food, rent, cell phones, and other goods and services.

Datasources: To quantify the economic contribution of Maine’s heating fuel industry, a multitude of datasources were used, including publicly available data from Maine’s Department of Labor (DOL) on employment, wages, and business operations; technician licensing data from the Maine Professional and Financial Regulation department; commodity shipping data from the US Census; an online survey to members of the Maine Energy Marketers Association as well as several interviews of the leaders of Maine’s largest heating fuel companies; and two economic models of the Maine economy, EMSI^v and REMI.^{vi} More information is available in the appendix.

Results

How many jobs are in Maine’s heating fuel industry?

In 2017, Maine’s heating fuel industry directly employed almost five thousand workers statewide,^{vii} with the largest concentration of employees working for fuel dealers followed by heating contracting companies (Table 1). Collectively, these employees were paid almost \$220 million in wages, indicating an average wage of \$44,400/year, slightly higher than the statewide average of \$43,900. Their overall earnings, including healthcare and other benefits, exceeded \$255 million.^{viii}

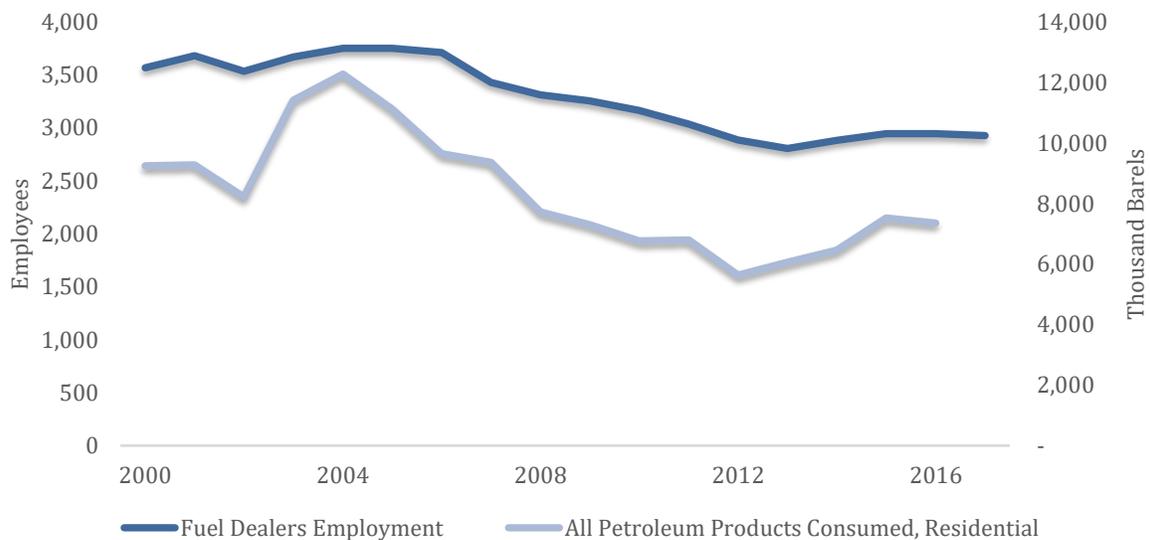
Table 1: Employment and Wages in the Heating Fuel Industry

	Employment	Wages	Earnings
Fuel Dealers + Distributors	3,210	\$139,732,000	\$162,054,000
Heating Contractors	1,620	\$74,667,000	\$86,595,000
Specialized Freight	140	\$5,593,000	\$6,486,000
Total	4,960	\$219,992,000	\$255,135,000

Shifts in energy consumption patterns by Maine households have contributed to a decline in industry employment levels in recent years. Employment by Fuel Dealers, the largest sector in the heating fuel industry,

has fallen roughly 18% since 2000,^{ix} consistent with a 20% decline in the overall consumption of petroleum products in the residential sector.^x During this same time period, the share of homes using fuel oil or propane has declined from roughly 85% of all Maine households to 73% today^{xi} and residential natural gas consumption has more than doubled.^{xii} Although energy forecasts suggest this trend will continue especially in urban areas with natural gas access, growth in the number of households switching away from heating fuel may slow as the environmental effects of new low-sulfur heating oil now rivals natural gas, efforts to address natural gas pipeline constraints in New England remain delayed, and oil prices remain competitive. Still, improvements in energy efficiency, meager statewide population growth, and limited new home construction will likely continue to put downward pressure on heating fuel related employment growth going forward.

Chart 1: Employment Over Time



What is the overall economic contribution of Maine’s heating fuel industry in terms of employment and wages?

To more fully describe the economic activity associated with the heating fuel industry, an input-output model of the state economy (EMSI) was used to follow the industry’s direct spending impact as it cycles through the economy. Spending by heating fuel companies becomes revenue to other businesses in the state such as automotive repair shops, landscaping companies, accountants, and more, and those businesses in turn purchase supplies from other businesses. In essence, the EMSI model follows this spending as it “multiplies” through the Maine economy. These supply-chain sales linkages constitute the industry’s indirect contribution to the Maine economy.

In addition to business-to-business relationships, payroll spending becomes earnings to employees both at heating fuel companies and at the businesses downstream, who in turn spend some of these earnings on goods and services in the local economy on groceries, home improvements, cell phones, and more. The consumer-spending linkages flowing from heating fuel companies’ payrolls constitute its

induced contribution to the region's economy. Both the indirect and induced contributions are added to the direct contribution to derive the industry's total economic contribution.

Incorporating the indirect and induced economic effects, the total economic activity associated with the heating fuel industry includes more than 9,500 jobs and \$440 million in earnings (Table 2).^{xiii} This indicates employment and earnings multipliers of 1.9 and 1.7, respectively, meaning, for example, that for every 100 jobs in the heating fuel industry, another 90 jobs are supported elsewhere in the economy.

Table 2: Economic Contribution of the Heating Fuel Industry

	Jobs	Earnings
Direct Contribution	4,960	\$255m
Indirect Contribution	1,470	\$57m
Inducted Contribution	3,080	\$132m
Total Contribution	9,510	\$443m
Multiplier	1.9	1.7

The \$440 million in earnings associated with the economic activity of the heating fuel industry generates roughly \$11 million in property taxes, \$10 million in sales taxes, and \$15 million in state income taxes. These estimates are based on the most recent tax incidence rates from Maine Revenue Services^{xiv} which calculate the amount of taxes paid by Maine residents as a percentage of income for each tax category.

Table 3: Taxes Associated with Maine's Heating Fuel Industry

	Property	Sales	Income
<i>Earnings of \$440m</i>			
Tax Incidence (MRS)	2.4%	2.2%	3.5%
Tax Revenue	\$10.7m	\$9.7m	\$15.3m

The employment and earnings multipliers also reflect the multitude of industries and occupations that interact with Maine's heating fuel industry, either through supply chain purchases or through their employees' spending. Chart 2 details the share of jobs in industries in the heating oil industry's supply chain (that is, their indirect economic contribution). The industries with the most jobs supported by spending in the heating fuel industry are real estate rental and leasing, primarily land and buildings; administrative support, which includes cleaning, billing, and waste disposal companies; and professional services, which includes accountants, lawyers, computer services, marketing and more.

Chart 2: Indirect Employment Contribution (Supply-Chain)

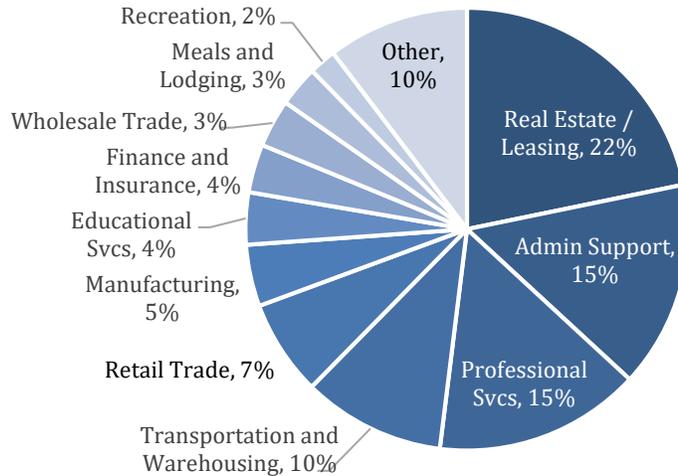


Chart 3 details employment in the industries associated with spending by employees in the heating fuel industry and their suppliers. This is the induced contribution of the heating fuel industry. The distribution of induced jobs roughly follows the pattern of the overall economy, with the largest share of jobs in healthcare; local government, which includes public schools; meals and lodging; and retail trade.

Chart 3: Induced Employment Contribution (Households)

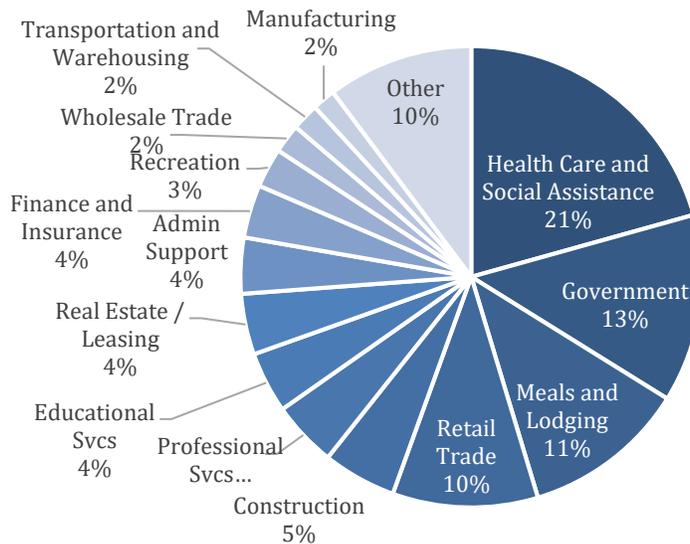
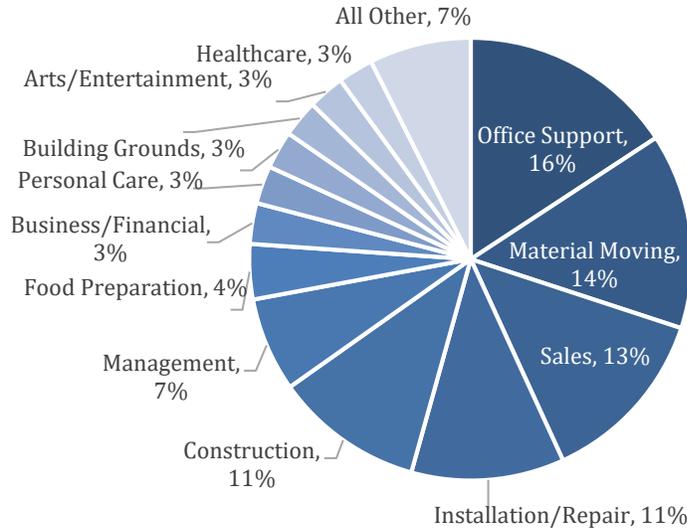


Chart 4 lists the occupations related to the total economic footprint of the heating fuel industry, including the direct, indirect, and induced effects. It illustrates that occupations associated with the heating fuel industry are primarily “middle-skill” jobs, including Office Support workers, drivers (“Material Moving”), and technicians (“Installation/Repair”).

Chart 4: Occupations, Total Economic Contribution



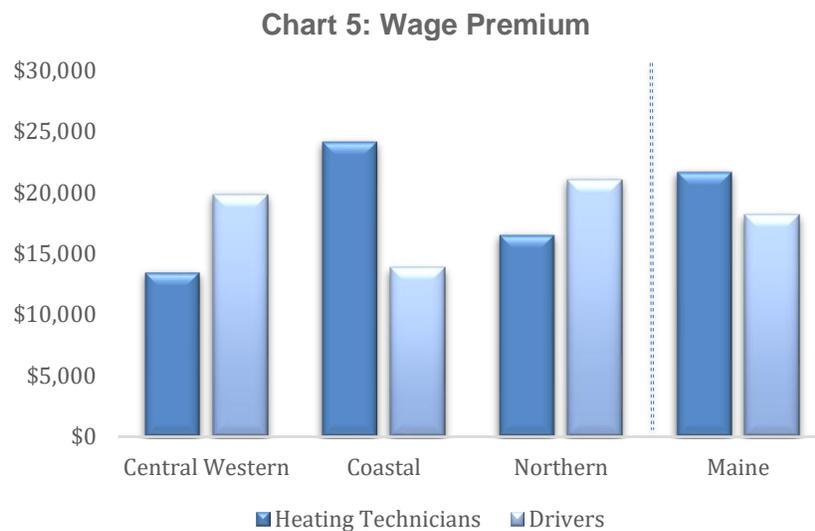
The Heating Industry Workforce

Workforce retention and skill building are an important priority for businesses in the heating fuel industry, particularly in the context of Maine’s population and demographic challenges. Like most other sectors in the state, the heating fuel industry will need to find ways to recruit and replace a workforce that is rapidly aging with the next generation of younger workers. More than half of the workers employed in the heating fuel industry are over age 45. The heating fuel industry has a similar age distribution as the overall Maine economy, but with a higher percentage in the 45-54 age group.^{xv}

Chart 6: Age Distribution



Experienced workers in Maine’s heating fuel industry enjoy a significant wage premium. Based on labor market data on occupational wages, an experienced heating technician can earn almost \$22,000 more in annual salary (\$10.40 more per hour) compared to an entry-level technician, and an experienced heavy-truck driver can earn \$18,000 more (\$8.70/hour) compared to an entry-level driver.^{xvi} Premiums for experience vary across the state, with the largest premium for experienced heating technicians in Maine’s coastal counties, and the largest premium for experienced drivers in northern and western Maine.



Survey respondents indicated that virtually all of these jobs include healthcare benefits (95%) and 88% include a retirement plan. A high percentage directly employed in the industry have a post-secondary credential of some kind, including a technician’s license or commercial driver’s license. In addition, an estimated 10% have a 2- or 4-year degree. 90% of survey respondents indicated an investment in employee training or workforce development in the most recent year.

In addition to paying good wages with benefits, many businesses in the industry are engaged with other efforts that will help address workforce challenges. Survey respondents indicated a high level of community involvement: ninety-five percent indicated supporting youth programming or sports; 85% volunteered in the community; and two-thirds devoted time towards community economic development initiatives.

Appendices

Methodology to estimate direct employment and wages

To quantify the economic contribution of Maine’s heating fuel industry, several analytical methods were undertaken:

- Publicly available data from Maine’s Department of Labor on employment and wages for four industries^{xvii} in Maine were analyzed: heating fuel dealers, petroleum distributors, heating equipment contractors (residential and non-residential), and specialized freight delivery companies.
- Information from the Employer Locator program^{xviii} was used to exclude companies in the equipment contracting industry engaged exclusively in plumbing. Licensing data from the Maine Professional and Financial Regulation department^{xix} for plumbers and heating technicians was used to further exclude employees who may work for a company in the heating fuel industry but who are essentially plumbers, not heating technicians. Ultimately, an estimated 33% of employees in NAICS codes 238221 and 238222 were deemed to be in the heating fuel industry.
- Data from the US Census Commodities Shipment Program^{xx} was used to identify the proportion of employment and wages in the specialized trucking industry exclusively associated with heating fuel. 9.2% of the total value of all commodities shipped by truck within Maine was fuel oils (this does not include gasoline). A corresponding 9.2% of employment in the specialized freight industry (NAICS code 484220) was attributed to the heating fuel industry.
- Self-employment data was incorporated based on several public data sources including the American Community Survey, the Non-employer Survey, and the Bureau of Economic Analysis, and compiled by EMSI. The self-employment data primarily affected employment in the heating equipment contractors industry, and to a lesser extent the fuel dealers industry. EMSI estimated 60 self-employed workers in the Fuel Dealers industry; 850 in the equipment contracting industry, of which 280 were attributed to the heating fuel industry (33%, see explanation above); and 77 in the specialized freight industry, of which 7 jobs were attributed to the heating fuel industry (9.2%, see above).
- The ratio of compensation to wages was derived from EMSI modeling for the overall heating fuel industry and equaled 116%. In other words, the cost of benefits equaled 16% of wages. This ratio was assumed to be constant across the four industries.

	Total Industry			Heating Fuel Industry, Only		
	Employment	Wages	% Allocation	Employment	Wages	Earnings
Fuel Dealers	2,990	\$126,774,000	100%	2,990	\$126,775,000	\$147,027,000
Petroleum Distributors	220	\$12,958,000	100%	220	\$12,958,000	\$15,028,000
Plumbing/Heating Contractors	4,930	\$227,426,000	33%	1,620	\$74,667,000	\$86,595,000
Specialized Freight	1,500	\$61,056,000	9%	140	\$5,593,000	\$6,486,000
			TOTAL	4,960	\$219,992,000	\$255,135,000

Survey and Interviews

In addition to the publicly available data, a custom online survey was sent to members of the Maine Energy Marketers Association, and several interviews were conducted of the leaders of Maine’s largest heating fuel

companies. The survey and interviews provided context and quality control to the publicly available data listed above. All MEMA members in the heating fuel industry were sent an online survey with 14 questions about their employment, payroll, and operations, for a total of 99 surveys successfully delivered. The survey was administered following general best practices, including an initial introductory email from the president of MEMA, followed by the survey, three follow-up reminders from Stepwise, and two additional reminders directly from the president of MEMA. In addition, a representative from Stepwise spoke at two MEMA board meetings to encourage participation. 24 responses were received for a response rate of 24%. In addition to the survey, interviews of three of the largest fuel dealers in the state were conducted. Information from the survey and interviews were not used in the economic contribution analysis, per se, but rather to provide additional context and validity for the results. While the survey responses were not used in the economic contribution model, their results affirmed the estimates of employment and wages. Both the total number of jobs and gallons delivered represented by survey respondents were half of the total jobs estimated through the data and process described above; using this ratio to scale the survey responses on compensation to the total industry indicated total compensation within 1% of the estimate of compensation used in the analysis, and an average wage within 4%. (Survey question available upon request).

Economic Models

Two economic models of the Maine economy were used to estimate the multiplicative effect of the employment and wages in the heating fuel industry as they ripple through the Maine economy in the form of additional jobs and earnings. Results from the EMSI economic model, a traditional input-output framework, was primarily used to quantify the economic contribution of the heating fuel industry, while REMI, a more dynamic long-term forecasting model, was used to validate and refine the EMSI model.

The EMSI input-output model is based on their 2018 fourth quarter dataset and gravitational flows multi-regional social account matrix model (MR-SAM). The underlying data includes the Census Bureau's Current Population Survey and American Community Survey, the Bureau of Economic Analysis' National Income and Product Accounts, Input-Output Make and Use Tables, and Gross State Product data, several proprietary EMSI datasets, and data from Oak Ridge National Labs on the cost of transportation between counties.

The REMI model uses many of the same datasets as EMSI but is more complex as it layers in additional econometric techniques. For this study, the REMI model was used to validate the EMSI model. Because REMI is a dynamic model, a multi-year average is used to allow for the demand and response to cycle through the effects. The results in the table below are consistent with and validate the EMSI results.

More information about EMSI can be found at <https://www.economicmodeling.com/>.
 More information about REMI can be found at <https://www.remi.com/>.

Economic contributions - REMI		5 Year Average
Category		Number
Direct employment	Individuals (Jobs)	4,959
Indirect & induced employment	Individuals (Jobs)	4,048
Total employment	Individuals (Jobs)	9,007
Total earnings	Millions of Fixed (2017) Dollars	\$411.547
Total output (sales)	Millions of Fixed (2017) Dollars	\$1,197.716

Endnotes

ⁱ US Census American Community Survey, 2017; 61.3% of households use fuel oil or kerosene; 11.5% of households use propane

ⁱⁱ Energy Information Agency; eia.gov; In 2016, 227 million gallons of #2 distillate fuel oil and 14 million gallons of kerosene were consumed by the residential sector, 48 million gallons of #2 fuel oil was consumed by the commercial sector, and 143 million gallons of propane was consumed by the residential and commercial sectors. Over the past four years, the average year experienced consumption of 200 million gallons of fuel oil and 9.5 million gallons of kerosene in the residential sector, 49 million gallons of fuel oil in the commercial sector, and 143 million gallons of propane in both sectors.

ⁱⁱⁱ The economic contribution estimates are for the year 2017.

^{iv} The employment and wage estimates are based on the Maine Department of Labor, Quarterly Census of Employment and Wages, 2017. The following industries and North American Industry Classification (NAICS) codes were included in the analysis: Fuel Dealers 454310; Petroleum and Petroleum Products Merchant Wholesalers (except Bulk Stations and Terminals), 424720; Specialized Freight (except Used Goods) Trucking, Local, 484220; Residential plumbing and HVAC Contractors, 238331; Nonresidential plumbing and HVAC contractors, 238222. Note that Petroleum Bulk Stations and Terminals 424710 was excluded from the analysis. Fuel dealers and Petroleum Wholesalers were aggregated together for ease of reading, as were residential and non-residential plumbing and heating contractors. As with many economic contribution studies, a primary analytical challenge of this analysis was to accurately identify the companies and workers directly involved in the heating fuel industry and exclude those who are not. For example, while plumbers and heating technicians are often grouped together in labor market data and in some cases may for the same company, this analysis is concerned only with heating technicians. Likewise, only a portion of the specialty trucking industry may be involved with heating fuel. A diverse set of datasources (listed above) were used in an attempt to identify only those companies and employees directly working in the heating fuel industry.

^v EMSI, 2018.Q4; <https://www.economicmodeling.com/>, see appendix for more information

^{vi} REMI, 2018; <https://www.remi.com/>

^{vii} Employment is based on the Maine Department of Labor, Quarterly Census of Employment and Wages, which counts both full-time and part-time jobs. As such, it is not necessarily a count of individuals, but may include some employees who have multiple part-time jobs in the industry.

^{viii} Based on the EMSI economic model, compensation equals 116% of wages.

^{ix} Maine Department of Labor, Quarterly Census of Employment and Wages, 2017 vs. 2000

^x Energy Information Agency, eia.gov, 2016 vs. 2000

^{xi} US Census American Community Survey, 2017 vs. US Census 2000

^{xii} Energy Information Agency, eia.gov, 2016 vs 2000

^{xiii} The number of jobs include both full- and part-time employees. The indirect and induced economic contributions were estimated by Ryan Wallace, Director of the Center for Business and Economic Research at the University of Southern Maine using the EMSI economic model.

^{xiv} Maine Revenue Services, "Maine State Tax Expenditure Report 2016-2017 and Maine Tax Incidence Study"

^{xv} EMSI, 2018.4

^{xvi} Maine Department of Labor, Occupational Employment and Wages, 2017; This is broadly consistent with the online survey to MEMA members: survey respondents indicated an average premium of \$10,000/year (\$5/hour) for an experienced fuel delivery driver compared to an entry-level driver, and a premium of \$14,000/year (\$7/hour) for an experienced heating equipment technician compared to an entry level technician.

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- ^{xvii} Fuel Dealers 454310; Petroleum and Petroleum Products Merchant Wholesalers (except Bulk Stations and Terminals), 424720; Specialized Freight (except Used Goods) Trucking, Local, 484220; Residential plumbing and HVAC Contractors, 238331; Nonresidential plumbing and HVAC contractors, 238222.
- ^{xviii} Maine Department of Labor Center for Workforce Research and Information, Interactive Employer Locator; <https://www.maine.gov/labor/cwri/employers.html>
- ^{xix} Maine Professional and Financial Regulation;
<https://www.pfr.maine.gov/almsonline/almquery/welcome.aspx>
https://www.maine.gov/pfr/professionallicensing/license_search.html
- ^{xx} US Census Commodity Flow Survey; <https://www.census.gov/programs-surveys/cfs.html>