

## **Petroleum Transmission & Distribution Workforce in Louisiana**

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The LSU Division of Economic Development and Forecasting is an applied economics research group within the Department of Economics in the E. J. Ourso College of Business at Louisiana State University. We conduct a variety of economics-related research spanning topics in labor, environmental, health, and regional economics.

Five years ago, our group at LSU began working with the Louisiana Workforce Commission (LWC) to improve the state's employment forecast. This process is a part of the State and Local Employment Projections program funded by the U.S. Department of Labor's Employment and Training Administration (ETA). After Hurricane Katrina, it became clear that the process used by most states to forecast employment was subject to significant bias in Louisiana because of the large fluctuations in employment brought on by Hurricane Katrina. We began developing a more robust approach to forecasting employment that better accounted for historical aberrations in the data, but also incorporated forward looking information from an annual survey of large employers and review of large-scale economic developments. Through this process, we have been able to develop a forecast that is generally seen within the state to provide more accurate results not only for industries, but at the level of specific occupations.<sup>1</sup> This employer outreach has also given us much greater insight into some of the unique workforce challenges facing the energy sector in the coming years.

### ***Recent Workforce Trends in the Energy Sector***

At a time when the energy sector would have already been facing significant workforce challenges due to the demographics of the existing workforce, the sector is experiencing an economic renaissance that compounds these workforce challenges. Upstream energy firms have shown rapid growth in recent years with the expansion of shale gas exploration and production. This activity has more than doubled employment nationally in oil and gas extraction and the related support activities from 2003 to 2013.<sup>2</sup> During this time of rapid growth, average hours and earnings have crept up with average weekly hours reaching 45 in oil and gas extraction and 48 in support activities for oil and gas operations. These trends indicate that this early energy boom has resulted in a tight labor market for many of the types of workers who will be critical to meeting future labor demand throughout the rest of the energy sector.

We are now at the leading edge of a boom in downstream manufacturing precipitated by the low price of natural gas. In Louisiana alone, over \$50 billion of capital investment is expected to reach the state

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<sup>1</sup> The employment forecast is subject to review by a panel of outside experts including industry representatives and econometricians and requires approval and acceptance by the state's Workforce Investment Council. A record of these public meetings is available at [http://www.laworks.net/PublicRelations/WIC\\_Main.asp](http://www.laworks.net/PublicRelations/WIC_Main.asp).

<sup>2</sup> Employment in oil and gas extraction (NAICS 211000) and support activities for oil and gas operations (NAICS 213112) have grown from a combined 241,400 in 2003 to 494,700 in 2013. Bureau of Labor Statistics. *Current Employment Statistics, 2003-2013*. Web. 20 May 2014.

within the next five years. Investments through 2015 are large enough to move statewide employment growth (1.8 percent per year) above the national trend of about 1.1 percent per year.

- Louisiana employment in Heavy & Civil Engineering Construction is projected to grow from approximately 40,850 to 56,900, an annual average increase of 13.1 percent.
- Louisiana employment in Specialty Trade Contractors is projected to grow from 61,900 to 78,940, an annual increase of 9.2 percent.

This construction is creating a sharp increase in demand for the skilled craft workers needed to carry out this work. The economic opportunity has already focused the efforts of state policy makers in responding to the challenges by expanding those training and education programs in highest demand. However, the need to repair, replace and expand the petroleum transmission and distribution network will further strain these education and workforce training programs as midstream companies compete with upstream and downstream companies for many of the same types of workers.

### ***Measuring Demand: Transmission Storage & Distribution (TS&D) Occupations***

The following list includes occupations that are in high demand within TS&D-relevant industries (see Appendix 1 for the 2015 and 2022 Louisiana forecasts by occupation including estimated demand for replacing retired workers by occupation):

- General and Operations Managers (SOC 11-1021)
- Cost Estimators (SOC 13-1051)
- Civil Engineers (SOC 17-2051)
- Electrical Engineers (SOC 17-2071)
- Health and Safety Engineers (SOC 17-2111)
- Mechanical Engineers (SOC 17-2141)
- Mechanical Drafters (SOC 17-3013)
- Geological and Petroleum Technicians (SOC 19-4041)
- Carpenters (SOC 47-2031)
- Construction Laborers (SOC 47-2061)
- Operating Engineers and Other Construction Equipment Operators (SOC 47-2073)
- Plumbers, Pipefitters, and Steamfitters (SOC 47-2152)
- First-Line Supervisors of Mechanics, Installers, and Repairers (SOC 49-1011)
- Industrial Machinery Mechanics (SOC 49-9041)
- Maintenance Workers, Machinery (SOC 49-9043)
- First-Line Supervisors of Production and Operating Workers (SOC 51-1011)
- Welders, Cutters, Solderers, and Brazers (SOC 51-4121)
- Petroleum Pump System Operators, Refinery Operators, and Gaugers (SOC 51-8093)
- Inspectors, Testers, Sorters, Samplers, and Weighers (SOC 51-9061)
- Laborers and Freight, Stock, and Material Movers, Hand (SOC 53-7062)

### *Demand in the Transmission, Storage & Distribution (TS&D) Sector and Related Industries*

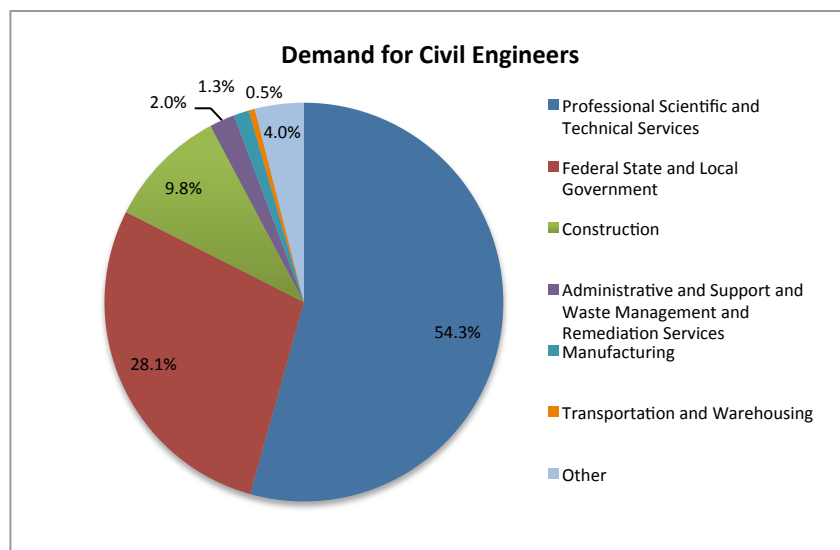
The industries (and associated North American Industry Classification System, or NAICS, codes) most relevant to this sector are

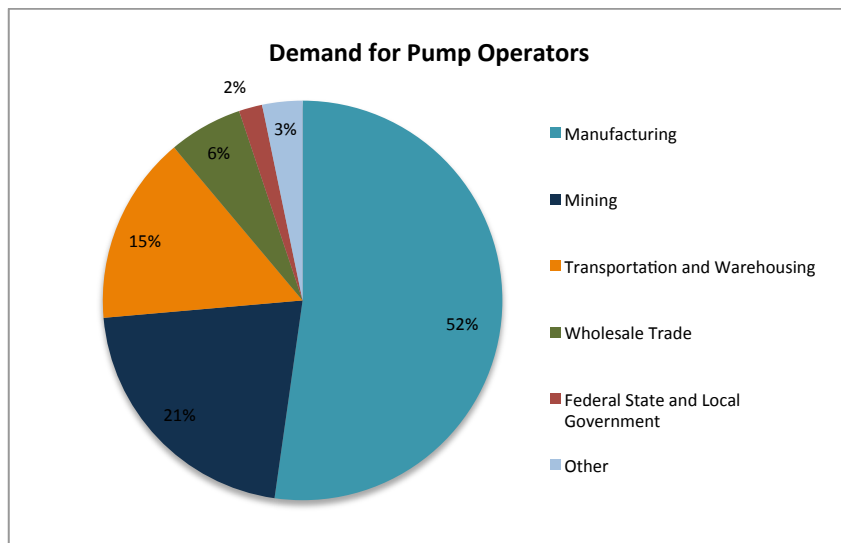
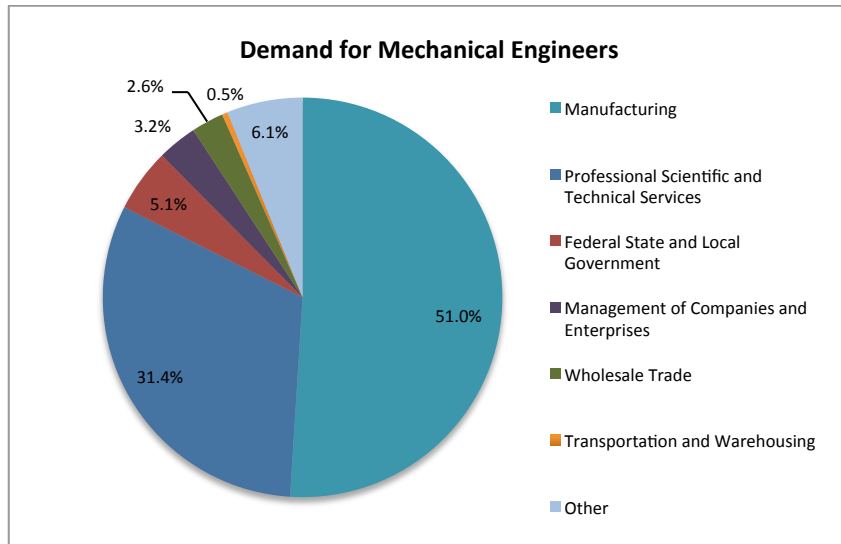
- Pipeline Transportation of Crude Oil (NAICS 486100)
- Pipeline Transportation of Natural Gas (NAICS 486200)
- Oil & Gas Pipeline and Related Structures Construction (NAICS 237120)

However, some TS&D activity and employment will also appear in closely related industries. Many of these related industries are also undergoing a similar combination of increased retirement and overall expansion. These industries will be competing for the same workers making the solution to the TS&D challenges one that is inherently linked to the broader workforce challenge facing the entire energy sector. Those industries hiring a large number of workers to occupations in high demand within the TS&D sector are

- Oil & Gas Extraction (NAICS 211000)
- Support Activities for Mining (213000)
- Petroleum & Coal Products Manufacturing (324100)
- Petrochemical Manufacturing (325110)
- Iron & Steel Pipe and Tube Manufacturing from Purchased Steel (331210)
- Rail Transportation (482000)
- Truck Transportation (484000)
- Support Activities for Transportation (488000)

The following charts provide examples of how the high demand TS&D occupations are distributed across a wider set of industries (Appendix 2 for a full summary of the distribution of workers in these high demand occupations across industries).





### ***Measuring Labor Supply and Shortages***

While reliable data is available for Louisiana demand, accurately measuring supply and linking that data to demand poses additional challenges that have not yet been solved. LSU and LWC were awarded a Workforce Data Quality Initiative grant by ETA to develop a data system that can be used to address this gap in knowledge. Preliminary work on this topic has revealed that the link between education programs and occupations is varied and complex with many occupations attracting graduates from a surprisingly large number of education programs and vice versa. Additional research on this topic is needed to make demand forecasts an actionable policy tool.

**Appendix 1: Louisiana Employment Forecast for High Demand TS&D Occupations**

<b>SOC Title</b>	<b>SOC Code</b>	<b>2012 LA Employment</b>	<b>10-year New LA Growth</b>	<b>10-year LA Replacement</b>	<b>10-year LA Total Openings</b>
LA, All Occupations	00-0000	2,004,830	259,660	498,840	758,500
General and Operations Managers	11-1021	31,060	4,790	5,810	10,600
Cost Estimators	13-1051	2,470	500	800	1,300
Civil Engineers	17-2051	3,960	890	1,010	1,900
Electrical Engineers	17-2071	1,100	180	220	400
Health and Safety Engineers	17-2111	780	120	280	400
Mechanical Engineers	17-2141	2,580	440	860	1,300
Mechanical Drafters	17-3013	1,050	70	130	200
Geological and Petroleum Technicians	19-4041	1,070	170	430	600
Carpenters	47-2031	18,510	2,800	5,600	8,400
Construction Laborers	47-2061	23,700	3,490	5,810	9,300
Operating Engineers and Other Construction Equipment Operators	47-2073	9,430	1,340	3,060	4,400
Plumbers, Pipefitters, and Steamfitters	47-2152	8,040	1,120	1,980	3,100
First-Line Supervisors of Mechanics, Installers, and Repairers	49-1011	9,000	1,120	2,480	3,600
Industrial Machinery Mechanics	49-9041	6,890	2,250	1,950	4,200
Maintenance Workers, Machinery	49-9043	2,320	450	250	700
First-Line Supervisors of Production and Operating Workers	51-1011	10,420	1,110	1,490	2,600
Welders, Cutters, Solderers, and Brazers	51-4121	14,590	2,050	4,450	6,500
Gas Plant Operators	51-8092	630	80	220	300
Petroleum Pump System Operators, Refinery Operators, and Gaugers	51-8093	5,920	440	2,160	2,600
Inspectors, Testers, Sorters, Samplers, and Weighers	51-9061	7,550	1,570	1,630	3,200
Laborers and Freight, Stock, and Material Movers, Hand	53-7062	39,440	6,180	12,220	18,400

**Appendix 2: Distribution of Workers in High Demand TS&D Occupations Across Industries**

SOC Code	SOC Title	Freq	Industry
11-1021	General and Operations Managers	15.1%	Retail Trade
		14.5%	Manufacturing
		12.4%	Wholesale Trade
		9.5%	Construction
		8.3%	Health Care and Social Assistance
		4.3%	Transportation and Warehousing
		35.9%	Other
13-1051	Cost Estimators	61.4%	Construction
		13.9%	Manufacturing
		6.2%	Other Services (except Federal State and Local Government)
		4.1%	Professional Scientific and Technical Services
		3.7%	Retail Trade
		0.7%	Transportation and Warehousing
		10.0%	Other
17-2051	Civil Engineers	54.3%	Professional Scientific and Technical Services
		28.1%	Federal State and Local Government
		9.8%	Construction
		2.0%	Administrative and Support and Waste Management and Remediation Services
		1.3%	Manufacturing
		0.5%	Transportation and Warehousing
		4.0%	Other
17-2071	Electrical Engineers	38.0%	Manufacturing
		34.1%	Professional Scientific and Technical Services
		11.0%	Utilities
		5.2%	Federal State and Local Government
		3.8%	Wholesale Trade
		0.2%	Transportation and Warehousing
		7.7%	Other
17-2111	Health and Safety Engineers	29.4%	Construction
		22.8%	Professional Scientific and Technical Services
		17.1%	Federal State and Local Government
		7.5%	Administrative and Support and Waste Management and Remediation Services
		6.7%	Transportation and Warehousing
		16.5%	Other
17-2141	Mechanical Engineers	51.0%	Manufacturing
		31.4%	Professional Scientific and Technical Services
		5.1%	Federal State and Local Government
		3.2%	Management of Companies and Enterprises
		2.6%	Wholesale Trade
		0.5%	Transportation and Warehousing
		6.1%	Other

17-3013	Mechanical Drafters	60.8%	Manufacturing
		25.0%	Professional Scientific and Technical Services
		4.5%	Administrative and Support and Waste Management and Remediation Services
		3.2%	Construction
		3.0%	Wholesale Trade
		0.3%	Transportation and Warehousing
		3.3%	Other
19-4041	Geological and Petroleum Technicians	54.0%	Mining
		28.2%	Professional Scientific and Technical Services
		5.8%	Wholesale Trade
		5.4%	Manufacturing
		2.1%	Management of Companies and Enterprises
		0.9%	Transportation and Warehousing
		3.6%	Other
47-2031	Carpenters	83.8%	Construction
		4.8%	Manufacturing
		3.5%	Administrative and Support and Waste Management and Remediation Services
		1.7%	Federal State and Local Government
		1.5%	Educational Services
		0.2%	Transportation and Warehousing
		4.4%	Other
47-2061	Construction Laborers	26.5%	Real Estate and Rental and Leasing
		20.0%	Manufacturing
		10.8%	Health Care and Social Assistance
		9.6%	Educational Services
		6.8%	Administrative and Support and Waste Management and Remediation Services
		4.0%	Transportation and Warehousing
		22.3%	Other
47-2073	Operating Engineers and Other Construction Equipment Operators	61.3%	Construction
		18.9%	Federal State and Local Government
		9.3%	Mining
		3.2%	Administrative and Support and Waste Management and Remediation Services
		1.6%	Manufacturing
		0.9%	Transportation and Warehousing
		4.8%	Other
47-2152	Plumbers, Pipefitters, and Steamfitters	80.5%	Construction
		4.7%	Federal State and Local Government
		4.2%	Manufacturing
		2.4%	Administrative and Support and Waste Management and Remediation Services
		2.3%	Utilities
		0.4%	Transportation and Warehousing
		5.6%	Other

49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers	14.7% 13.6% 12.7% 12.2% 9.4% 6.4% 31.1%	Retail Trade Other Services (except Federal State and Local Government) Manufacturing Federal State and Local Government Construction Transportation and Warehousing Other
49-9041	Industrial Machinery Mechanics	56.8% 11.8% 10.7% 4.7% 4.5% 2.0% 9.5%	Manufacturing Other Services (except Federal State and Local Government) Wholesale Trade Mining Federal State and Local Government Transportation and Warehousing Other
49-9043	Maintenance Workers, Machinery	63.5% 6.8% 6.4% 4.7% 4.6% 3.8% 10.2%	Manufacturing Wholesale Trade Mining Other Services (except Federal State and Local Government) Federal State and Local Government Transportation and Warehousing Other
51-1011	First-Line Supervisors of Production and Operating Workers	72.8% 4.4% 4.2% 3.5% 2.9% 1.1% 11.0%	Manufacturing Retail Trade Wholesale Trade Federal State and Local Government Other Services (except Federal State and Local Government) Transportation and Warehousing Other
51-4121	Welders, Cutters, Solderers, and Brazers	66.3% 12.7% 5.0% 4.9% 4.8% 0.0% 6.3%	Manufacturing Construction Federal State and Local Government Wholesale Trade Administrative and Support and Waste Management and Remediation Services Transportation and Warehousing Other
51-8092	Gas Plant Operators	51.6% 25.4% 12.6% 4.4% 4.3% 1.8%	Utilities Transportation and Warehousing Mining Federal State and Local Government Manufacturing Other



51-8093	Petroleum Pump System Operators, Refinery Operators, and Gaugers	52.2% 21.4% 15.3% 6.0% 1.9% 3.3%	Manufacturing Mining Transportation and Warehousing Wholesale Trade Federal State and Local Government Other
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	74.0% 8.9% 6.0% 2.5% 1.6% 7.1%	Manufacturing Administrative and Support and Waste Management and Remediation Services Wholesale Trade Transportation and Warehousing Other Services (except Federal State and Local Government) Other
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	23.1% 22.2% 17.0% 14.1% 12.0% 11.7%	Transportation and Warehousing Administrative and Support and Waste Management and Remediation Services Wholesale Trade Retail Trade Manufacturing Other