Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2015

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Prepared for the Propane Education & Research Council (PERC)

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1. Introduction and Summary

1.1. Introduction

Propane is the third most widely used fuel in the U.S. by the number of households, second to electricity and natural gas. All told, propane is used in roughly 50 million American households, with 7.8 million households using propane for in-home heating, 5.5 million of which depend on propane as their primary space heating fuel.[1] In addition, 4.6 million homes use propane for water heating and over 42 million homes use propane for outdoor grilling activities.[2]

In addition to the significant role propane plays in the residential sector, the propane industry directly serves about 900,000 commercial customers, 168,000 industrial customers, and 320,000 agricultural customers.[3] Propane also continues to be the most common internal combustion fuel for forklifts and has rapidly become the third most common fuel for school buses. U.S. internal combustion demand accounts for 10 percent of domestic retail consumption, and ICF estimates that in the U.S. nearly 143,000 vehicles used propane as fuel in 2015.[4]

In recognition of the important role propane plays in the U.S. energy marketplace, the Propane Education & Research Council (PERC) has commissioned ICF to perform what is now the fourth analysis of the impact of the odorized propane industry on the national and state economies. Previous iterations of the report were released in 2004 (reporting estimates for 2002), in 2011 (reporting estimates for 2009), and in 2014 (reporting estimates for 2012).[5,6,7] As with past releases, the focus of this report is to estimate the aggregate GDP impacts due to propane industry activity, as well as the contribution of the odorized propane industry to employment and wages both on the national level and from a state-by-state perspective.

Following record cold weather experienced during the 2013/14 winter Polar Vortex, 2015 was the second warmest year recorded in the U.S. Lower 48, second only to 2012.[8] The warm weather impacted consumption across all sectors, with particularly pronounced declines in consumption in the residential sector for space heating, and in the agricultural sector for grain drying. As a result,

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[1] *American Community Survey 2015 1-year estimates*, U.S. Census Bureau, Washington, DC, October 2016.
[2] *Residential Energy Consumption Survey (2015)*, Energy Information Administration, Washington, DC, February 2017.
[3] *2015 Sales of Natural Gas Liquids and Liquefied Industrial Gases*, American Petroleum Institute, Washington, DC January 2017.
[4] *Alternative Fuel Vehicle Data (2011)*, Energy Information Administration, Washington, DC, April 2013.
[5] *Harry Vidas, Bruce Henning, and Bob Hugman, Study of the Propane Industry's Impact on U.S. and State Economics, Energy and Environmental Analysis, Inc., Arlington, VA, November 2004.*
[6] *Wilczewski, Warren; Sloan, Michael, Propane Industry Impact on U.S. and State Economies, ICF, Fairfax, VA, November 2011.*
[7] *Wilczewski, Warren; Sloan, Michael, Propane Industry Impact on U.S. and State Economies, ICF, Fairfax, VA, March 2014.*
[8] *2015 is Earth's warmest year by widest margin on record, National Oceanic and Atmospheric Administration, Washington, DC. Available at: https://www.ncdc.noaa.gov/sotc/summary-info/global/201512*

2015 resulted in the second lowest consumer propane sales in over a decade, with only 2012 sales being lower.

Overall, API reported odorized propane sales increased 9.2 percent between 2012 and 2015, from 7.7 billion gallons to just over 8.4 billion gallons. Roughly 71 percent of this increase can be attributed to increases in residential consumption, primarily driven by colder weather, with some growth in the number of propane heated households in the U.S. Northeast. Total employee count attributed to the odorized propane industry increased 7.6 percent, while payroll expanded 8.4 percent.

1.2. Key Changes from 2012 to 2015

The odorized propane industry's direct economic impact increased to $46.2 billion in 2015 – an increase over the 2012 impact of $40.5 billion. This increase was primarily supported by three key factors:

1. Growth of domestic propane supplies,
2. Increased retail margins of propane retailers, and
3. An increase in total propane consumption.

The growth in the domestic component of the odorized propane market, which is the amount of the propane consumed in the U.S. that was also produced domestically, experienced an increase in value increased from $38.8 billion in 2012 to $45.2 billion in 2015. Over this same time, there was a 44.4 percent increase in domestic propane production.

From 2012 to 2015, the retail margins for propane retailers increased. This increase in retail margins was due to the combination of both a recovery in sales volumes, reducing per-unit fixed costs, as well as retail prices falling at a slower pace than underlying wholesale costs. For instance, from 2012 to 2015 Mont Belvieu propane prices declined 54.8 percent, from 100 ¢/gallon in 2012 to 45.3 ¢/gallon in 2015. While compared to 2012, the EIA's reported 2015 residential heating oil prices averaged 215 ¢/gallon,[9] only a 13% decline from the 247 ¢/gallon average in 2012. Using the EIA SHOPP data, ICF estimates the average retail price of propane in 2015, which accounts sales in other categories and sales during the summer months, averaged 185 ¢/gallon.[10]

From 2012 to 2015 there was a 9.2 percent increase in retail consumption, from 7.74 billion gallons in 2012 to 8.45 billion gallons in 2015. Weather was the dominant factor influencing annual per-household consumption and accounts for the majority of the 505 million gallon increase in residential consumption between 2012 and 2015. In fact, 2015 was the second warmest year on

[9] *The EIA's State Heating Oil and Propane Price (SHOPP) survey reports weekly propane prices for the heating season from October to March. In 2014 the EIA added 16 new states to the SHOPP survey, which may impact direct national residential pricing estimates.*

[10] *The 2015 average residential includes January to March of the 2014/15 winter season and October to December of the 2015/16 winter season. ICF utilizes the residential SHOPP data to estimate prices in other demand sectors of the retail propane industry*

record for the continental U.S., second only to 2012. In fact, temperatures in 2015 were 5.8 percent warmer than the 20-year average, while in 2012 they were 13.1 percent warmer.[11]

Other factors have also impacted overall consumption levels from 2012 to 2015. These include things such as improvements in energy efficiency and fuel switching technologies, which reduce per-household fuel use due to increases in the average fuel efficiency for in-home appliances. The agricultural sector experienced a modest increase from 2012 to 2015, growing by 1.3%, with a reduction in demand from crop drying partially offsetting the growth in demand from other agricultural applications. Demand from internal combustion increased by 7.1% from 2012 to 2015. New propane engine applications and growth of on-road vehicle sales helped to support this sector's growth, which is expected to be one of the retail propane industry's key growth driver in the coming years.

Table 1. Comparison of 2009, 2012 and 2015 Propane Production and Consumption

(Million Gallons)	2009	2012	2015	Change from 2012 to 2015
Domestic Propane Production	12,830	15,154	21,881	44.4%
Propane Imports	1,933	1,303	1,600	22.7%
Propane Exports	1,299	2,625	9,426	259.1%
Propane Consumption	9,598	7,739	8,440	9.1%
Residential	5,565	4,074	4,579	12.4%
Commercial	1,499	1,482	1,619	9.2%
Industrial	501	508	469	-7.7%
Agricultural	484	615	623	1.3%
Internal Combustion	1,188	809	866	7.1%
Resell	361	251	284	13.0%
Heating Degree Days (Annual)	4,423	3,792	4,111	8.4%
Mont Belvieu Propane Price (¢/gallon)	84.06	100.15	45.32	-54.8%

Source: ICF, EIA, API, Bloomberg, NOAA

1.3. Economic Added Value from the Retail Propane Sector

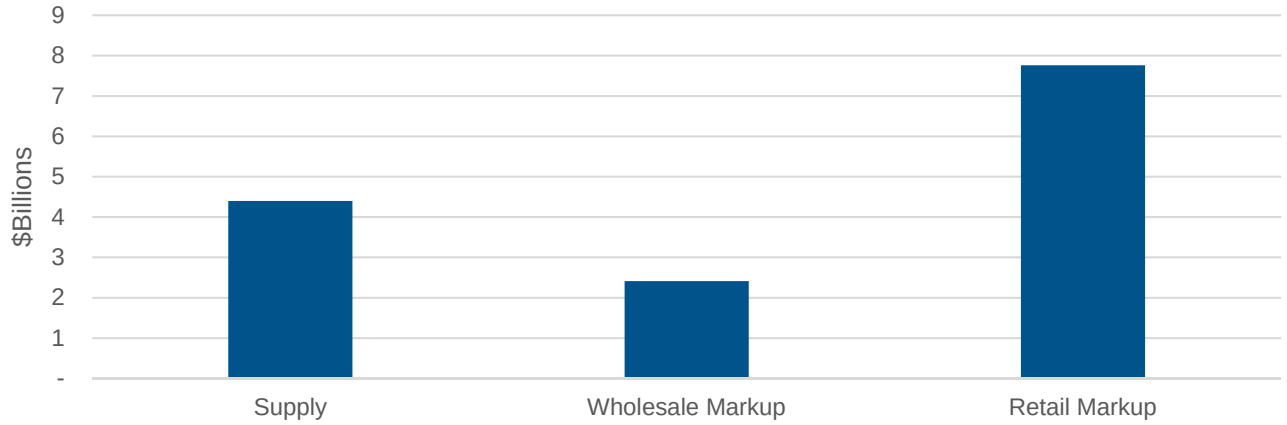
In 2015 the odorized propane sector contributed $14.6 billion in direct added value to the nation's economy. In 2015, roughly 53 percent of the total added value of the odorized propane industry was attributed to the retail portion of the sector, or $7.8 billion, which averaged 92 ¢/gallon sold. This was a 37 percent increase from 2012 levels.

The wholesale sector also experienced an increase in the direct value added to the national economy, also supported by increased sales volumes, contributing $2.4 billion to the U.S. economy

[11] *As defined by the National Oceanic and Atmospheric Administration (NOAA), a heating degree day (HDD)* is "*a quantitative index demonstrated to reflect demand for energy to heat… houses and businesses. Heating degree days are summations of negative differences between the mean daily temperature and the 65°F base; …. For more information, see NOAA's explanation page at http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/cdus/degree_days/ddayexp.shtml*

in 2015, or 21 ¢/gallon sold. The direct added value of the supply segment of the odorized propane sector experienced a 29 percent decline from 2012 levels, contributing $4.4 billion to the U.S. economy.

Figure 1. 2015 Odorized Propane's Total Direct Value Added by Value Chain Component

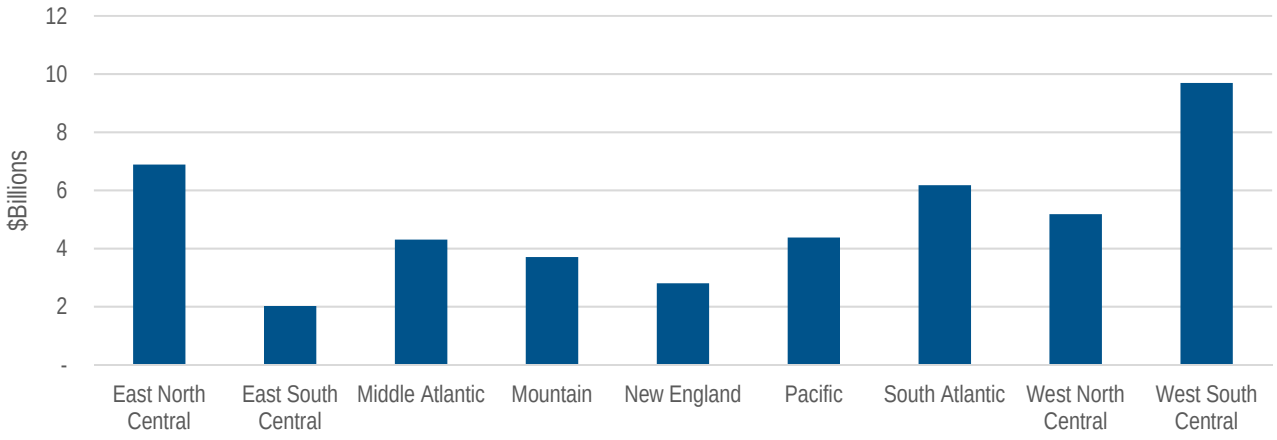


Source: ICF Propane Value Study (2015)

On a geographic basis, the total direct value of the odorized propane sector increased from 2012 to 2015 most dramatically in the Northeast and Midwest regions, with a small increase in the Western U.S. The Southern U.S. experienced a minor decline in the direct economic contribution from the odorized propane sector, which was driven primarily by declines in Texas due to the reduced economic contribution of the supply segment from lower propane prices.

New England saw the added economic value from propane increase 62.3 percent between 2012 and 2015, while the South Atlantic and Middle Atlantic census regions both experienced gains in excess of 40 percent. Due to the decline in value added from propane supply activities such as propane production, processing, and fractionation, the West South Central and Mountain census regions experienced declines in the value contributed from the Odorized (Retail) propane sector.

Figure 2. Odorized Propane's Total (Direct & Indirect) Added Value by U.S. Census Region



Source: ICF Propane Value Study (2015)

1.4. Growth of Domestic Propane Production and Exports

One key factor to the increase in added value of propane to the U.S. economy is due to the expansion of domestically produced and sourced propane, which has also resulted in the U.S. becoming the largest propane exporter in the world. Propane production in the U.S. has increased markedly with the increases in shale gas and associated gas production from U.S. tight oil plays. Additionally, increased oil production from new tight oil plays also has increased the volumes of propane produced from domestically sourced crude oil.

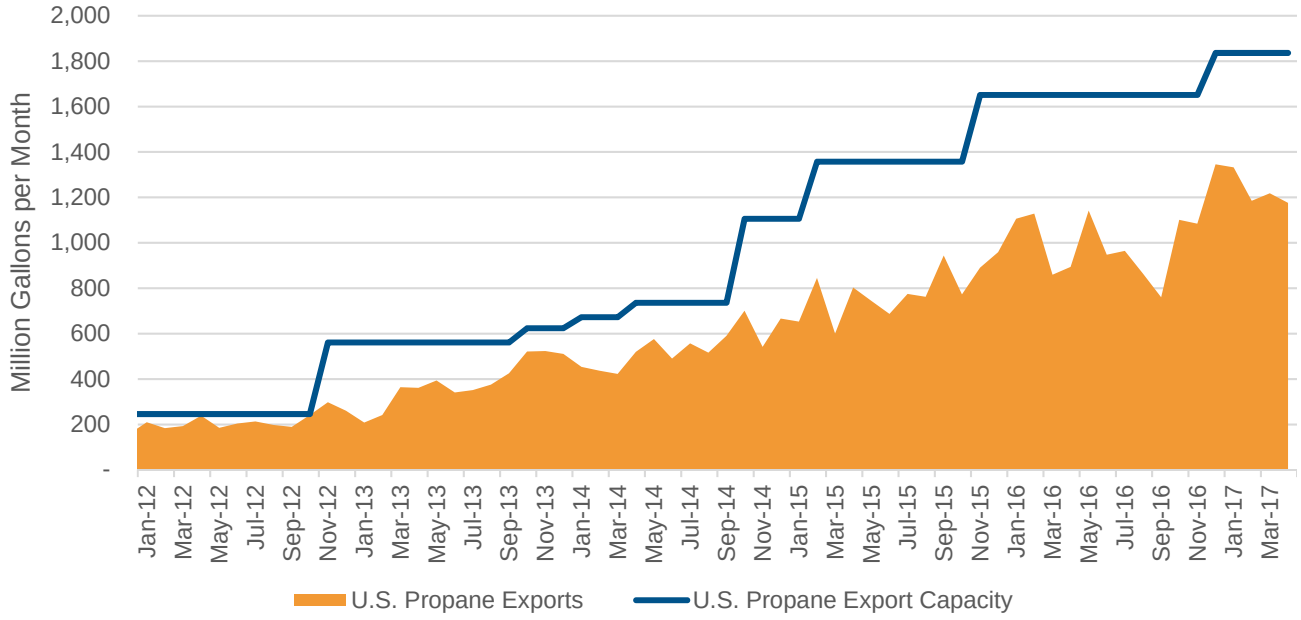
Domestic propane production from gas plant processing has grown 60 percent from 2012 to 2015 to a total of 17.5 billion gallons in 2015. While propane produced from domestic crude oil grew 39 percent, reaching 2.6 billion gallons in 2015. U.S. produced crude in the country's refinery feedstock increased from 43 percent in 2012 to 56 percent in 2015 as a result of growing domestic oil production.

As a result of the growing domestic propane supply, the domestic contribution to the odorized propane industry continues to grow even as imported propane remained relatively stable. The value added from U.S. sourced propane increased from 87 percent in 2012 to 93 percent in 2015. Including Canada, value added in the odorized propane industry attributable to North American labor and resources increased from 92 percent in 2012 to 97 percent in 2015.

The share of the volumes of odorized propane consumed in the U.S. produced from U.S. resources increased from 74 percent in 2012 to 82 percent in 2015. When imports of Canadian purity propane and refining and gas plant feedstock are included, North American contribution to volumes increased from 89 percent in 2012 to 94 percent in 2015, with the remaining propane volume derived from imported crude oil.

Following this rise in propane supply, exports have grown substantially to become the largest source of demand. In 2015, over 9.4 billion gallons of propane were exported, which marked the first year that propane exports have exceeded retail propane consumption. Propane exports are expected to continue to increase both in volume and in the share of domestic production that they support, bolstered by several new major propane export terminals coming online in 2016 that have increased the total U.S. export capacity to 23.3 billion gallons per year. Despite the projected long-term increases in propane exports that these facilities will support, it is expected that there will be significant underutilized capacity in the near-term as markets adjust to changing supply and demand conditions.

Figure 3. Monthly U.S. Propane Export Capacity and Actual Exports



Source: EIA, ICF

1.5. Methodology and Scope of Analysis

To perform a detailed value-chain analysis for odorized propane at the state level ICF took a two-step approach: one, to identify all points along the pathway from the wellhead to the burner tip where value is added; and two, to allocate these values to individual states.

The primary source of propane production and inventory data is the Energy Information Administration (EIA). Because data reported by the EIA is primarily available only at the PADD[12] level, or in some cases at the refining district level[13], the data reported by the EIA was allocated to the state level by ICF. For this task, ICF employed a number of sources, both proprietary and public.

The comingling of various natural gas liquids (NGLs) at several levels of production and transport, as well as the lack of data on the individual components of the NGL-mix, resulted in the need to perform a full sector analysis that evaluated the volume and value chains of all NGL purity products. Through this process ICF was able to arrive at detailed estimates of both the share of total gallons and the share of value attributable to odorized propane. As a result, this study includes value tables for the total NGL complex, as well as the subsets of all propane, odorized propane, butanes, and ethane. By evaluating the full value chain for all liquids and the propane component in particular, the analysis resulted in estimates of the economic impact of odorized propane at the three stages of

[12] The Petroleum Administration for Defense Districts (PADDs) are geographic aggregations of the 50 States and the District of Columbia into five districts: PADD 1 is the East Coast, PADD 2 the Midwest, PADD 3 the Gulf Coast, PADD 4 the Rocky Mountain Region, and PADD 5 the West Coast. Due to its large population, PADD 1 is further divided into sub-PADDs, with PADD 1A as New England, PADD 1B the Central Atlantic States, and PADD 1C comprising the Lower Atlantic States. (Energy Information Administration, available at: http://www.eia.gov/todayinenergy/detail.cfm?id=4890)

[13] Refining Districts are PADD sub-regions, also defined by the Department of Energy. For a detailed description of refining districts, see: http://www.eia.gov/petroleum/supply/monthly/pdf/append.pdf

the supply chain: production, wholesale transport and storage, and retail. That impact, measured in terms of employment, wages, and gross domestic product (GDP) is then allocated at the state level.

1 Production

This study is focused solely on natural gas liquids purity products.[14] This approach, a result of ICF's in-house analysis and the employment of newly-available data sources, allows for a more accurate representation of the impact of the natural gas liquids industry on the U.S. economy. The result is a study that is both more useful to the propane industry and better able to report the value and volume chains of the butanes component of the NGL mix. Leveraging more accurate and complete data sources also allows for a more accurate tracking of product imports into the country, in terms of both quantities of products and ports of entry.

The analysis of propane production includes volumes produced from natural gas feedstocks – via gas processing plants and fractionators— as well as those produced as byproducts of the crude oil refining process. ICF calculations represent the volumes and values of natural gas liquids in the gas processing sector at a more detailed level than in previous studies, primarily by better applying data from both the EIA and internal sources on the raw gas quality produced in the various regions of the country. This approach more accurately credits natural gas liquids (NGLs) entrained in raw gas to those states where production takes place. A similar approach has also been employed to Liquefied Refinery Gases (LRGs) produced in refineries out of domestic and imported crudes. Crudes of varying qualities are credited with different shares of liquids yields, both by U.S. state, and for imported crudes. This data was not available in prior years, and its inclusion again provides for a more accurate assessment of where propane volumes and values are generated at the state level.

2 Midstream

ICF estimates for Midstream contribution to the value added generated by natural gas liquids include all activity in the transportation, storage, and wholesale stage of the value chain. These estimates are based on reported transportation costs of purity and mixed NGLs, reported volumes of product moved on all modes of transportation, and estimates of transport required within states in both upstream production activities and downstream retail activities. These costs are then allocated to the various purities, to propane specifically, and in the end to the odorized propane component of the market. Values allocated to the states include:

- All inter- and intra-state pipeline, surface, and water-borne transport of natural gas liquids. Both gathering lines that carry liquids entrained in raw natural gas and pipelines that move unfractionated raw NGLs are included. Special accounting is also made of liquids moved in dense phase along with natural gas along the Alliance pipeline.
- All activities associated with the shipment of purity propane from production regions to wholesale markets, such as Mont Belvieu and Conway, and on to the consumption centers.
- Accounting is also made of value added by wholesale activities. Value is also allocated to the market balancing services provided by storage operators.

3 Downstream

The retail sector is the largest source of employment directly attributable to the odorized propane industry. It also generates 64 percent of all value added for the retail propane sector and 42 percent for the entire propane sector. LPG dealers are responsible for 98 percent of all value at the retail

[14] Natural Gas Liquids purity products include Ethane, Ethylene, Propane, Propylene, Normal Butane, Iso-Butane, Butylene, and Pentanes Plus.

level, with gasoline stations contributing the remainder, due to their propane sale volumes. Total GDP impact of the retail sector is calculated as the difference between the value of propane at wholesale that is attributed to the odorized propane industry and the value of that same propane at the point of delivery to the customer. The total contribution of the retail industry is then allocated to the states depending on a) that state's share of total gallons sold, and b) the total gallons of propane sold at the consumer level through gasoline stations (this includes gallons attributed to the motor vehicle market as well as propane cylinder sales done through gasoline stations).

Update to Retail Prices Methodology

One key update to the methodology in the 2015 Value Study compared to prior studies is related to assumption and information used to estimate the odorized propane sector's average retail pricing. These differences have been primarily driven by changes in the availability of data.

ICF has expanded the use of pricing information from the EIA's State Heating Oil and Propane Price (SHOPP) pricing data for information on residential and wholesale prices. The EIA's SHOPP service reports weekly residential and wholesale propane prices over the winter heating season (October to March). In 2014, 16 states were added to the survey, increasing the total number of states reported to 38 state, and providing additional coverage to calculate regional and national prices based on propane consumption at the state level.

Prior ICF Propane Value studies has relied on EIA reported retail propane pricing information by each consumption sector (Residential, Commercial, Industrial, Resell), however, this reporting program was suspended in 2010. Due to the fact that this sector level pricing information is now several years out of date, ICF has estimated the retail pricing for each sector based on the underlying SHOPP information for Residential prices and analysis of shipping costs and margin expectations for each of the other retail propane sectors.

1.6. Summary of Results

The basic results of the ICF analysis are shown in a series of value-chain and volume-chain diagrams. The detailed results, including volumes, value and prices for each step in the value chain are shown in Figure 4 through Figure 13.

Explanation of Value/Volume Chain Diagrams

Each of the ten value/volume chain diagrams illustrates the flow of values or volumes for one of the product categories considered: (Odorized Propane, Propane, Propane/Propylene, Ethane, and Total NGLs/LRGs). These diagrams depict the total product supply process, from the wellhead to the burner tip. They are organized horizontally by supply source, with crude oil and refining at the left, natural gas and natural gas processing and fractionation in the center, and imports and inventory changes at the right. Vertically, the diagrams start upstream, indicating the value/volume of inputs. Thus, the top left box contains the value/volume in domestically-produced crude converted to product shown.

The diagrams split out the contribution to the value/volume chain from Canadian resources. Thus, the second box down shows the value in Canadian crude/"wet" natural gas imported into the U.S. and converted to the product shown in the diagram, and the box below sums up domestic and Canadian inputs into a North America total. The fourth box down then adds in non-North American crude to sum up to total value/volume of crude converted to product. LNG imports from outside North America are not processed for NGL extraction.

The column on the right shows the import/export balance. The top box shows the total value/ volume of product exported from the United States. The second box in the Product Imports/ Exports column shows the value/volume of product imports from Canada. Third box down shows the total imports from outside North America, with the box below netting out imports and exports to arrive at the total net imports of product into the U.S.

Net inventory changes for the year, calculated as the difference in inventory levels between January 1st and December 31st of 2015, are not shown. Positive numbers indicate net storage withdrawals, which add to total supply, and therefore to total value/volume contributed to the economy in that year.

The processing, or midstream, section of the diagram shows value added in the refining, natural gas processing, and fractionating stages of NGL/LRG production (the volume chain diagrams do not show Processing and Market Services sector contributions, as these do not add to volume). For refining, this value represents the difference between the Refiner Acquisition Cost of Crude (RACC) and the wholesale value of product on a $/MMBtu basis. A negative number indicates a discount, on a Btu basis, of product to crude price for the year. The processing and fractionation value is the total value added by the natural gas processing industry in the processing of both domestic and Canadian gas (at the Aux Sable plant in Illinois).

Below the processing sector is the market services section, which adds in the value of wholesaling services and retail markup. For wholesaling services, the total is the difference between the supply and wholesale pricing points. Retail services are the final component of the value chain, and represent the difference between the wholesale value of the product and the total retail value at the ultimate point of consumption.

Both the value chain analysis diagram and the volume chain diagram to its right show at bottom the share of domestic and North American value/volume contribution to the total product consumption in the United States.

Figure 4: Value Chain for Odorized Propane (C_3H_8), 2015 (Million Dollars)

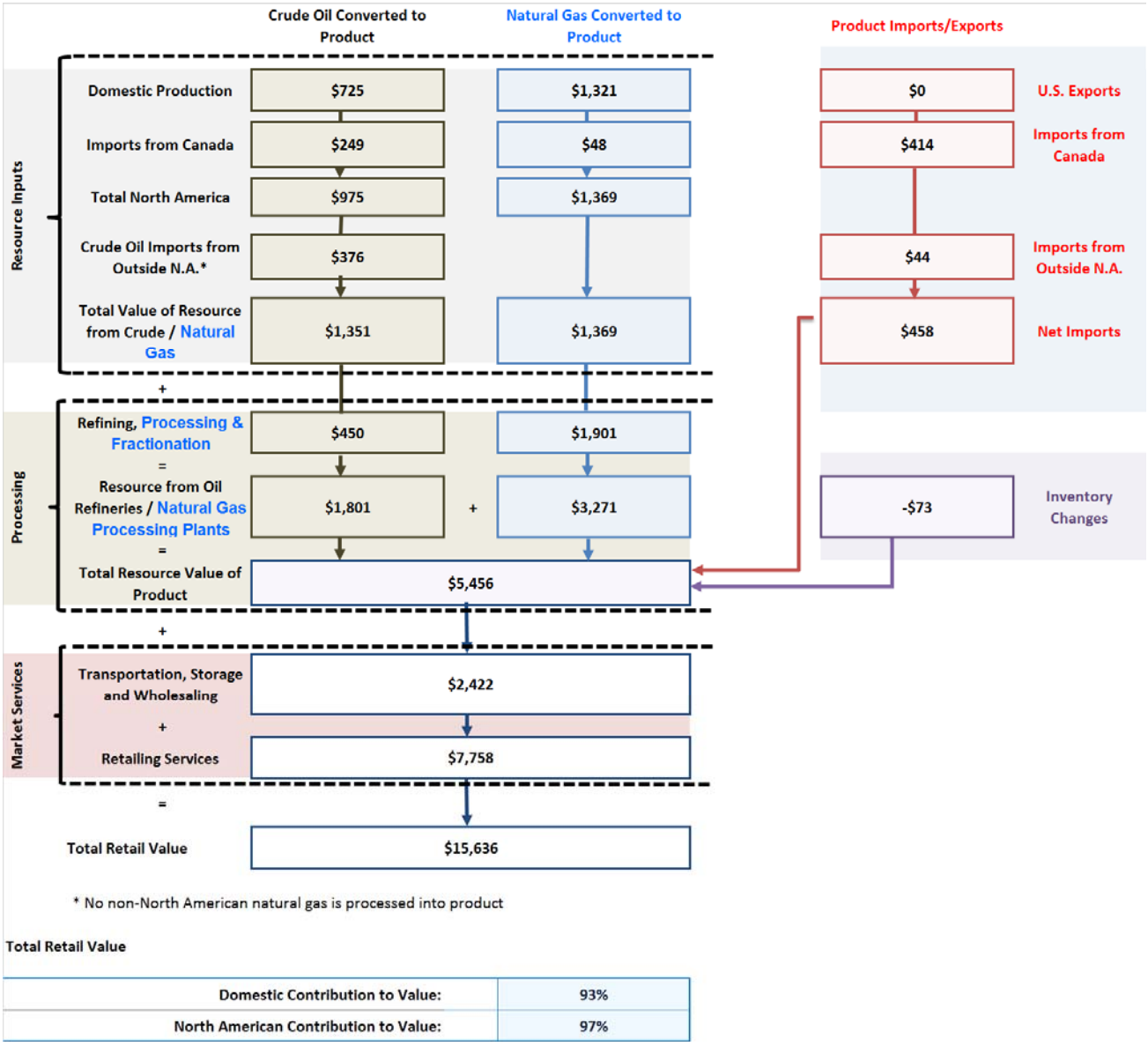
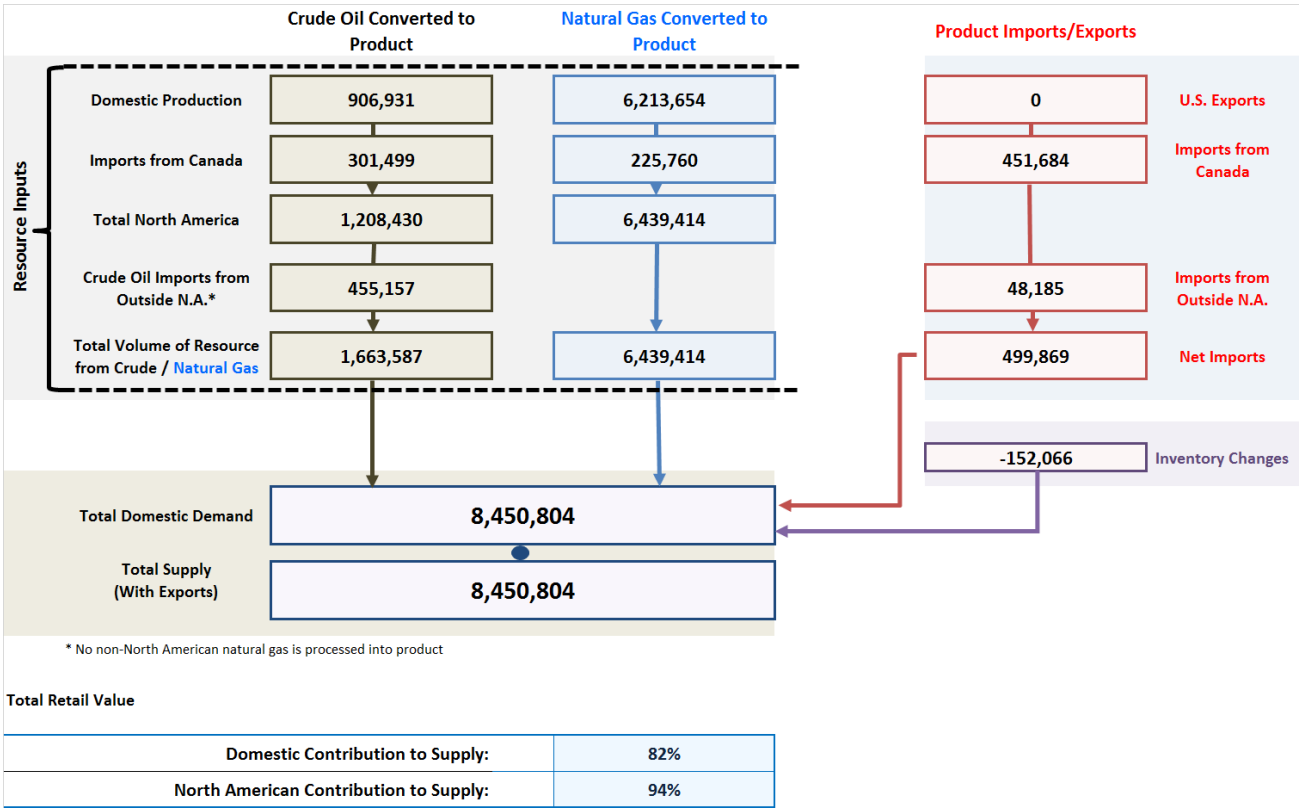


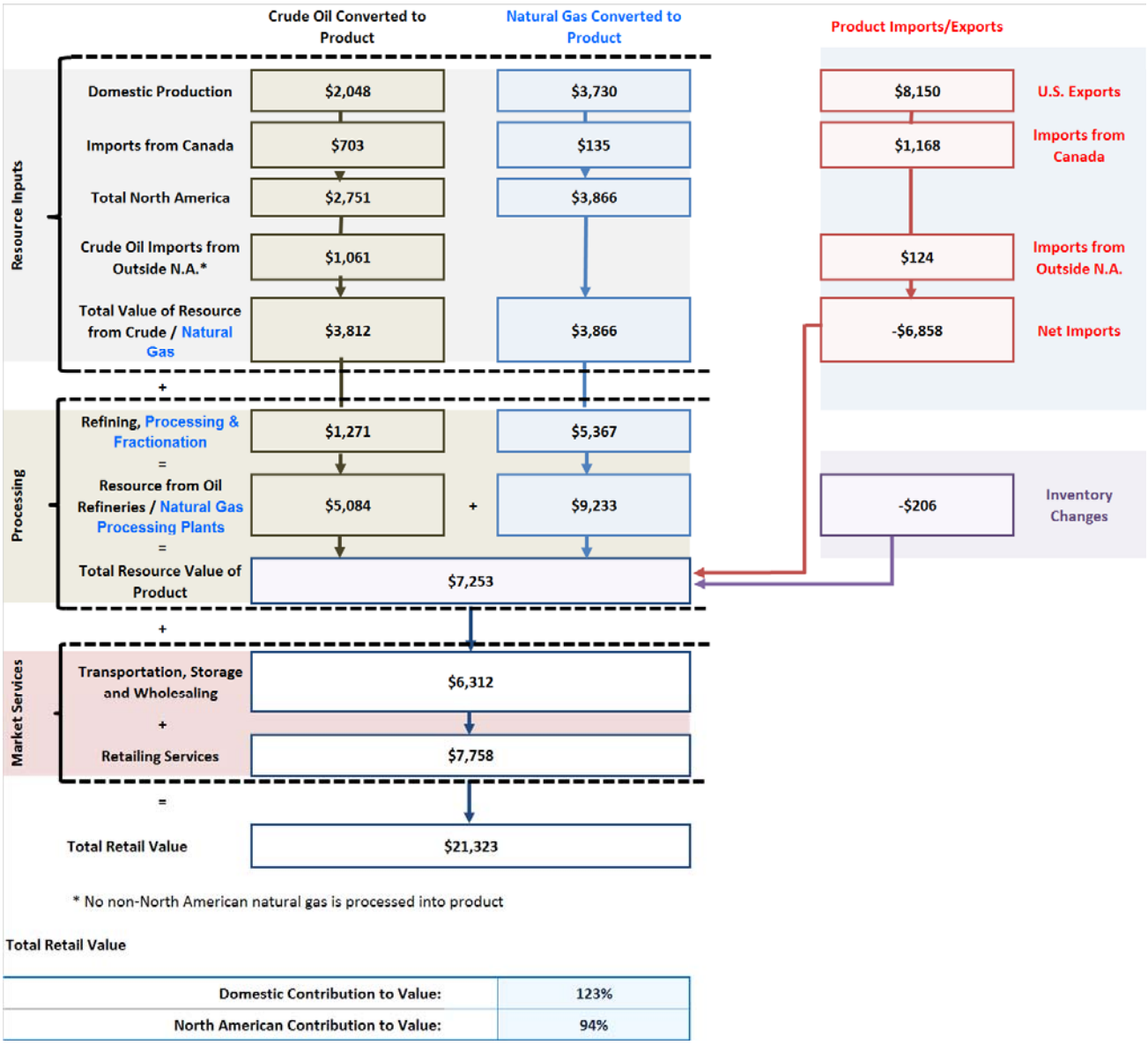
Figure 5: Volume Chain for Odorized Propane (C_3H_8), 2015 (Thousand Gallons)



Total Retail Value

Domestic Contribution to Supply:	**82%**
North American Contribution to Supply:	**94%**

Figure 6: Value Chain for All Purity Propane (C_3H_8), 2015 (Million Dollars)



Total Retail Value

Domestic Contribution to Value:	123%
North American Contribution to Value:	94%

Figure 7: Volume Chain for All Purity Propane (C_3H_8), 2015 (Thousand Gallons)

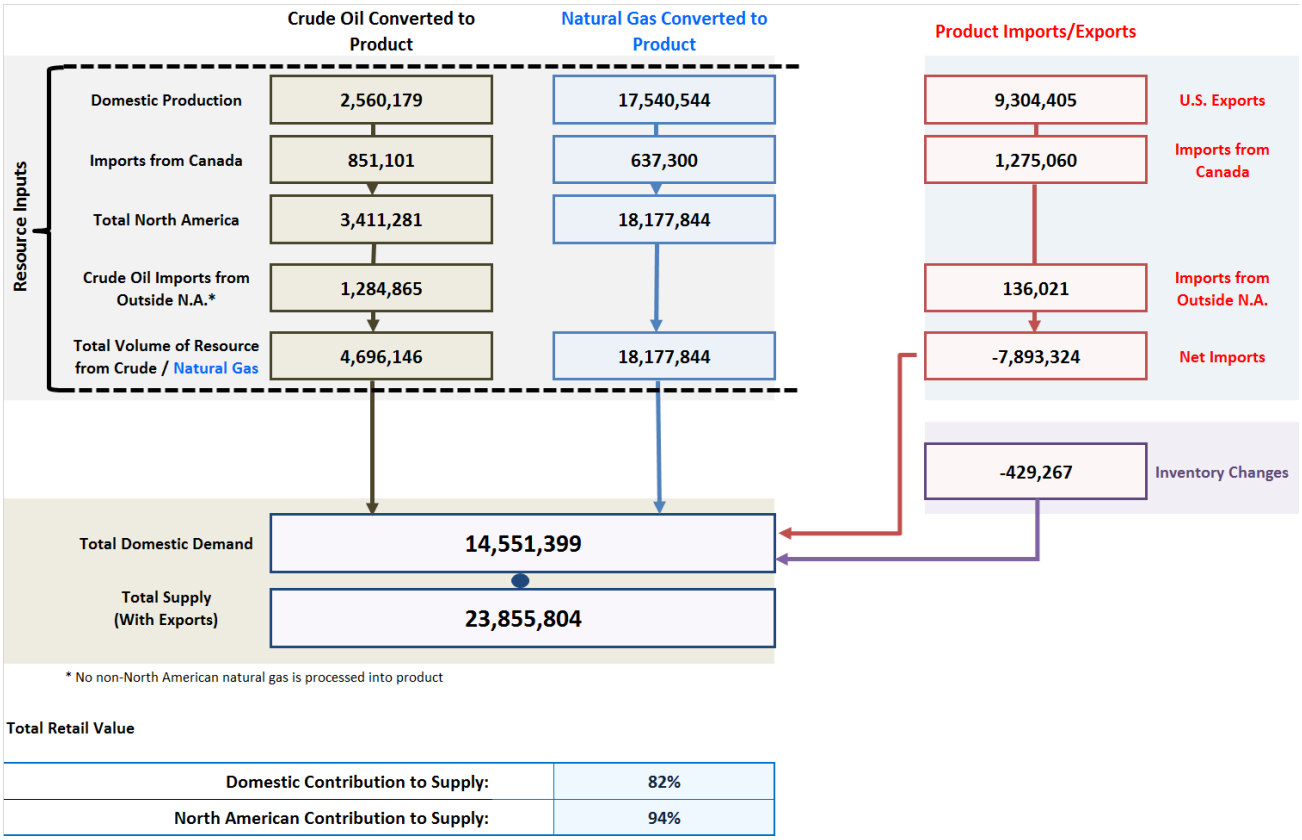


Figure 8: Value Chain for Butanes (C_4H_{10}), 2015 (Million Dollars)

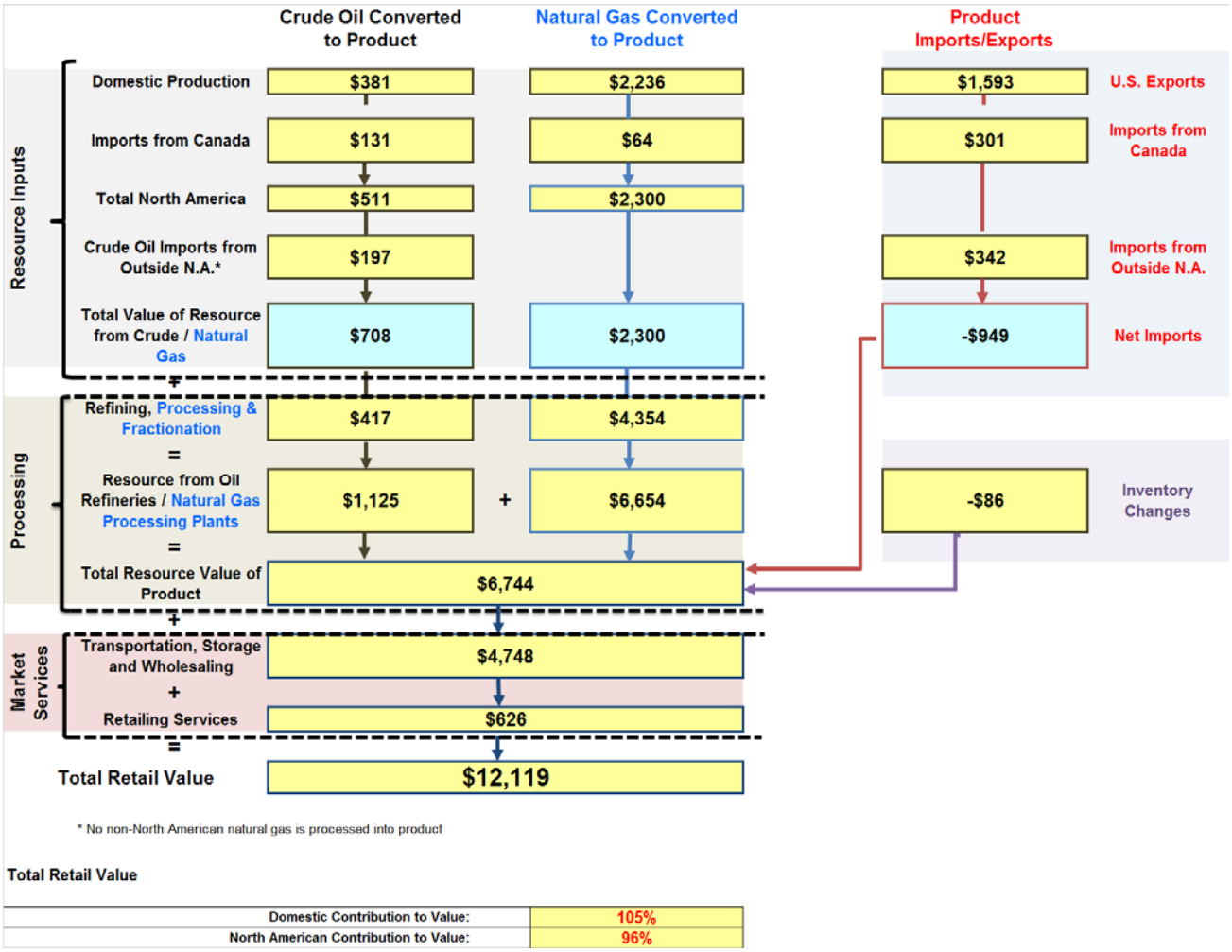


Figure 9: Volume Chain for Butanes (C_4H_{10}), 2015 (Thousand Gallons)

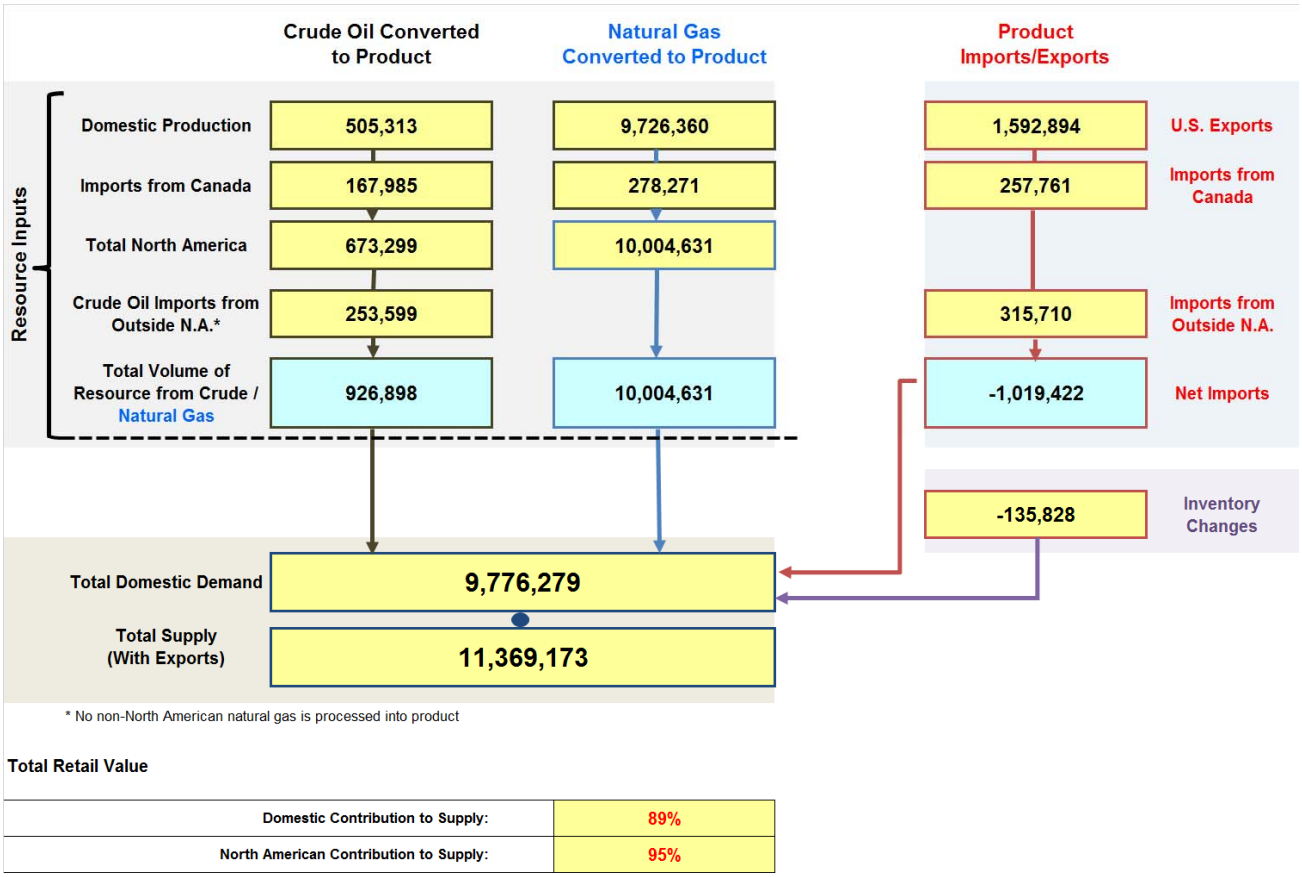
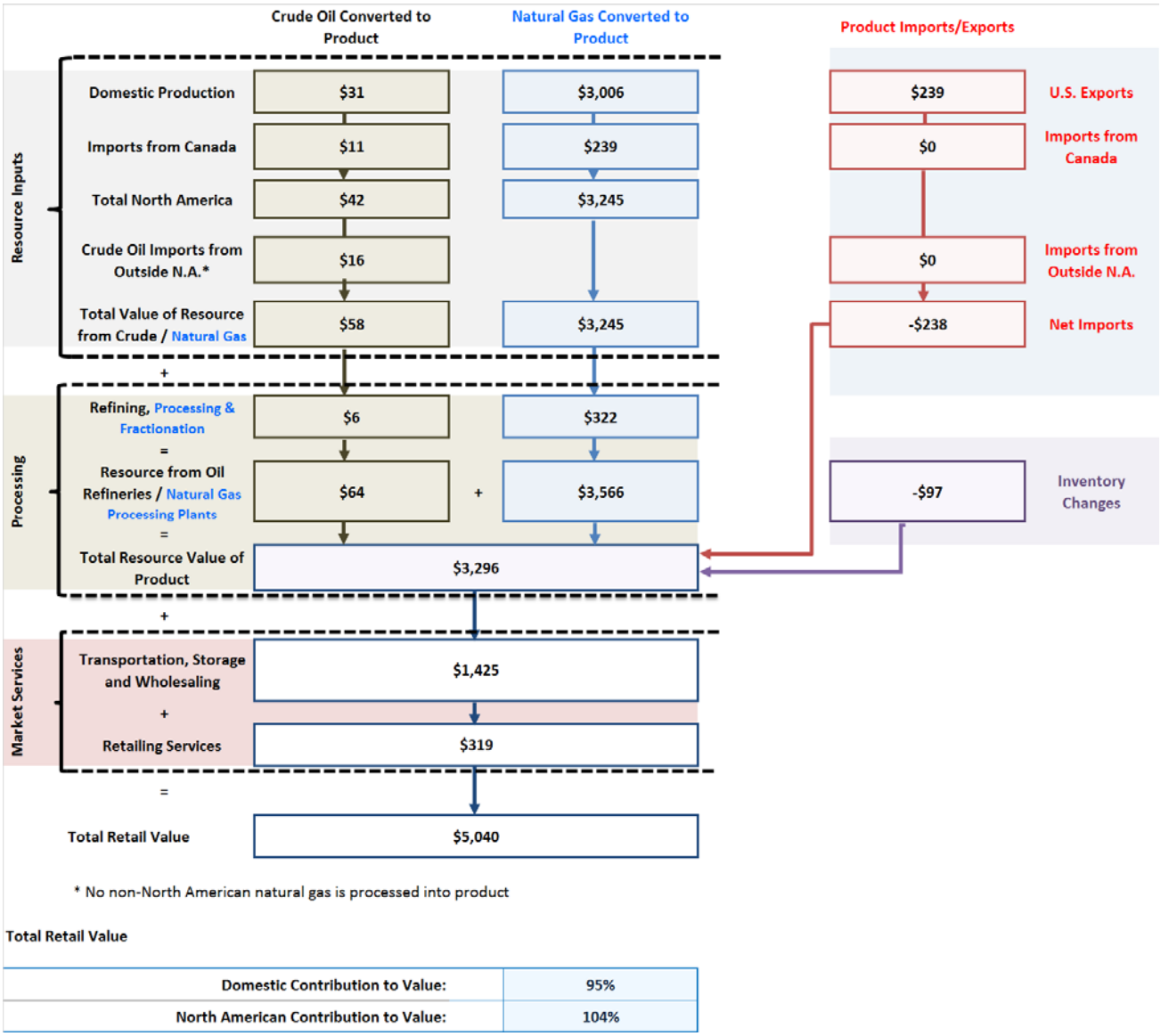


Figure 10: Value Chain for Ethane (C_2H_6), 2015 (Million Dollars)



Total Retail Value	
Domestic Contribution to Value:	95%
North American Contribution to Value:	104%

Figure 11: Volume Chain for Ethane (C_2H_6), 2015 (Thousand Gallons)

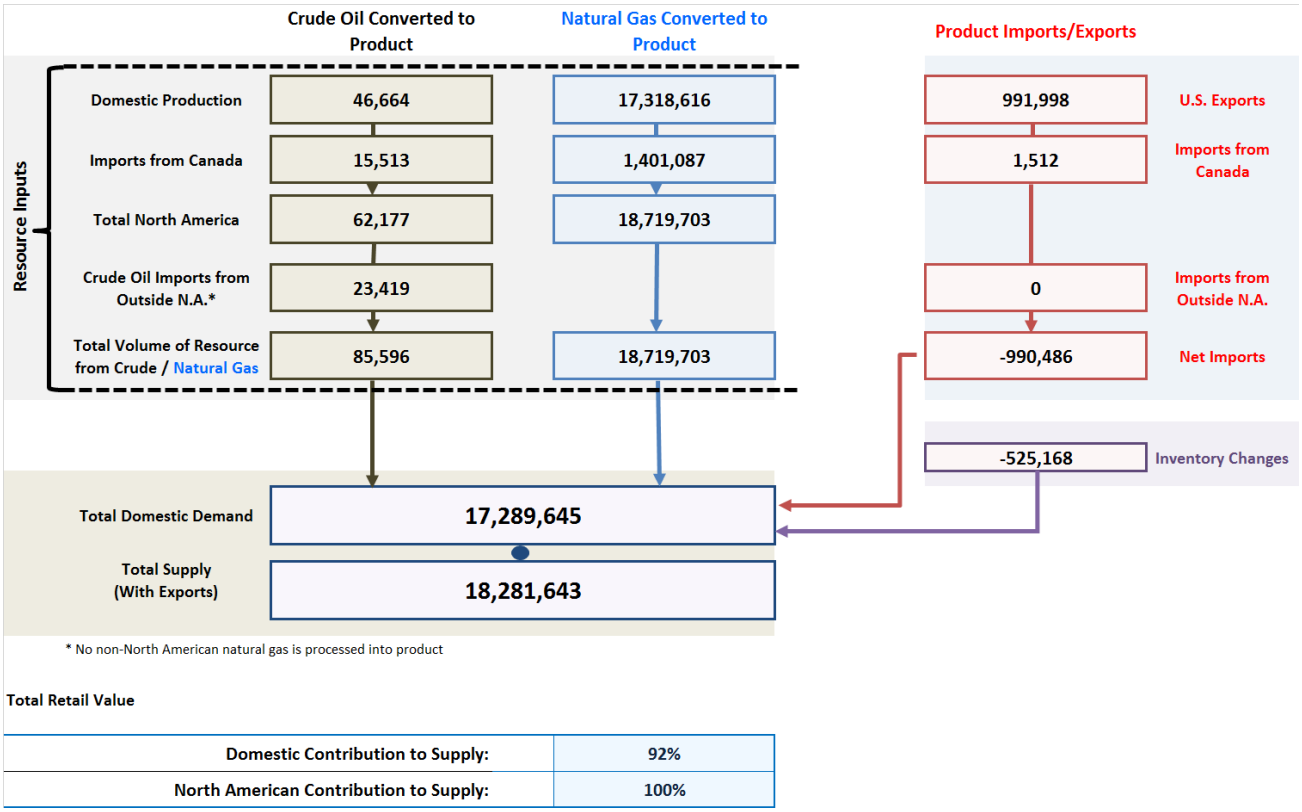
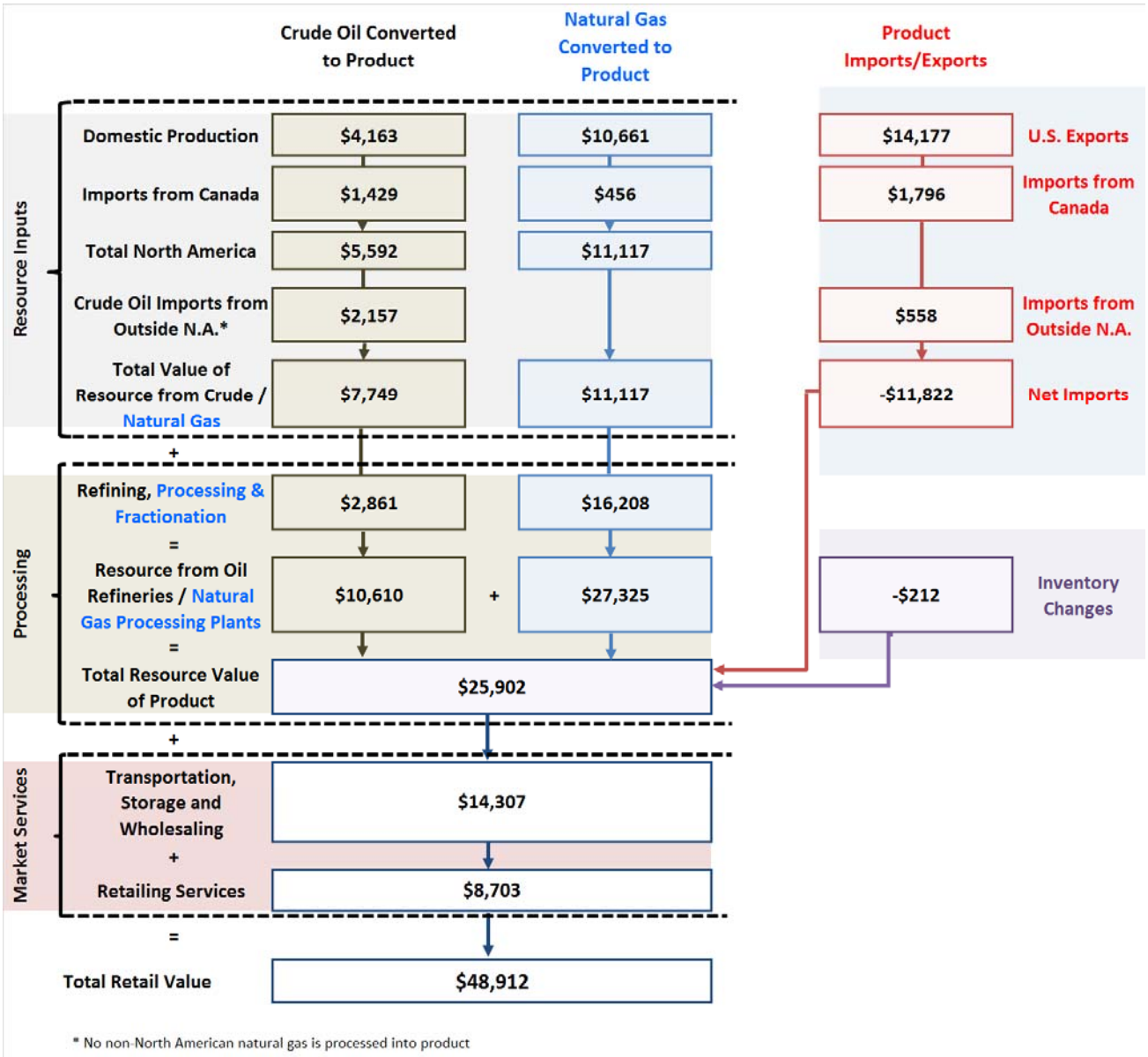


Figure 12: Value Chain for All NGLs and LRGs, 2015 (Million Dollars)



Total Retail Value

Domestic Contribution to Value:	116%
North American Contribution to Value:	123%

Figure 13: Volume Chain for All NGLs and LRGs, 2015 (Thousand Gallons)

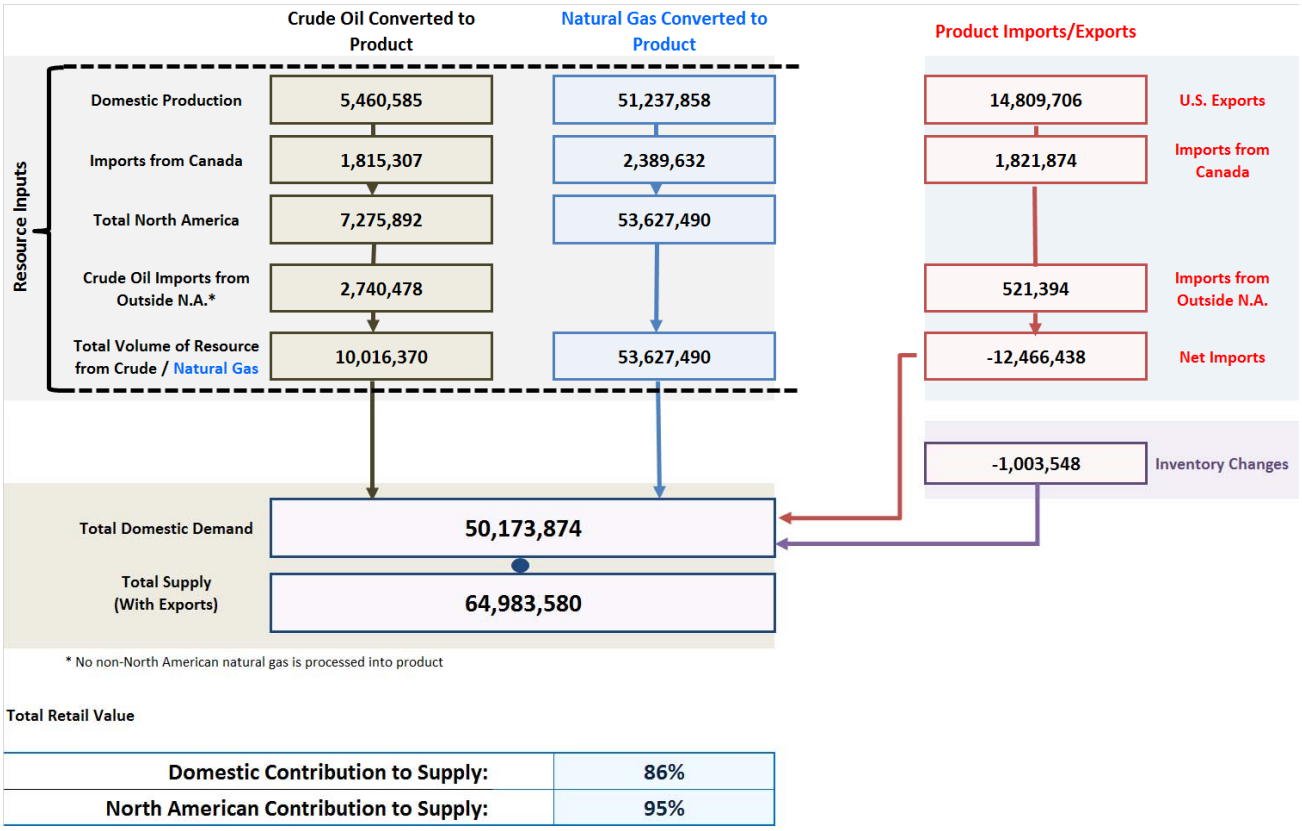


Table 2: National Value Summary for Odorized Propane (C_3H_8), 2015

	Volume	Value	Price
	Gallons (1,000)	$ Million	$ per Gal.
Refining			
Value in Imported Crude (CIF)	756,656	625.0	0.826
in Canadian Crude	301,499	249.0	0.826
in Non-Canadian crude	455,157	376.0	0.826
Value in Domestic Crude	906,931	725.5	0.800
Value Added by Crude Refining	1,663,587	450.4	0.271
Refinery Sales	**1,663,587**	**1,800.9**	**1.083**
Gas Processing			
Value in Natural Gas	6,213,654	1,321.5	0.213
Value Added by Gas Processing	6,213,654	1,467.2	0.236
Fractionation	6,213,654	287.9	0.046
Gas Plants (With Fractionation)	**6,213,654**	**3,076.6**	**0.495**
EIA Product Imports			
Imported Product Value (CIF)	630,348	576.3	0.914
Canadian Imports	**582,164**	532.3	0.914
Non-Canadian Imports	48,185	44.1	0.914
Terminaling	630,348	11.7	0.019
Imports (With Terminaling)	**630,348**	**588.0**	**0.933**
Inventory Change	(152,066)	(73.1)	0.481
Supply	**8,355,523**	**5,392.4**	**0.645**
Import Adjust. (Imports Not Counted by EIA)	**(130,480)**	(118.6)	0.909
Aux Sable Value Added by Gas Processing and Frac.	225,760	146.3	0.648
Aux Sable Value of Canadian Gas	225,760	47.9	0.212
Total Supply	**8,450,804**	**5,468.0**	**0.647**
Exports			
Export Product Value	-	-	
Terminaling	-	-	
Export Value (FOB)	**-**	**-**	
Domestic Demand	8,450,804	7,877.9	0.932
Balancing Item	-	-	0.932
Total Domestic Demand (Wholesale Value)	**8,450,804**	**7,877.9**	**0.932**
Supply Value	8,450,804	5,468.0	0.647
Wholesale Value	8,450,804	7,877.9	0.932
Wholesale Market Services	**8,450,804**	**2,410.0**	**0.285**
Breakout of Wholesale Market Services			
Long Distance P/L Transportation		135.5	
Intra PAD P/L Transporation		139.2	
Storage and Wholesale Markup		2,135.3	
Wholesale Value Balancing Item		-	
Total Wholesale Market Services	**8,450,804**	**2,410.0**	**0.285**
Final Retail Values			
Wholesale Value	8,450,804	7,877.9	0.932
Retail Markup on Total Volume	8,450,804	7,758.0	0.918
Total Retail Value	**8,450,804**	**15,636.0**	**1.850**

Table 3: National Value Summary for All Purity Propane (C_3H_8), 2015

	Volume	Value	Price
	Gallons (1,000)	$ Million	$ per Gal.
Refining			
Value in Imported Crude (CIF)	2,135,967	1,764.3	0.826
in Canadian Crude	851,101	703.0	0.826
in Non-Canadian crude	1,284,865	1,061.3	0.826
Value in Domestic Crude	2,560,179	2,048.0	0.800
Value Added by Crude Refining	4,696,146	1,271.5	0.271
Refinery Sales	**4,696,146**	**5,083.8**	**1.083**
Gas Processing			
Value in Natural Gas	17,540,544	3,730.5	0.213
Value Added by Gas Processing	17,540,544	4,141.6	0.236
Fractionation	17,540,544	812.8	0.046
Gas Plants (With Fractionation)	**17,540,544**	**8,684.9**	**0.495**
EIA Product Imports			
Imported Product Value (CIF)	1,779,413	1,626.9	0.914
Canadian Imports	1,643,392	1,502.5	0.914
Non-Canadian Imports	136,021	124.4	0.914
Terminaling	1,779,413	33.0	0.019
Imports (With Terminaling)	**1,779,413**	**1,659.9**	**0.933**
Inventory Change	(429,267)	(206.3)	0.481
Supply	**23,586,836**	**15,222.4**	**0.645**
Import Adjust. (Imports Not Counted by EIA)	(368,332)	(334.9)	0.909
Aux Sable Value Added by Gas Processing and Frac.	637,300	412.9	0.648
Aux Sable Value of Canadian Gas	637,300	135.3	0.212
Total Supply	**23,855,804**	**15,435.6**	**0.647**
Exports			
Export Product Value	9,304,405	8,149.5	0.876
Terminaling	9,304,405	345.9	0.037
Export Value (FOB)	**9,304,405**	**8,495.4**	**0.913**
Domestic Demand	10,979,771	10,235.5	0.932
Balancing Item	3,571,628	3,329.5	0.932
Total Domestic Demand (Wholesale Value)	**14,551,399**	**13,565.0**	**0.932**
Supply Value	14,551,399	9,415.3	0.647
Wholesale Value	14,551,399	13,565.0	0.932
Wholesale Market Services	**14,551,399**	**4,149.7**	**0.285**
Breakout of Wholesale Market Services			
Long Distance P/L Transportation		382.4	
Intra PAD P/L Transporation		393.1	
Storage and Wholesale Markup		3,374.2	
Wholesale Value Balancing Item		1,783.3	
Total Wholesale Market Services	**14,551,399**	**5,933.0**	**0.408**
Final Retail Values			
Wholesale Value	14,551,399	13,565.0	0.932
Retail Markup on Total Volume	14,551,399	7,758.0	0.533
Total Retail Value	**14,551,399**	**21,323.0**	**1.465**

Table 4: National Value Summary for Butanes (C_4H_{10}), 2015

	Volume	Value	Price
	Gallons (1,000)	$ Million	$ per Gal.
Refining			
Value in Imported Crude (CIF)	421,585	328	0.778
in Canadian Crude	167,985	131	0.778
in Non-Canadian crude	253,599	197	0.778
Value in Domestic Crude	505,313	381	0.753
Value Added by Crude Refining	926,898	417	0.450
Refinery Sales	**926,898**	**1,125.1**	**1.214**
Gas Processing			
Value in Natural Gas	9,726,360	2,236	0.230
Value Added by Gas Processing	9,726,360	3,632	0.373
Fractionation	9,726,360	458	0.047
Gas Plants (With Fractionation)	**9,726,360**	**6,325.6**	**0.650**
EIA Product Imports			
Imported Product Value (CIF)	573,472	644	1.123
Canadian Imports	257,761	301	1.170
Non-Canadian Imports	315,710	342	1.084
Terminaling	573,472	13	0.023
Imports (With Terminaling)	**573,472**	**656.8**	**1.145**
Inventory Change	(135,828)	(86)	0.632
Supply	**11,090,902**	**8,021.7**	**0.723**
Import Adjust. (Imports Not Counted by EIA)	-	-	-
Aux Sable Value Added by Gas Processing and Frac.	278,271	265	0.951
Aux Sable Value of Canadian Gas	278,271	64	0.229
Total Supply	**11,369,173**	**8,349.9**	**0.734**
Exports			
Export Product Value	1,592,894	1,593	1.000
Terminaling	1,592,894	57	0.036
Export Value (FOB)	**1,592,894**	**1,649.7**	**1.036**
Domestic Demand	9,721,362	11,436	1.176
Balancing Item	54,917	64.6	1.176
Total Domestic Demand (Wholesale Value)	**9,776,279**	**11,500.4**	**1.176**
Supply Value	9,776,279	7,180.0	0.734
Wholesale Value	9,776,279	11,500.4	1.176
Wholesale Market Services	**9,776,279**	**4,320.4**	**0.442**
Breakout of Wholesale Market Services			
Long Distance P/L Transportation		496.6	
Intra PAD P/L Transporation		185.8	
Storage and Wholesale Markup		3,662.9	
Wholesale Value Balancing Item		332.9	
Total Wholesale Market Services	**9,776,279**	**4,678.3**	**0.479**
Final Retail Values			
Wholesale Value	9,776,279	11,500.4	1.176
Retail Markup on Total Volume	9,776,279	1,175.9	0.120
Total Retail Value	**9,776,279**	**12,676.2**	**1.297**

Table 5: National Value Summary for Ethane (C_2H_6), 2015

	Volume	Value	Price
	Gallons (1,000)	$ Million	$ per Gal.
Refining			
Value in Imported Crude (CIF)	38,932	26.8	0.687
in Canadian Crude	15,513	10.7	0.687
in Non-Canadian Crude	23,419	16.1	0.687
Value in Domestic Crude	46,664	31.1	0.666
Value Added by Crude Refining	85,596	6.4	0.075
Refinery Sales	**85,596**	**64.2**	**0.751**
Gas Processing			
Value in Natural Gas	17,318,616	3,005.6	0.174
Value Added by Gas Processing	17,318,616	(618.9)	(0.036)
Fractionation	17,318,616	797.2	0.046
Gas Plants (With Fractionation)	**17,318,616**	**3,183.9**	**0.184**
EIA Product Imports			
Imported Product Value (CIF)	1,512	0.4	0.263
Canadian Imports	1,512	0.4	0.263
Non-Canadian Imports	-	-	-
Terminaling	1,512	0.0	0.010
Imports (With Terminaling)	**1,512**	**0.4**	**0.273**
Inventory Change	(525,168)	(96.5)	0.184
Supply	**16,880,556**	**3,152.0**	**0.187**
Import Adjust. (Imports Not Counted by EIA)	-	-	
Aux Sable Value Added by Gas Processing and Frac.	1,401,087	143.6	0.103
Aux Sable Value of Canadian Gas	1,401,087	238.9	0.171
Total Supply	**18,281,643**	**3,534.6**	**0.193**
Exports			
Export Product Value	991,998	238.8	0.241
Terminaling	991,998	32.1	0.032
Export Value (FOB)	**991,998**	**270.9**	**0.273**
Domestic Demand	17,318,616	4,728.9	0.273
Balancing Item	-28,971	(7.9)	0.273
Total Domestic Demand (Wholesale Value)	**17,289,645**	**4,721.0**	**0.273**
Supply Value	17,289,645	3,342.8	0.193
Wholesale Value	17,289,645	4,721.0	0.273
Wholesale Market Services	**17,289,645**	**1,378.2**	**0.080**
Breakout of Wholesale Market Services			
Long Distance P/L Transportation		274.2	
Intra PAD P/L Transporation		319.7	
Storage and Wholesale Markup		784.4	
Wholesale Value Balancing Item		14.9	
Total Wholesale Market Services	**17,289,645**	**1,393.1**	**0.080**
Retail Margin			
Non-Chemical Retail Value	296,873	399.7	1.347
Non-Chemical Wholesale Value	296,873	81.1	0.273
Difference = Retail Markup on Non-Chem.	**296,873**	**318.7**	**1.073**
Final Retail Values			
Wholesale Value	17,289,645	4,721.0	0.273
Retail Markup on Total Volume	17,289,645	318.7	0.018
Total Retail Value	**17,289,645**	**5,039.7**	**0.291**

Table 6: National Value Summary for Total NGL and LRG, 2015

	Volume	Value	Price
	Gallons (1,000)	$ Million	$ per Gal.
Refining			
Value in Imported Crude (CIF)	4,555,785	3,586.3	0.787
in Canadian Crude	1,815,307	1,429.0	0.787
in Non-Canadian crude	2,740,478	2,157.3	0.787
Value in Domestic Crude	5,460,585	4,162.9	0.762
Value Added by Crude Refining	10,016,370	2,861.0	0.286
Refinery Sales	**10,016,370**	**10,610.2**	**1.059**
Gas Processing			
Value in Natural Gas	51,237,858	10,661.0	0.208
Value Added by Gas Processing	51,237,858	12,909.2	0.252
Fractionation	51,237,858	2,387.5	0.047
Gas Plants (With Fractionation)	**51,237,858**	**25,957.7**	**0.507**
EIA Product Imports			
Imported Product Value (CIF)	2,760,691	2,733.7	0.990
Canadian Imports	2,239,297	2,175.6	0.972
Non-Canadian Imports	521,394	558.1	1.070
Terminaling	2,760,691	54.8	0.020
Imports (With Terminaling)	**2,760,691**	**2,788.6**	**1.010**
Inventory Change	(1,003,548)	(211.6)	0.211
Supply	**63,011,371**	**39,144.9**	**0.621**
Import Adjust. (Imports Not Counted by EIA)	(417,423)	(379.6)	0.909
Aux Sable Value Added by Gas Processing and Frac.	2,389,632	911.2	0.381
Aux Sable Value of Canadian Gas	2,389,632	456.4	0.191
Total Supply	**64,983,580**	**40,133.0**	**0.618**
Exports			
Export Product Value	14,809,706	14,176.5	0.957
Terminaling	14,809,706	529.2	0.036
Export Value (FOB)	**14,809,706**	**14,705.7**	**0.993**
Domestic Demand	47,671,841	39,194.0	0.822
Balancing Item	2,502,033	1,014.7	0.406
Total Domestic Demand (Wholesale Value)	**50,173,874**	**40,208.7**	**0.801**
Supply Value	50,173,874	28,803.0	0.574
Wholesale Value	50,173,874	40,208.7	0.801
Wholesale Market Services	**50,173,874**	**11,405.8**	**0.227**
Breakout of Wholesale Market Services			
Long Distance P/L Transportation		1,648.3	
Intra PAD P/L Transporation		1,081.9	
Storage and Wholesale Markup		8,675.5	
Wholesale Value Balancing Item		2,317.3	
Total Wholesale Market Services	**50,173,874**	**13,723.0**	**0.274**
Final Retail Values			
Wholesale Value	50,173,874	40,208.7	0.801
Retail Markup on Total Volume	50,173,874	8,702.8	0.173
Total Retail Value	**50,173,874**	**48,911.6**	**0.975**

2. Findings

2.1. Employment and Wages in the Odorized Propane Industry

2.1.1 Direct Employment

This study assesses the level of employment in the propane industry by state for 2015. While no single, comprehensive classification under the North American Industrial Classification System (NAICS) captures all employment and wage data associated with the natural gas liquids industry — or especially with the retail propane industry in particular — ICF has identified those industrial segments where the employees working in the propane industry would be classified, including in the production, transportation, and distribution of propane, and has allocated employment in these industries accordingly, based on the contribution of the propane industry within each segment. Current analysis of total employment and wages attributable to the retail propane industry includes data obtained from the Bureau of Labor Statistics (BLS), the main source for labor-related data in this report. As of the writing of this report, the most recent year for which a full set of employment and wages data was available is 2016, but 2015 data was used for consistency with other reported values that did not have final 2016 values.

The BLS's Quarterly Census of Employment and Wages (QCEW) served as the primary source of labor and wage statistics for all Propane Industry Economic Impacts studies performed by ICF, including the 2004, 2009, and 2012 reports, as well as the current report based on 2015 data. The Bureau of Labor Statistics defines the census as "a comprehensive tabulation of employment and wage information for workers covered by state unemployment insurance (UI) laws and federal workers covered by the Unemployment Compensation for Federal Employees (UCFE) program." This definition in effect covers 98 percent of the U.S. legal labor force outside of the agricultural sector. The QCEW therefore serves as the primary data source for employment statistics across the U.S. economy, with statistics reported down to the county and metropolitan area level on a quarterly and annual basis, with monthly estimates.

Due to a number of data gathering and release restrictions, including the withholding of values to protect the anonymity of large employers, employment and wages data may not be available for all geographies in all periods. ICF attempts to account for these data disclosure restrictions by estimating state level data based on the national totals, which are given for all categories in the data series, and other data that is available at the state level.

In the second quarter of 2011 the NAICS codes for Heating Oil Dealers and LPG Dealers were merged, and all economic statistics for these two classifications are now summed and reported under the Fuel Dealers classification. ICF accounted for this data reporting issue by attributing employment and wages to each category based on a combination of state-level historical trends, including total gallon sales, customer numbers, and sales per account for both propane and Fuel Oil usage. ICF also considered other reported propane employment reports, including the LP Gas Top 50, and macro-level economic drivers in its determination of state-level wage and employment data.

For the 2015 report, ICF also includes a total of 11 different employment and wage industry classifications. A full listing and description of these 11 NAICS categories can be found in Appendix A. For the purposes of this study, the three stages of the value chain and their associated NAICS categories are identified as follows:

- **Production**: Oil and Gas Extraction (NAICS Code 211111), NGL Extraction (211112), Drilling Oil and Gas Wells (213111), Support Activities for O&G Operations (213112), and Petroleum Refining (32411)
- **Transportation**: Crude Pipelines (4861), Refined Petroleum Product Pipelines (48691), Natural Gas Pipelines (4862), and Wholesale Petroleum Trade (4247)
- **Retail** (Distribution): Gasoline Stations (447), Fuel Dealers (45431), and LPG Dealers (454312)

In order to disaggregate employment in the odorized propane industry from the broader categories reported in the QCEW data, ICF quantified the share of value component attributed to each output along the production chain, estimating the share of employees and wages coming from: 1) the total NGLs industry; 2) propane industry as a whole; and lastly 3) the odorized propane industry.

Total wages for the 11 classifications in 2015 were nearly $105 billion, compared to nearly $100 billion in 2012. Growth in wages was again concentrated primarily in the upstream and midstream segments of the overall industry (See Table 7). Of the total wages for these industries, production accounts for two thirds, followed by 19 percent from the retail sector and 13 percent in the transportation sectors.

Wages attributed to the odorized (retail) propane sector, the retail component accounts for the majority of wages with a total of 61 percent, followed by the production sector with 33 percent and 6 percent in the transportation sector. From 2012 to 2015, wages attributable to the odorized (retail) propane sector increased by 7.3 percent to $3.3 billion. The indirect and induced wages and employees supported by the odorized propane sector total $4.1 billion.[15]

Table 7 below summarizes the employment and wages directly associated with the odorized propane industry at every step in the value chain. For state-by-state details, see Table 9 through Table 11.

Table 7: National Summary of Direct Employment and Wages Associated with Odorized Propane

Employee Count	Production	Transportation, Storage, Wholesale	Retail	Total Direct	Indirect and Induced
	Employees	Employees	Employees	Employees	Employees
All 11 NAICS Categories	609,299	147,208	943,804	1,700,311	2,890,528
Total NGL's	73,534	19,341	41,972	134,847	229,240
Propane/Propylene	32,230	7,530	41,972	81,731	138,943
Propane Only	27,405	6,419	41,972	75,796	128,852
Odorized Propane	**9,708**	**2,283**	**41,972**	**53,963**	**37,775**

[15] **Indirect employment** are employees or workers that do not directly produce the goods and services directly related to that sector and are not readily available, but indirectly support the workers in that industry. **Induced employment** are the jobs that are created from that sector's employees spending their money in the economy.

Wages	Production	Transportation, Storage, Wholesale	Retail	Total Direct	Indirect and Induced
	(Thousand $)	(Thousand $)	(Thousand $)	(Thousand $)	(Thousand $)
All 11 NAICS Categories	70,773,138	13,731,683	20,239,997	104,744,818	235,675,841
Total NGL/LRG	8,387,547	1,617,323	1,948,650	11,953,519	26,895,419
Propane/Propylene	3,685,279	640,958	1,948,650	6,274,886	14,118,494
Propane Only	3,132,021	547,234	1,948,650	5,627,905	12,662,785
Odorized Propane	**1,109,503**	**193,855**	**1,948,650**	**3,252,008**	**4,065,010**

Accounting for odorized propane industry's contribution to total value, an estimated total of 53,963 full time employment positions are directly attributable to the production, transportation, and distribution of odorized propane, accounting for 3.1 percent of all employees in the eleven industrial categories. The majority of these jobs (78 percent) are on the retail, or distribution, side of the industry.

2.1.2 Direct Wages

For this study, data on wages by NAICS category was also sourced from the Bureau of Labor Statistics' Quarterly Census of Employment and Wages. ICF estimated the total 2015 wages per sector attributable to NGLs, purity propane, and odorized propane using the same total-value-to-odorized-propane-value ratios used to allocate employment. The share of employment attributable to the product categories was estimated individually for each of the eleven NAICS codes included in the study. These estimates are found in Table 8 below. Summary totals for each product by industry segment are shown in Table 7 above. More detailed state-level estimates of national-level wages by NAICS code are shown in the rightmost columns of Table 8, while state-level data for total Production, Transportation, and Retail can be found in Table 9 through Table 11.

As shown in Table 8 on the following page, direct wages generated by the odorized propane industry totaled $3.2 billion in 2015, representing 2.7 percent of all wages generated by the eleven employment categories included in the odorized propane value chain, and employees 2.8 percent of the total employment for the eleven categories. This close relationship between odorized propane industry's share of total labor and total wages reflects the impact the industry has along the full value chain. Within the sector, however, there are wide disparities in wages per employee, with annual income in the supply segment on average double the wages in the retail segment.

Relative to 2012, per-employee average wages in the propane industry increased roughly 1 percent in nominal terms, from $59,600 in 2012 to $60,260 in 2015. The average per-employee wage in the retail segment of the odorized propane sector increased to $46,428 per year, which was well above the growth in wages reported for all labor categories covered by the Bureau of Labor Statistics' QCEW, which reported average U.S. worker wages increased in nominal terms from $49,300/yr in 2012 to $52,900/yr in 2015 – an increase of 8.9 percent over three years, more than doubling the cumulative inflation during the same period.[16] The fastest wage growth was observed in the upstream segment of the propane value chain, as the tightening labor market in oil and gas drilling caused wage escalation well above the national trend.

[16] *Consumer Price Index – Chained Consumer Price Index,* Series Id: SUUR0000SA0, Bureau of Labor Statistics, Washington, DC. Available at: http://www.bls.gov/cpi/data.htm

2.1.3 Indirect and Induced Employment and Wages

The odorized propane industry has an impact on the economy beyond the direct employment and wages it generates. As companies in the production, transportation, and distribution segments of the value chain employ services that supply their operations (indirect economic impacts), or as the workers directly employed in the odorized propane industry spend their income and create demand for goods and services (induced economic impacts), the benefits of their spending lead to further employment throughout the U.S. economy.

ICF estimates that for 2015, in addition to the 53,964 jobs directly created by the odorized propane industry, another 37,775 indirect and induced full time jobs can be attributed to the industry, with indirect and induced wages adding another $4.1 billion to the total wages that can be attributed to the odorized propane industry in addition to the $3.2 billion from direct wages.

Table 8: Employment and Wages in Odorized Propane and Related Industries, 2015

		2015 Total Employees			Total Wages ($1,000)			Average Weekly Wages			2015 Employee Counts Allocated to:			2015 Wages ($1,000) Allocated to:		
Description	NAICS Code	Private	Government	Total	Private	Government	Total	Private	Government	Total	All NGLs	Consumer-Grade Propane (C_3H_8)	Odorized Propane	All NGLs	Consumer-Grade Propane (C_3H_8)	Odorized Propane
Oil and Gas Extraction	211111	184,796	-	**184,796**	$ 30,152,579	$ -	**$ 30,152,579**	$3,138	-	**$3,138**	24,155	8,904	3,154	3,941,216	1,452,885	514,677
NGL Extraction	211112	7,741	-	**7,741**	$ 1,025,668	$ -	**$ 1,025,668**	$2,548	-	**$2,548**	3,088	1,338	474	409,092	177,295	62,806
Drilling Oil & Gas Wells	213111	69,944	-	**69,944**	$ 6,955,762	$ -	**$ 6,955,762**	$1,912	-	**$1,912**	9,142	3,370	1,194	909,181	335,159	118,729
Support Activities for O&G Operations	213112	278,444	-	**278,444**	$ 23,128,317	$ -	**$ 23,128,317**	$1,597	-	**$1,597**	36,395	13,417	4,753	3,023,081	1,114,425	394,780
Petroleum Refineries	32411	68,374	-	**68,374**	$ 9,510,813	$ -	**$ 9,510,813**	$2,675	-	**$2,675**	755	376	133	104,976	52,257	18,512
Asphalt, Paving & Roofing Manf.	32412	24,252	-	**24,252**	$ -	$ -	**$ -**	$0	-	**$0**	-	-	-	-	-	-
Crude Pipelines	4861	10,643	-	**10,643**	$ 1,238,102	$ -	**$ 1,238,102**	$2,237	-	**$2,237**	117	58	21	13,666	6,803	2,410
Refined Petroleum Product Pipelines	48691	7,780	-	**7,780**	$ 934,510	$ -	**$ 934,510**	$2,310	-	**$2,310**	1,167	383	136	140,196	46,008	16,298
Natural Gas Pipelines	4862	29,643	838	**30,481**	$ 3,730,471	$ 50,107	**$ 3,780,579**	$2,420	$1,150	**$2,385**	726	315	111	90,074	39,037	13,829
Wholesale Petroleum Trade	4247	98,304	-	**98,304**	$ 7,778,493	$ -	**$ 7,778,493**	$1,522	-	**$1,522**	17,331	5,663	2,016	1,369,419	449,403	159,199
Gasoline Stations	447	903,511	1,619	**905,130**	$ 18,321,417	$ 36,818	**$ 18,358,235**	$390	$437	**$390**	3,298	3,298	3,298	66,888	66,888	66,888
Heating Oil Dealers	454311	36,673	-	**36,673**	$ 2,080,380	$ -	**$ 2,080,380**	$1,091	-	**$1,091**	-	-	-	-	-	-
LPG Dealers	454312	38,674	-	**38,674**	$ 1,881,762	$ -	**$ 1,881,762**	$936	-	**$936**	38,674	38,674	38,674	1,881,762	1,881,762	1,881,762
Natural Gas Distributors	2212	112,326	-	**112,326**	$ 11,929,944	$ -	**$ 11,929,944**	$2,042	-	**$2,042**	-	-	-	-	-	-
Total		**1,871,105**	**2,457**	**1,873,562**	**118,668,217**	**86,926**	**118,755,143**	**1,220**	**680**	**1,219**	**134,847**	**75,796**	**53,963**	**11,949,552**	**5,621,921**	**3,249,888**

Table 9: Odorized Propane (C_3H_8) Employment and Wages Summary, 2015

State	Production		Trans., Stor., Wholesaling		Retail		Total	
	Employee Count	Wages (Thousand $)	Employee Count	Wages (Thousand $)	Employee Count	Wages (Thousand $)	Employee Count	Wages (Thousand $)
Alabama	121	13,702	19	1,609	1,119	41,087	1,259	56,398
Alaska	260	29,511	5	476	59	3,287	325	33,273
Arizona	0	6	15	3,003	680	27,318	694	30,327
Arkansas	10	1,096	21	1,778	649	24,056	681	26,930
California	315	35,928	72	5,843	3,182	161,660	3,569	203,432
Colorado	471	53,852	60	5,317	720	32,346	1,251	91,515
Connecticut	0	0	17	1,376	525	30,288	542	31,664
Delaware	2	218	9	716	288	16,782	298	17,715
District of Columbia	0	0	1	52	15	749	16	801
Florida	4	423	26	2,042	1,978	86,025	2,008	88,489
Georgia	0	0	40	3,243	1,778	69,088	1,818	72,332
Hawaii	1	102	5	374	104	5,486	109	5,962
Idaho	0	0	7	564	237	8,932	244	9,496
Illinois	26	3,155	97	7,962	928	39,235	1,051	50,353
Indiana	6	762	48	3,983	1,168	51,388	1,222	56,132
Iowa	0	0	70	5,595	471	17,781	542	23,376
Kansas	118	13,577	57	4,885	316	12,560	491	31,022
Kentucky	23	2,678	21	1,669	685	28,716	728	33,063
Louisiana	630	72,487	114	9,712	635	21,422	1,379	103,620
Maine	0	0	20	1,618	244	11,115	264	12,733
Maryland	0	0	17	1,379	551	26,917	568	28,297
Massachusetts	0	0	17	1,326	815	50,392	832	51,718
Michigan	16	1,874	66	5,249	1,418	64,785	1,500	71,908
Minnesota	2	231	55	4,397	970	38,255	1,027	42,884
Mississippi	142	16,146	22	1,865	920	35,283	1,084	53,294
Missouri	0	22	49	3,965	1,223	71,753	1,272	75,740
Montana	43	4,855	14	1,145	416	17,963	473	23,962
Nebraska	4	434	43	3,612	222	6,760	269	10,807
Nevada	0	43	6	480	344	17,036	351	17,559
New Hampshire	0	0	27	2,157	624	40,585	652	42,743
New Jersey	4	520	14	1,097	410	29,110	427	30,726
New Mexico	466	53,088	38	3,529	698	30,520	1,203	87,137
New York	0	42	49	3,866	1,652	91,025	1,702	94,934
North Carolina	0	0	64	5,192	2,396	96,928	2,460	102,120
North Dakota	851	96,689	40	3,698	115	4,424	1,006	104,811
Ohio	215	24,776	80	6,848	1,313	57,193	1,608	88,817
Oklahoma	858	98,072	92	8,459	629	23,705	1,578	130,236
Oregon	0	0	9	712	304	12,626	313	13,338
Pennsylvania	114	13,202	62	5,159	1,684	101,017	1,860	119,378
Rhode Island	0	0	3	236	108	5,909	111	6,145
South Carolina	0	0	25	2,061	873	36,978	898	39,040
South Dakota	2	250	9	737	179	6,510	190	7,496
Tennessee	3	371	16	1,280	1,426	50,214	1,445	51,864
Texas	4,270	487,598	537	46,440	3,051	176,453	7,858	710,491
Utah	98	11,137	15	1,348	193	7,631	307	20,116
Vermont	0	0	16	1,250	390	20,864	406	22,114
Virginia	0	2	34	2,712	975	43,401	1,010	46,115
Washington	3	454	23	1,863	628	27,724	655	30,041
West Virginia	357	41,045	40	3,718	225	8,894	622	53,656
Wisconsin	0	23	53	4,175	1,243	49,402	1,296	53,600
Wyoming	273	31,136	23	2,081	193	9,072	489	42,290
US Total	**9,708**	**1,109,503**	**2,283**	**193,855**	**41,972**	**1,948,650**	**53,963**	**3,252,008**

Table 10: Propane (C_3H_8) Employment and Wages Summary, 2015

	Production		Trans., Stor., Wholesaling		Retail		Total	
State	Employee Count	Wages (Thousand $)	Employee Count	Wages (Thousand $)	Employee Count	Wages (Thousand $)	Employee Count	Wages (Thousand $)
Alabama	340	38,679	54	4,543	1,119	41,087	1,514	84,310
Alaska	735	83,305	14	1,343	59	3,287	808	87,935
Arizona	0	16	15	8,476	680	27,318	694	35,810
Arkansas	27	3,093	61	5,019	649	24,056	737	32,168
California	890	101,423	204	16,495	3,182	161,660	4,276	279,577
Colorado	1,331	152,018	169	15,009	720	32,346	2,220	199,373
Connecticut	0	0	49	3,884	525	30,288	574	34,172
Delaware	4	614	25	2,020	288	16,782	317	19,416
District of Columbia	0	0	2	147	15	749	17	896
Florida	11	1,193	73	5,764	1,978	86,025	2,062	92,981
Georgia	0	0	112	9,156	1,778	69,088	1,891	78,244
Hawaii	2	288	13	1,056	104	5,486	119	6,830
Idaho	0	0	20	1,593	237	8,932	257	10,525
Illinois	74	8,906	274	22,477	928	39,235	1,276	70,618
Indiana	17	2,150	136	11,242	1,168	51,388	1,321	64,781
Iowa	0	0	199	15,793	471	17,781	670	33,574
Kansas	334	38,326	160	13,791	316	12,560	810	64,677
Kentucky	65	7,560	58	4,710	685	28,716	808	40,986
Louisiana	1,779	204,622	322	27,415	635	21,422	2,736	253,460
Maine	0	0	58	4,568	244	11,115	302	15,683
Maryland	0	0	49	3,894	551	26,917	600	30,811
Massachusetts	0	0	47	3,743	815	50,392	862	54,135
Michigan	46	5,289	186	14,818	1,418	64,785	1,649	84,892
Minnesota	5	652	156	12,413	970	38,255	1,130	51,321
Mississippi	400	45,578	63	5,265	920	35,283	1,383	86,126
Missouri	1	63	137	11,193	1,223	71,753	1,361	83,009
Montana	121	13,705	40	3,231	416	17,963	576	34,899
Nebraska	11	1,226	120	10,197	222	6,760	353	18,184
Nevada	1	123	17	1,354	344	17,036	362	18,513
New Hampshire	0	0	77	6,090	624	40,585	701	46,676
New Jersey	11	1,467	38	3,096	410	29,110	459	33,673
New Mexico	1,317	149,863	108	9,963	698	30,520	2,123	190,345
New York	1	118	138	10,915	1,652	91,025	1,791	102,058
North Carolina	0	0	182	14,656	2,396	96,928	2,577	111,584
North Dakota	2,402	272,943	114	10,440	115	4,424	2,631	287,807
Ohio	607	69,940	226	19,331	1,313	57,193	2,147	146,465
Oklahoma	2,422	276,847	259	23,878	629	23,705	3,309	324,430
Oregon	0	0	25	2,011	304	12,626	330	14,637
Pennsylvania	321	37,268	176	14,563	1,684	101,017	2,181	152,848
Rhode Island	0	0	8	666	108	5,909	116	6,575
South Carolina	0	0	70	5,819	873	36,978	943	42,797
South Dakota	6	706	26	2,080	179	6,510	211	9,295
Tennessee	8	1,046	45	3,612	1,426	50,214	1,479	54,872
Texas	12,054	1,376,441	1,516	131,096	3,051	176,453	16,621	1,683,990
Utah	276	31,440	44	3,806	193	7,631	513	42,877
Vermont	0	0	45	3,528	390	20,864	434	24,393
Virginia	0	5	97	7,655	975	43,401	1,072	51,061
Washington	9	1,281	66	5,260	628	27,724	703	34,265
West Virginia	1,007	115,866	112	10,495	225	8,894	1,345	135,255
Wisconsin	0	65	149	11,786	1,243	49,402	1,393	61,253
Wyoming	770	87,895	64	5,875	193	9,072	1,028	102,842
US Total	**27,405**	**3,132,021**	**6,419**	**547,234**	**41,972**	**1,948,650**	**75,796**	**5,627,905**

Table 11: Total NGLs / LRGs Employment and Wages Summary, 2015

	Production		Trans., Stor., Wholesaling		Retail		Total	
State	Employee Count	Wages (Thousand $)	Employee Count	Wages (Thousand $)	Employee Count	Wages (Thousand $)	Employee Count	Wages (Thousand $)
Alabama	919	104,278	66	5,864	1,119	41,087	2,104	151,229
Alaska	1,988	225,171	38	3,551	59	3,287	2,085	232,009
Arizona	0	43	45	5,621	680	27,318	725	32,982
Arkansas	74	8,346	97	8,329	649	24,056	820	40,731
California	2,391	271,919	517	41,873	3,182	161,660	6,090	475,452
Colorado	3,574	407,671	1,032	85,952	720	32,346	5,326	525,969
Connecticut	0	0	33	2,576	525	30,288	557	32,863
Delaware	9	1,234	18	1,527	288	16,782	315	19,543
District of Columbia	0	0	1	98	15	749	17	846
Florida	28	3,224	49	3,849	1,978	86,025	2,055	93,098
Georgia	0	0	91	8,098	1,778	69,088	1,870	77,187
Hawaii	4	578	9	784	104	5,486	118	6,848
Idaho	0	0	13	1,056	237	8,932	250	9,988
Illinois	188	22,292	696	57,575	928	39,235	1,812	119,102
Indiana	40	4,981	195	16,822	1,168	51,388	1,403	73,191
Iowa	0	0	292	23,310	471	17,781	764	41,091
Kansas	893	102,193	1,544	125,414	316	12,560	2,753	240,167
Kentucky	170	19,720	157	12,687	685	28,716	1,012	61,123
Louisiana	4,737	542,857	1,176	98,295	635	21,422	6,548	662,574
Maine	0	0	38	3,029	244	11,115	282	14,144
Maryland	0	0	33	2,582	551	26,917	584	29,499
Massachusetts	0	0	31	2,482	815	50,392	846	52,874
Michigan	122	13,997	147	11,962	1,418	64,785	1,687	90,745
Minnesota	9	1,310	114	9,328	970	38,255	1,094	48,894
Mississippi	1,076	122,352	153	12,939	920	35,283	2,149	170,574
Missouri	2	171	156	13,368	1,223	71,753	1,381	85,292
Montana	325	36,894	29	2,432	416	17,963	770	57,289
Nebraska	29	3,327	197	17,732	222	6,760	449	27,819
Nevada	3	330	11	900	344	17,036	358	18,266
New Hampshire	0	0	51	4,039	624	40,585	675	44,624
New Jersey	21	2,946	203	16,249	410	29,110	634	48,305
New Mexico	3,549	403,465	244	22,868	698	30,520	4,491	456,853
New York	3	321	91	7,238	1,652	91,025	1,747	98,584
North Carolina	0	0	136	11,627	2,396	96,928	2,532	108,554
North Dakota	6,483	736,054	172	17,128	115	4,424	6,770	757,605
Ohio	1,616	185,673	434	38,289	1,313	57,193	3,363	281,155
Oklahoma	6,502	741,955	792	71,643	629	23,705	7,923	837,303
Oregon	0	0	17	1,334	304	12,626	321	13,959
Pennsylvania	849	98,049	892	72,267	1,684	101,017	3,424	271,333
Rhode Island	0	0	6	442	108	5,909	113	6,351
South Carolina	0	0	62	5,767	873	36,978	935	42,745
South Dakota	17	1,914	17	1,384	179	6,510	213	9,807
Tennessee	20	2,458	32	2,642	1,426	50,214	1,478	55,314
Texas	32,374	3,690,198	7,815	646,719	3,051	176,453	43,240	4,513,370
Utah	741	84,423	695	55,919	193	7,631	1,629	147,973
Vermont	0	0	30	2,340	390	20,864	419	23,204
Virginia	0	13	64	5,076	975	43,401	1,040	48,490
Washington	18	2,573	126	10,121	628	27,724	773	40,418
West Virginia	2,687	308,446	181	18,452	225	8,894	3,093	335,791
Wisconsin	1	131	99	7,829	1,243	49,402	1,343	57,362
Wyoming	2,072	236,040	200	17,917	193	9,072	2,465	263,029
US Total	**73,534**	**8,387,547**	**19,341**	**1,617,323**	**41,972**	**1,948,650**	**134,847**	**11,953,519**

2.2. Economic Impact of the Odorized Propane Industry

2.2.2 Direct Economic Impact

The study of the impact of the U.S. consumer propane industry on the national and state economies is based upon a bottom-up approach to economic value assessment. Because the odorized propane industry sources its product from total U.S. purity propane supply, and because that purity propane is the product of both the refining and gas processing industries output of natural gas liquids (NGLs) and liquid refinery gasses (LRGs), ICF's approach to value calculation for the odorized propane industry attempts to trace the flow of all NGLs through the economy from the wellhead to the burner tip across all sources of production.

To estimate the state level direct economic impact of the odorized propane industry, ICF uses API's reported totals for 2015 odorized propane sales by sector,[17] to allocate the national direct economic impacts volumes among the states. A national summary of the sector specific retail propane consumption for 2015 is shown in table 12 below.

Table 12. National-Level Odorized Propane Consumption by Sector

Retail Sector	Consumption (Million Gallon)	Percent of Total Consumption
Residential	4,589.4	54.3%
Commercial	1,618.6	19.2%
Sales to Resellers	284.3	3.4%
Internal Combustion	623.2	7.4%
Industrial	468.9	5.5%
Agricultural	866.4	10.3%
Total U.S. Odorized Propane Demand	8,451	

Source: American Petroleum Institute, 2015 Sales of Natural Gas Liquids and Liquefied Refinery Gases, ICF

Various data sources are also used to estimate the value of these gallons across the federal and state economies. These include data reported by Bloomberg, industry publications on wholesale and regional rack prices for propane, EIA reported retail prices for the heating season, and ICF's modeled estimates for retail propane prices at the state level for all months and sectors not reported by the EIA.

This comprehensive approach to volume and price aggregation allows for the estimation of not only the total value of odorized propane on the U.S. market, but also of all purity propane, ethane, butanes, and pentanes plus. National-level estimates for total value along the full production chain for odorized propane and purity NGLs are found in Table 2 through Table 6. Detailed estimates of the impact of the odorized, total purity propane industry, and all NGLs are found in Table 15, Table 16, and Table 17.

1 Upstream

Tracing the value added by the propane industry in the upstream sector begins by accounting for crude oil and natural gas inputs into refining and gas processing facilities. ICF used EIA data in combination with in-house proprietary information, such as gas and crude oil quality and transport infrastructure (pipelines, barges, rail, etc.) capacity, to estimate production of crude oil, lease condensate, and natural gas at the state level (see Table 14). This data was then combined with

[17] *2015 Sales of Natural Gas Liquids and Liquefied Refinery Gases, American Petroleum Institute, January 2017*

information on the composition of gas produced and refinery yields from various crudes to estimate total quantities and values of natural gas liquids – and subsequently odorized propane - produced at the state level.

- ICF estimates the total value of natural gas liquids (also referred to as Liquefied Refinery Gasses) coming from domestic crude at nearly $4.2 billion, with odorized propane's share of LRGs in domestic crude at $725 million.
- We estimate the value of NGLs produced from U.S. natural gas production at nearly $10.7 billion, with odorized propane's share of NGLs in raw domestic gas at $1.3 billion.

The total value of imported NGLs and LRGs from imported crude oil commodities is estimated at $3.6 billion, with $1.4 billion from imported Canadian crude oil and $2.2 billion from imported crude oil from the rest of the world. Odorized propane accounted for $249 million of Canadian crude import value and $376 million from other crude oil imports.

The total Imported Product Value of NGLs is estimated to at $3 billion, with $2.3 billion imported from Canada. This value does not include the value of NGLs present in imported natural gas, which is estimated at $456 million. Odorized propane accounts for $576 million of the imported product value and $48 million of the NGLs included in the imported natural gas, which is processed at the gas processing plant Aux Sable in Illinois.

2 Midstream

Accounting for value added generated by the midstream sector includes estimates for the economic contribution from the refining and gas processing sectors, fractionation sector, and pipeline and other transportation, storage, and wholesale market activities. As with upstream values, ICF's calculations begin with an accounting of the total value produced by the natural gas liquids complex, a value subsequently apportioned first to individual purity products, and finally from purity propane to odorized propane.

The share of refining revenues generated by natural gas liquids, and by propane, and odorized propane, specifically, continues to fall, resulting in declining value added from the refining sector. From 2012 to 2015, U.S. oil prices declined nearly 50 percent to an average of $48 per barrel, while propane prices fell 54.5 percent over the same time period to average $45.7 ¢/gallon. Propane's share of total refinery output (measured in retail value) declined slightly, from 1.14 percent in 2012 to 1.01 percent in 2015, while the share of production from refineries declined from 2.4 percent in 2012 to 2.3 percent in 2015.

For gas processors and fractionators the continued low natural gas prices mean liquids produced out of the raw natural gas provided a significant uplift to dry gas prices, with the notable exception of ethane. Due to an over-supplied market, ethane traded near parity with natural gas in 2015. Despite this anomaly, overall declines in the value of crude oil and related petroleum products relative to natural gas resulted in the value added from gas processing generating 56.8 percent of the value in NGLs produced from natural gas in 2015, down from 69 percent in 2012.

The majority of this value was generated from heavier NGLs, specifically butanes and pentanes, accounting for $10.8 billion in added value. Propane accounted for $3.3 billion of all value added generated by the gas processors in 2015, while $2.4 billion, or 22 percent of the total, can be attributed to odorized propane.

The trend of an increasingly higher share of value from natural gas production generated from the liquids extracted continues to favor natural gas development to more NGL rich areas of production. There has also been a dramatic increase in associated gas production from expanding development of U.S. tight oil resources, such as the Bakken and Eagle Ford shales and Permian

region. Associated gas production contains high levels of NGLs within the natural gas production stream, which has supported the dramatic increase in domestic NGL production from gas processing. This expansion in NGL production has facilitated an increase in value despite a reduction in the price for NGL prices.

The industry's focus on the development of NGL rich gas resources has also occurred in Canada, resulting in higher NGLs production, bolstered by the development of the Montney tight gas resources and Duvernay shale. Total NGL imports from Canada increased from 2,163 million gallons in 2012 to 2,239 million gallons in 2015, including those of propane, which rose from 1,497 million gallons in 2012 to 1,643 million gallons in 2015. The value of odorized propane imported from Canada was $414 million in 2015, down sharply from the $742 million in 2012. This decline in imported propane attributed to occurred despite the fact that total propane imports only declined by 12% from 2012 to 2015, the increase in propane exports relative to retail propane demand results in fewer imported propane gallons from Canada being attributed to the odorized propane sector.

ICF used in-house data on pipeline capacity and throughput, pipeline tolls, and estimates of total transportation costs for "wet" natural gas and natural gas liquids to calculate the value added by the transportation sector. These estimates consider value added throughout the entire transportation sector, which includes gathering lines, intra- and inter-PAD pipelines moving various grades of NGLs from producers and fractionators to wholesalers and distributors, and terminaling services offered at export and import facilities throughout the country.

ICF estimates midstream value added for all NGL products to be $13.7 billon, including:

- $10,885 million for storage and wholesaling services of NGLs, including $2,410 million for wholesaling services attributed to odorized propane.
- $1,648 million for long-distance transportation of NGLs, including $135 million for long-distance transport attributed to odorized propane.
- $1,081 million for intra-PAD transportation of NGLs, including $139 million for intra-PAD transport attributed to odorized propane.

3 Downstream

The total retail value for odorized propane is calculated based on total volumes of propane delivered to final consumers, by category of consumer, as well as the prices paid by those consumers, based on consumer type and geography. For this study ICF based volumes of odorized propane sold in the consumer market on the American Petroleum Institute's *2015 Sales of Natural Gas Liquids and Liquefied Refinery Gases* survey. For those states and customer types where API withholds data to avoid disclosure of individual company data, ICF estimated values based on in-house modeling using the Propane Database and Forecast Model (PDFM).[18] Pricing information for odorized propane is drawn from the Energy Information Administration's database of retail prices by region[19] and industry, wholesale and rack prices reported on Bloomberg, state heating fuel pricing

[18] The Propane Database and Forecast Model (PDFM) is a proprietary model that ICF utilizes to forecast all sectors of the U.S. retail propane sector, including Residential, Commercial, and Industrial, Agricultural, Resell, and Internal combustion demand. The PDFM utilizes multiple data sources and regressions to forecast annual and monthly propane consumption based on a variety of forecast metrics, including economic growth, weather, energy efficiency, economic growth, housing trends, and the adoption of propane engines across multiple uses.

[19] The EIA suspended publishing retail propane prices (Residential, Commercial, etc) by state in 2011. ICF has utilized historic relationships between sectors, Mont Belvieu wholesale propane prices, winter residential propane prices from EIA's State Heating Oil and Propane Price (SHOPP) state and regional Rack propane prices to estimate retail propane prices by sector and state.

reports, as well as ICF's own estimates of retail prices based on in-house modeling and market data. The total value added attributable to the retail segment of the value chain is then calculated as the difference between the value of product at the wholesale level and the value of that product at the point of delivery to the ultimate consumer.

For 2015, value added by the retail sector totals just under $7.8 billion dollars – a 37 percent increase over the 2012 value. This increase in the added value attributable of the odorized propane sector was due to the combination of increased sales volumes from 2012 to 2015 and an increase in the retail margin of propane retailers. Propane retailer margins benefited from the combination of increased sales volumes allowing for a lower per-unit fixed cost basis and a lower decline in retail pricing relative to wholesale prices.

On a per-gallon basis, average retail markup across all consumer groups increased from an estimated $73 ¢/gallon in 2012 to $92 ¢/gallon in 2015. As a percentage of total added value the contribution of the odorized propane segment, the added value from the retail portion as a percent of total added value increased from 39.8 percent in 2012 to nearly 53 percent in 2015.

2.2.3 Indirect Economic Impact

In addition to the direct impact an industry has on the economy, indirect impacts are generated that affect employment and wages, as well as value added that can be attributed back to that industry. The natural gas liquids industry indirectly impacts the U.S. economy through several channels. These include the inputs it procures, the taxes paid by the industry and its employees, and the activity generated by the products it sells, as well as any positive impact the industry generates further down the value chain in terms of demand spurred by the wages it pays and services it buys (generally referred to as induced impact). ICF's estimates for the indirect and induced value-added generated by the odorized propane industry can be found in Table 13 below.

The 2015 ICF study used national level estimates of indirect and induced value added, and allocated this value throughout the U.S. economy at the state level. For odorized propane, the indirect and induced contribution to national GDP is estimated at over $30.6 billion. Including the $14.6 billion in direct added value from the odorized propane sector, the total economic contribution to the U.S. GDP is estimated at nearly $45.2 billion for 2015.

The increase in the added value from the odorized propane sector, which experienced a 17 percent increase relative to 2012, is largely due to the three factors. These factors include 9 percent increase in gallons sold between 2012 and 2015, the increase in the margin and profitability of propane retailers, and the increased percentage of domestic propane production relative to total consumption.

2.2.4 Supported Industries and Employment

The retail propane industry supports multiple domestic industries and jobs associated with the manufacturing, distribution, and sales of propane-related equipment, in addition to the direct and indirect/induced employment. The types of companies supported by the retail propane sector include companies that sell, distribute and manufacture residential and commercial appliances, engines, fireplaces, and barbeques, varied agricultural equipment used by the nation's farmers, and multiple types of internal combustion engines and generators used in personal, commercial and industrial applications.

There are over 150 original equipment manufacturing companies that directly supply propane appliances or propane-fueled engines. These companies have offices, manufacturing facilities, and

distribution outlets in nearly every state across the country. While it is not possible to explicitly quantify the total number of employees directly related to the retail propane sector, ICF believes that there are a large number of U.S. manufacturing, sales, and distribution jobs that are depend on the sales of propane related equipment.

Original equipment manufacturers supporting the retail propane sector include traditional residential and commercial appliances such as space heaters, water heaters, clothes dryers, and indoor gas ranges. However, the retail propane sector also supports manufacturing jobs and companies outside of these more traditional sectors. Several additional manufacturing areas are highlighted below.

Outdoor Propane Appliances

Most Americans are familiar with propane through the use of propane-fueled grills or outdoor fireplaces. Of the 50 million U.S. households that use propane, over 42 million of those households have a propane-fueled grill or other type of outdoor propane equipment.[20] The proliferation of outdoor propane appliances supports U.S. jobs in manufacturing facilities, distribution and sales offices, and retail stores.

One example of a U.S. company that is in part supported by the retail propane sector is Empire Comfort Systems. This company manufactures indoor and outdoor fireplaces, grills, and outdoor heating systems, including brands such as American Hearth, White Mountain Hearth, Empire Heating System, and Broilmaster Premium Grills. The company manufactures its products at two facilities located in Belleville, Illinois and has over 200 product distribution facilities across the country. Other equipment manufacturers include companies such as R.H. Peterson, Bull Outdoor Products, Woodland Direct, and Travis Industries.

Propane-Fueled School Busses

In recent years there has been a marked increase in the manufacturing and adoption of propane-fueled school busses. There are currently three bus manufacturers offering propane-fueled options: Thomas Built Bus, IC Bus, and Blue Bird. The leading manufacturer of propane-fueled school busses is Blue Bird. The company primarily produces gasoline and diesel-fueled school busses, but they have recently experienced large growth from alternative fuel busses, including propane, that now account for 41% of its company's sales. Blue Bird has over 1,500 employees and its primary manufacturing facility is located in Fort Valley, Georgia. Blue Bird also has a parts distribution center located in Delaware, Ohio, and additional distribution offices across the country. The company has manufactured over 10,000 propane school busses through 2016.[21]

Propane Engines and Generators

The Propane Education & Research Council and the retail propane industry have made investments in recent years to improve the quality and selection of propane fueled engines and electric generators. These efforts have been successful in increasing the penetration of propane engines in applications as far ranging as portable agricultural irrigation engines, forklift engines, commercial lawn mowers, and portable electric generators. Additionally, propane as an internal

[20] Energy Information Agency – 2015 Residential Energy Consumption Survey
[21] www.blue-bird.com – Blue Bird Annual Report

combustion fuel has made headway in various vehicle engines, including off-road engines, and small-, medium-, and heavy-duty on-road vehicles. In 2015, there were over 40,000 propane engines and over 3,500 propane generators sold in the U.S.[22] The companies active in this sector include large multinational companies, such as Siemens, Yanmar, and U.S. based manufacturers like Briggs & Stratton Corp, JD North America, and Power Solutions International.

Agricultural Products (non-Engine)

Propane is used on over 800,000 farms across multiple sectors of agricultural industry.[23] While propane is used to fuel engines by the agricultural sector, such as irrigation engines, propane is more commonly used in non-engine applications. Non-engine agricultural products include grain drying equipment, forced air heaters and radiant heat brooders for swine and poultry facilities, greenhouse heaters and horticulture heating systems, and handheld propane torches for pest control and weed clearing.

There is a large and robust sector of U.S. based companies operating manufacturing facilities domestically to supply equipment to the agricultural sector. Several examples of leading original equipment manufacturers of propane-fueled equipment include firms like GSI, Matthews Company, L.B. White, Detroit Radiant Products, and the Sukup Manufacturing Company. GSI is one of the world's leading manufacturers of agricultural equipment and is based in Assumption, Illinois. The company makes several different types of propane-fueled tower dryers used for grain storage and is the largest manufacturer of agricultural storage equipment. Matthews Company, which is also based in Illinois, and Sukup Manufacturing Company both manufacture propane-fueled grain drying and storage equipment. L.B. White manufactures various agricultural heating appliances, including forced air heaters, radiant heat brooders, and portable heaters, while Detroit Radiant Products specializes in portable space heating equipment.

[22] Propane Education & Research Council
[23] Propane Education & Research Council

Table 13: State Value Added, Employment, and Wages for Odorized Propane, 2015

State	Value Added ($1,000)			Employment	Wages ($1,000)
	Direct	Indirect & Induced	Total	Direct	Direct
Alabama	163,031	356,513	519,545	1,259	56,398
Alaska	76,822	127,701	204,522	325	33,273
Arizona	94,840	296,762	391,602	694	30,327
Arkansas	121,993	240,560	362,553	681	26,930
California	615,707	2,383,353	2,999,061	3,569	203,432
Colorado	446,414	764,117	1,210,531	1,251	91,515
Connecticut	168,209	377,935	546,144	542	31,664
Delaware	85,859	151,601	237,461	298	17,715
District of Columbia	6,980	69,035	76,015	16	801
Florida	185,342	734,360	919,702	2,008	88,489
Georgia	225,689	609,614	835,303	1,818	72,332
Hawaii	33,228	84,635	117,863	109	5,962
Idaho	62,831	123,556	186,388	244	9,496
Illinois	534,200	1,206,959	1,741,158	1,051	50,353
Indiana	245,624	618,674	864,298	1,222	56,132
Iowa	369,481	609,372	978,853	542	23,376
Kansas	221,893	389,555	611,448	491	31,022
Kentucky	159,474	352,905	512,379	728	33,063
Louisiana	340,205	629,323	969,528	1,379	103,620
Maine	181,433	271,296	452,729	264	12,733
Maryland	174,175	431,458	605,633	568	28,297
Massachusetts	165,172	515,592	680,763	832	51,718
Michigan	522,274	1,030,527	1,552,801	1,500	71,908
Minnesota	416,652	766,508	1,183,160	1,027	42,884
Mississippi	179,947	307,527	487,474	1,084	53,294
Missouri	291,983	575,339	867,321	1,272	75,740
Montana	129,127	194,023	323,150	473	23,962
Nebraska	126,865	239,200	366,065	269	10,807
Nevada	53,031	145,555	198,585	351	17,559
New Hampshire	268,684	395,953	664,637	652	42,743
New Jersey	121,620	495,430	617,051	427	30,726
New Mexico	267,314	398,731	666,045	1,203	87,137
New York	507,108	1,457,237	1,964,345	1,702	94,934
North Carolina	434,766	938,530	1,373,296	2,460	102,120
North Dakota	406,527	561,145	967,672	1,006	104,811
Ohio	464,515	1,048,800	1,513,314	1,608	88,817
Oklahoma	539,328	816,796	1,356,123	1,578	130,236
Oregon	73,842	268,903	342,745	313	13,338
Pennsylvania	550,637	1,176,258	1,726,895	1,860	119,378
Rhode Island	26,814	68,269	95,083	111	6,145
South Carolina	111,094	287,443	398,538	898	39,040
South Dakota	75,730	127,582	203,311	190	7,496
Tennessee	122,602	382,776	505,378	1,445	51,864
Texas	2,561,327	4,443,030	7,004,357	7,858	710,491
Utah	93,779	216,872	310,651	307	20,116
Vermont	151,437	215,158	366,595	406	22,114
Virginia	284,972	662,252	947,225	1,010	46,115
Washington	182,520	531,769	714,289	655	30,041
West Virginia	320,102	462,474	782,576	622	53,656
Wisconsin	431,306	784,887	1,216,194	1,296	53,600
Wyoming	172,241	246,317	418,558	489	42,290
U.S. State Totals	**14,566,746**	**30,590,168**	**45,156,914**	**53,963**	**3,252,008**
Imports	**1,069,229**		**1,069,229**		
Total Including Imports	**15,635,975**	**30,590,168**	**46,226,143**		

Table 14: State Production attributed to Odorized Propane (C_3H_8), 2015

	Volume (1,000 Gal)			Percentage of National Total		
State	Refinery	Gas Plant	Total	of Ref. Prod.	of Gas Plt. Production	of Total Production
Alabama	10,265	42,317	52,582	0.62%	0.68%	0.67%
Alaska	7,117	41,858	48,975	0.43%	0.67%	0.62%
Arizona	-	-	-	0.00%	0.00%	0.00%
Arkansas	1,130	1,999	3,129	0.07%	0.03%	0.04%
California	99,959	25,377	125,336	6.01%	0.41%	1.59%
Colorado	4,298	423,690	427,989	0.26%	6.82%	5.43%
Connecticut	-	-	-	0.00%	0.00%	0.00%
Delaware	16,808	-	16,808	1.01%	0.00%	0.21%
District of Columbia	-	-	-	0.00%	0.00%	0.00%
Florida	-	980	980	0.00%	0.02%	0.01%
Georgia	-	-	-	0.00%	0.00%	0.00%
Hawaii	7,086	-	7,086	0.43%	0.00%	0.09%
Idaho	-	-	-	0.00%	0.00%	0.00%
Illinois	82,077	9,129	91,206	4.93%	0.15%	1.16%
Indiana	39,485	-	39,485	2.37%	0.00%	0.50%
Iowa	-	-	-	0.00%	0.00%	0.00%
Kansas	24,912	69,498	94,410	1.50%	1.12%	1.20%
Kentucky	24,680	21,384	46,064	1.48%	0.34%	0.58%
Louisiana	405,532	287,576	693,108	24.38%	4.63%	8.80%
Maine	-	-	-	0.00%	0.00%	0.00%
Maryland	-	-	-	0.00%	0.00%	0.00%
Massachusetts	-	-	-	0.00%	0.00%	0.00%
Michigan	11,365	9,984	21,348	0.68%	0.16%	0.27%
Minnesota	21,274	-	21,274	1.28%	0.00%	0.27%
Mississippi	40,358	43,108	83,467	2.43%	0.69%	1.06%
Missouri	-	-	-	0.00%	0.00%	0.00%
Montana	8,566	5,889	14,455	0.51%	0.09%	0.18%
Nebraska	-	-	-	0.00%	0.00%	0.00%
Nevada	90	-	90	0.01%	0.00%	0.00%
New Hampshire	-	-	-	0.00%	0.00%	0.00%
New Jersey	40,126	-	40,126	2.41%	0.00%	0.51%
New Mexico	5,075	290,806	295,881	0.31%	4.68%	3.76%
New York	-	-	-	0.00%	0.00%	0.00%
North Carolina	-	-	-	0.00%	0.00%	0.00%
North Dakota	5,226	395,586	400,812	0.31%	6.37%	5.09%
Ohio	49,193	226,931	276,124	2.96%	3.65%	3.51%
Oklahoma	36,842	771,593	808,436	2.21%	12.42%	10.26%
Oregon	-	-	-	0.00%	0.00%	0.00%
Pennsylvania	48,408	133,163	181,571	2.91%	2.14%	2.31%
Rhode Island	-	-	-	0.00%	0.00%	0.00%
South Carolina	-	-	-	0.00%	0.00%	0.00%
South Dakota	-	-	-	0.00%	0.00%	0.00%
Tennessee	16,860	1,608	18,467	1.01%	0.03%	0.23%
Texas	607,652	2,679,282	3,286,934	36.53%	43.12%	41.73%
Utah	7,661	63,007	70,668	0.46%	1.01%	0.90%
Vermont	-	-	-	0.00%	0.00%	0.00%
Virginia	-	-	-	0.00%	0.00%	0.00%
Washington	31,521	-	31,521	1.89%	0.00%	0.40%
West Virginia	450	464,753	465,202	0.03%	7.48%	5.91%
Wisconsin	2,127	-	2,127	0.13%	0.00%	0.03%
Wyoming	7,442	204,134	211,577	0.45%	3.29%	2.69%
U.S. Total	**1,663,587**	**6,213,654**	**7,877,239**	**100.00%**	**100.00%**	**100.00%**

Table 15: State Level Value Summary for Odorized Propane (C_3H_8), 2015

		Value Added ($1,000)						
						Direct	Indirect & Induced	Total
State	SUB PAD	Supply	Transportation, Storage, and Wholesaling Markup	Wholesale Value	Retail Markup	Value Added	Contribution to GDP	Contribution To GDP
Alabama	3	33,268	26,847	60,115	102,916	163,031	356,513	519,545
Alaska	5	63,201	3,826	67,027	9,795	76,822	127,701	204,522
Arizona	5	8	20,867	20,875	73,965	94,840	296,762	391,602
Arkansas	3	2,172	26,852	29,024	92,969	121,993	240,560	362,553
California	5	59,889	121,589	181,478	434,229	615,707	2,383,353	2,999,061
Colorado	4	224,007	56,609	280,616	165,797	446,414	764,117	1,210,531
Connecticut	1-A	0	32,512	32,512	135,697	168,209	377,935	546,144
Delaware	1-B	5,524	15,201	20,725	65,135	85,859	151,601	237,461
District of Columbia	1-B	0	1,232	1,232	5,749	6,980	69,035	76,015
Florida	1-C	991	48,103	49,093	136,249	185,342	734,360	919,702
Georgia	1-C	0	56,855	56,855	168,834	225,689	609,614	835,303
Hawaii	5	0	8,120	8,120	25,108	33,228	84,635	117,863
Idaho	4	0	13,335	13,335	49,496	62,831	123,556	186,388
Illinois	2	152,345	98,531	250,876	283,324	534,200	1,206,959	1,741,158
Indiana	2	468	62,676	63,145	182,479	245,624	618,674	864,298
Iowa	2	0	87,610	87,610	281,870	369,481	609,372	978,853
Kansas	2	62,524	48,305	110,829	111,064	221,893	389,555	611,448
Kentucky	2	11,573	34,617	46,190	113,284	159,474	352,905	512,379
Louisiana	3	264,366	31,638	296,004	44,201	340,205	629,323	969,528
Maine	1-A	0	38,236	38,236	143,197	181,433	271,296	452,729
Maryland	1-B	0	32,591	32,591	141,584	174,175	431,458	605,633
Massachusetts	1-A	0	31,329	31,329	133,843	165,172	515,592	680,763
Michigan	2	5,810	117,666	123,475	398,799	522,274	1,030,527	1,552,801
Minnesota	2	0	97,608	97,608	319,044	416,652	766,508	1,183,160
Mississippi	3	40,259	29,640	69,899	110,048	179,947	307,527	487,474
Missouri	2	31	71,385	71,417	220,566	291,983	575,339	867,321
Montana	4	9,900	25,136	35,035	94,092	129,127	194,023	323,150
Nebraska	2	611	37,967	38,579	88,286	126,865	239,200	366,065
Nevada	5	59	11,323	11,382	41,649	53,031	145,555	198,585
New Hampshire	1-A	0	50,977	50,977	217,707	268,684	395,953	664,637
New Jersey	1-B	13,187	21,836	35,022	86,598	121,620	495,430	617,051
New Mexico	3	157,649	28,356	186,005	81,310	267,314	398,731	666,045
New York	1-B	59	91,353	91,412	415,696	507,108	1,457,237	1,964,345
North Carolina	1-C	0	104,060	104,060	330,706	434,766	938,530	1,373,296
North Dakota	2	272,295	36,480	308,775	97,752	406,527	561,145	967,672
Ohio	2	133,504	88,188	221,692	242,823	464,515	1,048,800	1,513,314
Oklahoma	2	386,445	54,993	441,438	97,890	539,328	816,796	1,356,123
Oregon	5	0	16,833	16,833	57,009	73,842	268,903	342,745
Pennsylvania	1-B	93,973	91,857	185,831	364,807	550,637	1,176,258	1,726,895
Rhode Island	1-A	0	5,577	5,577	21,237	26,814	68,269	95,083
South Carolina	1-C	0	30,091	30,091	81,003	111,094	287,443	398,538
South Dakota	2	352	17,382	17,733	57,996	75,730	127,582	203,311
Tennessee	2	780	28,348	29,127	93,475	122,602	382,776	505,378
Texas	3	2,000,517	168,026	2,168,543	392,784	2,561,327	4,443,030	7,004,357
Utah	4	37,356	14,932	52,287	41,492	93,779	216,872	310,651
Vermont	1-A	0	29,531	29,531	121,906	151,437	215,158	366,595
Virginia	1-C	2	64,076	64,078	220,894	284,972	662,252	947,225
Washington	5	0	40,825	40,825	141,695	182,520	531,769	714,289
West Virginia	1-C	252,221	22,787	275,008	45,094	320,102	462,474	782,576
Wisconsin	2	0	98,432	98,432	332,875	431,306	784,887	1,216,194
Wyoming	4	113,411	16,811	130,222	42,019	172,241	246,317	418,558
Total Allocated to states		**4,398,756**	**2,409,955**	**6,808,711**	**7,758,036**	**14,566,746**	**30,590,168**	**45,156,914**

Values Not Applied to States	
Value of Imported NGL Product	588,019
Value in Imported Crude	625,011
Value in Foreign Natural Gas	47,918
Storage Inventory Change	-73,076
Import Adjustments	-118,643

					Value in Non-U.S. Consumption ↘		
					0		
U.S. Total	**5,467,984**	**2,409,955**	**7,877,939**	**7,758,036**	**15,635,975**	**28,144,755**	**43,780,730**

Table 16: State Level Value Summary for Propane (C_3H_8), 2015

		Value Added ($1,000)						
						Direct	Indirect & Induced	Total
State	SUB PAD	Supply	Transportation, Storage, and Wholesaling Markup	Wholesale Value	Retail Markup	Value Added	Contribution to GDP	Contribution To GDP
Alabama	3	93,913	30,554	124,467	102,916	227,383	531,314	758,696
Alaska	5	178,411	5,289	183,700	9,795	193,495	296,922	490,417
Arizona	5	22	20,867	20,889	73,965	94,854	406,142	500,996
Arkansas	3	6,132	33,592	39,724	92,969	132,693	306,146	438,839
California	5	169,060	127,310	296,370	434,229	730,600	3,530,651	4,261,250
Colorado	4	632,351	78,959	711,310	165,797	877,107	1,439,879	2,316,986
Connecticut	1-A	0	32,512	32,512	135,697	168,209	478,341	646,549
Delaware	1-B	15,593	16,050	31,644	65,135	96,778	191,003	287,781
District of Columbia	1-B	0	1,232	1,232	5,749	6,980	106,836	113,816
Florida	1-C	2,797	48,128	50,925	136,249	187,174	1,047,808	1,234,982
Georgia	1-C	0	65,751	65,751	168,834	234,585	820,534	1,055,119
Hawaii	5	0	8,478	8,478	25,108	33,586	111,225	144,811
Idaho	4	0	13,335	13,335	49,496	62,831	149,957	212,788
Illinois	2	430,054	152,926	582,980	283,324	866,303	1,961,791	2,828,095
Indiana	2	1,322	76,985	78,308	182,479	260,787	827,114	1,087,901
Iowa	2	0	123,775	123,775	281,870	405,646	737,742	1,143,387
Kansas	2	176,498	76,906	253,404	111,064	364,468	638,635	1,003,103
Kentucky	2	32,670	36,428	69,098	113,284	182,382	474,469	656,851
Louisiana	3	746,280	171,890	918,170	44,201	962,371	1,556,067	2,518,438
Maine	1-A	0	38,236	38,236	143,197	181,433	293,635	475,068
Maryland	1-B	0	32,591	32,591	141,584	174,175	560,717	734,892
Massachusetts	1-A	0	31,329	31,329	133,843	165,172	705,270	870,441
Michigan	2	16,401	120,360	136,761	398,799	535,560	1,269,442	1,805,001
Minnesota	2	0	100,540	100,540	319,044	419,584	912,080	1,331,664
Mississippi	3	113,647	34,889	148,535	110,048	258,584	456,152	714,736
Missouri	2	89	81,417	81,506	220,566	302,072	711,870	1,013,942
Montana	4	27,946	25,724	53,669	94,092	147,761	234,738	382,499
Nebraska	2	1,726	59,260	60,986	88,286	149,272	315,156	464,428
Nevada	5	167	11,327	11,495	41,649	53,143	194,002	247,145
New Hampshire	1-A	0	50,977	50,977	217,707	268,684	425,372	694,056
New Jersey	1-B	37,225	23,864	61,088	86,598	147,686	741,977	889,664
New Mexico	3	445,028	44,621	489,649	81,310	570,959	825,760	1,396,719
New York	1-B	166	91,353	91,519	415,696	507,215	1,960,463	2,467,678
North Carolina	1-C	0	112,433	112,433	330,706	443,139	1,184,778	1,627,917
North Dakota	2	768,662	49,029	817,691	97,752	915,443	1,243,326	2,158,769
Ohio	2	376,869	116,831	493,700	242,823	736,523	1,682,911	2,419,434
Oklahoma	2	1,090,896	101,953	1,192,848	97,890	1,290,738	1,866,552	3,157,290
Oregon	5	0	16,833	16,833	57,009	73,842	377,910	451,752
Pennsylvania	1-B	265,277	103,033	368,310	364,807	733,116	1,703,752	2,436,868
Rhode Island	1-A	0	5,577	5,577	21,237	26,814	89,333	116,147
South Carolina	1-C	0	38,464	38,464	81,003	119,467	388,493	507,960
South Dakota	2	993	17,382	18,375	57,996	76,371	146,782	223,153
Tennessee	2	2,201	29,242	31,443	93,475	124,918	526,621	651,539
Texas	3	5,647,266	791,132	6,438,398	392,784	6,831,183	10,695,709	17,526,891
Utah	4	105,451	21,061	126,512	41,492	168,003	373,229	541,232
Vermont	1-A	0	29,531	29,531	121,906	151,437	226,688	378,126
Virginia	1-C	7	64,076	64,083	220,894	284,977	846,212	1,131,188
Washington	5	0	42,418	42,418	141,695	184,113	719,499	903,612
West Virginia	1-C	711,997	43,207	755,203	45,094	800,297	1,115,942	1,916,240
Wisconsin	2	0	98,539	98,539	332,875	431,414	926,364	1,357,778
Wyoming	4	320,148	26,649	346,797	42,019	388,816	541,987	930,803
Total Allocated to states		**12,417,263**	**3,574,843**	**15,992,106**	**7,758,036**	**23,750,142**	**49,875,298**	**73,625,440**
Values Not Applied to States								
Value of Imported NGL Product		1,659,921						
Value in Imported Crude		1,764,345						
Value in Foreign Natural Gas		135,267						
Storage Inventory Change		-206,286				**Value in Non-U.S. Consumption ↘**		
Import Adjustments		-334,918				-5,445,449		
U.S. Total		**15,435,592**	**3,574,843**	**19,010,435**	**7,758,036**	**21,323,022**	**38,381,439**	**59,704,461**

Table 17: State Level Value Summary for Total NGLs / LRGs, 2015

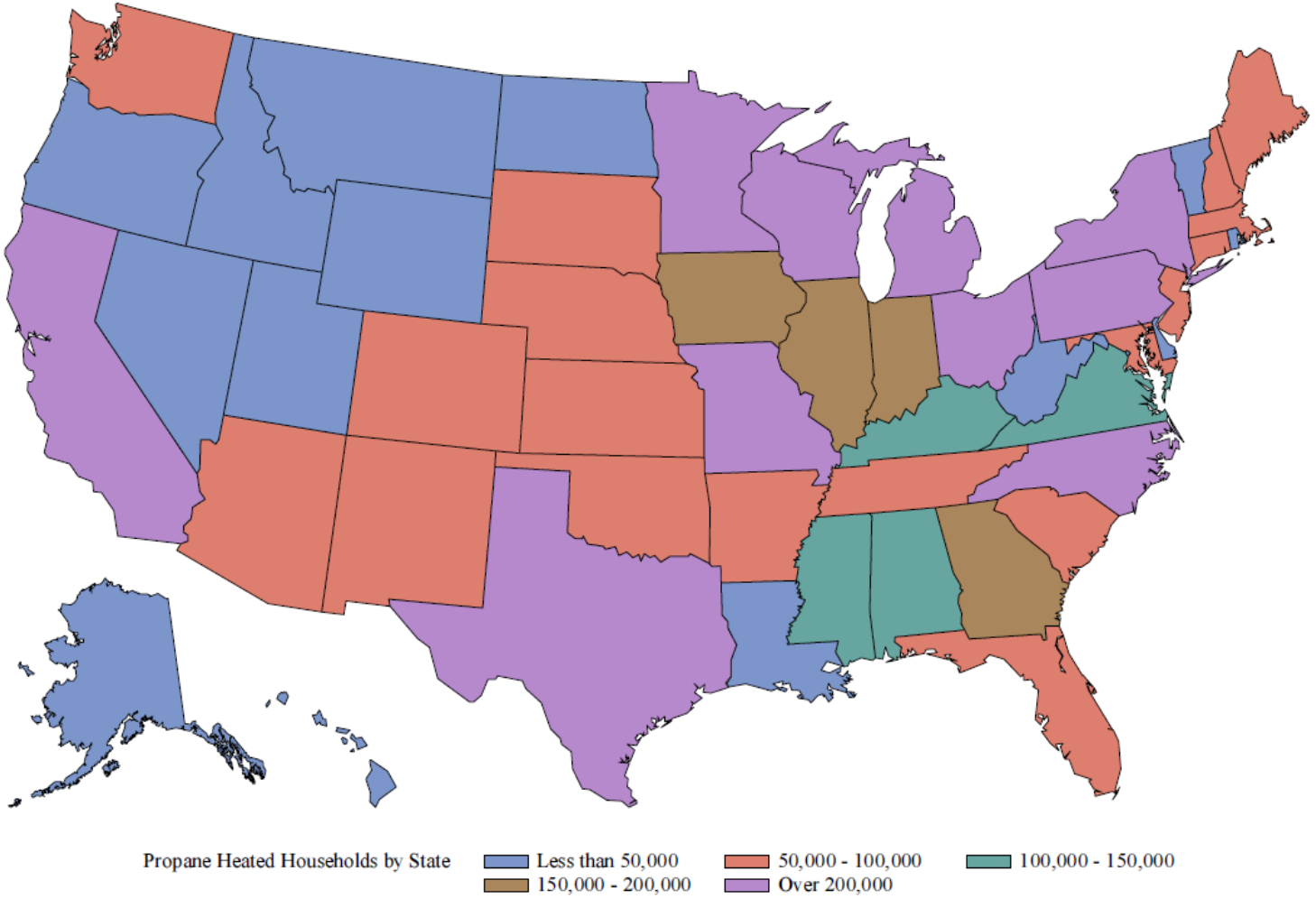
		Value Added ($1,000)						
						Direct	Indirect & Induced	Total
State	SUB PAD	Supply	Transportation, Storage, and Wholesaling Markup	Wholesale Value	Retail Markup	Value Added	Contribution to GDP	Contribution To GDP
Alabama	3	245,612	49,896	295,508	102,916	398,424	1,048,743	1,447,166
Alaska	5	834,850	18,117	852,967	10,521	863,488	1,224,721	2,088,209
Arizona	5	45	20,867	20,912	73,965	94,877	760,229	855,106
Arkansas	3	15,015	79,756	94,771	92,969	187,740	545,008	732,748
California	5	619,944	292,842	912,786	454,091	1,366,876	7,588,620	8,955,496
Colorado	4	1,839,093	535,947	2,375,040	214,289	2,589,329	4,040,864	6,630,193
Connecticut	1-A	0	32,512	32,512	135,697	168,209	803,402	971,611
Delaware	1-B	35,087	16,391	51,478	65,135	116,612	298,396	415,008
District of Columbia	1-B	0	1,232	1,232	5,749	6,980	229,216	236,197
Florida	1-C	6,379	48,207	54,586	136,249	190,835	2,059,641	2,250,476
Georgia	1-C	0	69,515	69,515	168,834	238,349	1,470,837	1,709,186
Hawaii	5	0	8,683	8,683	25,108	33,791	196,069	229,860
Idaho	4	0	13,335	13,335	49,496	62,831	235,427	298,258
Illinois	2	953,835	408,057	1,361,892	295,826	1,657,718	4,036,655	5,694,373
Indiana	2	2,688	138,610	141,298	183,142	324,440	1,520,871	1,845,311
Iowa	2	0	195,657	195,657	283,403	479,060	1,096,567	1,575,627
Kansas	2	472,620	779,707	1,252,327	197,863	1,450,190	2,256,408	3,706,598
Kentucky	2	88,110	92,822	180,931	121,694	302,625	927,936	1,230,562
Louisiana	3	1,995,400	629,392	2,624,792	104,751	2,729,543	4,235,180	6,964,723
Maine	1-A	0	38,236	38,236	143,197	181,433	365,956	547,389
Maryland	1-B	0	32,591	32,591	141,584	174,175	979,192	1,153,366
Massachusetts	1-A	0	31,329	31,329	133,843	165,172	1,319,350	1,484,522
Michigan	2	41,797	134,483	176,280	399,707	575,986	2,039,562	2,615,548
Minnesota	2	0	107,263	107,263	319,044	426,307	1,379,767	1,806,074
Mississippi	3	288,841	88,707	377,548	116,733	494,281	912,770	1,407,052
Missouri	2	180	127,111	127,292	221,431	348,723	1,172,070	1,520,793
Montana	4	67,326	26,399	93,725	94,092	187,817	340,200	528,017
Nebraska	2	3,508	145,387	148,896	88,286	237,182	581,037	818,219
Nevada	5	340	11,330	11,670	41,649	53,319	350,603	403,922
New Hampshire	1-A	0	50,977	50,977	217,707	268,684	520,616	789,300
New Jersey	1-B	83,761	102,198	185,960	97,541	283,501	1,607,024	1,890,525
New Mexico	3	1,275,913	148,854	1,424,767	82,386	1,507,152	2,147,357	3,654,510
New York	1-B	338	91,353	91,691	415,696	507,387	3,589,419	4,096,806
North Carolina	1-C	0	115,975	115,975	330,706	446,681	1,951,370	2,398,051
North Dakota	2	1,910,553	88,311	1,998,864	97,752	2,096,615	2,845,510	4,942,126
Ohio	2	1,025,547	270,771	1,296,318	249,030	1,545,348	3,642,497	5,187,845
Oklahoma	2	2,893,589	418,265	3,311,854	122,148	3,434,002	4,888,880	8,322,882
Oregon	5	0	16,833	16,833	57,009	73,842	730,819	804,661
Pennsylvania	1-B	650,529	460,296	1,110,825	543,209	1,654,034	3,840,693	5,494,727
Rhode Island	1-A	0	5,577	5,577	21,237	26,814	157,527	184,341
South Carolina	1-C	0	42,006	42,006	81,003	123,009	685,007	808,017
South Dakota	2	2,018	17,382	19,400	57,996	77,396	207,576	284,972
Tennessee	2	5,836	30,016	35,851	93,475	129,326	988,303	1,117,629
Texas	3	15,513,642	3,983,358	19,497,000	840,512	20,337,512	30,526,221	50,863,733
Utah	4	297,189	389,504	686,693	60,219	746,913	1,319,625	2,066,537
Vermont	1-A	0	29,531	29,531	121,906	151,437	264,018	415,455
Virginia	1-C	13	64,076	64,089	220,894	284,983	1,441,769	1,726,752
Washington	5	0	81,043	81,043	145,452	226,495	1,375,662	1,602,157
West Virginia	1-C	1,805,533	83,869	1,889,403	45,094	1,934,497	2,684,985	4,619,482
Wisconsin	2	0	98,460	98,460	332,875	431,335	1,383,836	1,815,172
Wyoming	4	917,700	122,548	1,040,248	47,732	1,087,980	1,496,626	2,584,607
Total Allocated to states		**33,892,832**	**10,885,581**	**44,778,414**	**8,702,842**	**53,481,256**	**112,310,637**	**165,791,893**
Values Not Applied to States								
Value of Imported NGL Product		2,788,564						
Value in Imported Crude		3,586,287						
Value in Foreign Natural Gas		456,443						
Storage Inventory Change		-211,561						
Import Adjustments		-379,556				-10,809,857		
						Value in Non-U.S. Consumption ↘		
U.S. Total		**40,133,008**	**10,885,581**	**51,018,589**	**8,702,842**	**48,911,575**	**88,040,835**	**136,952,410**

3. Maps of National Level Overview

The maps on the following pages present a state by state visual representation of the economic and employment impacts from the entire propane sector, the retail propane sector, and the entire NGL value chain. The data for these maps is derived from the tables presented in Section 2 of this report and is intended to present this information in an easy to understand format. The title of each map refers to the information being presented and includes the propane heated households, employment, wage, and the economic impacts. Each map includes a legend at the bottom that separates the states into roughly five equal groupings of states.

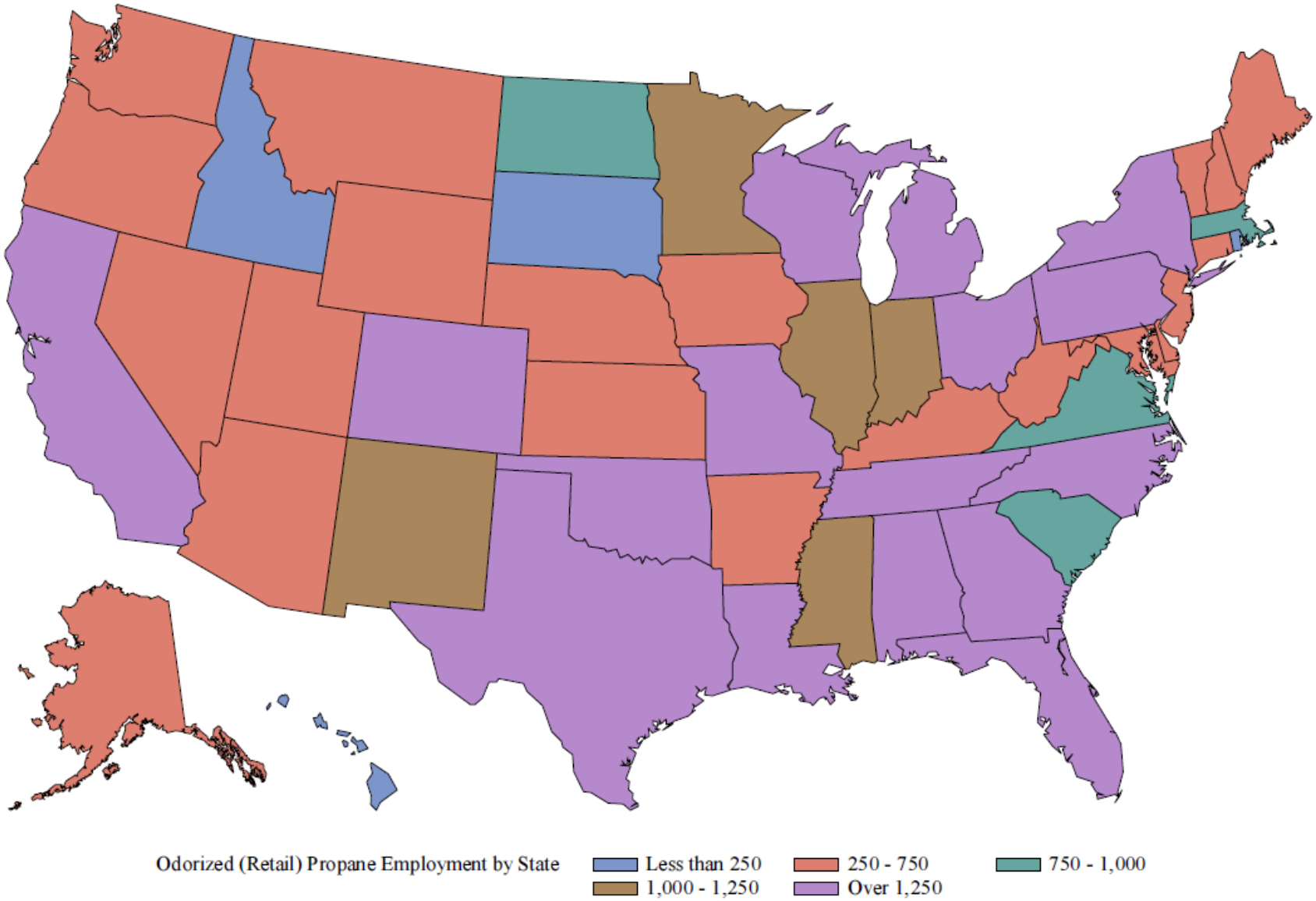
3.1. Propane Heated Households by State

Figure 14. Propane Heated Households by State



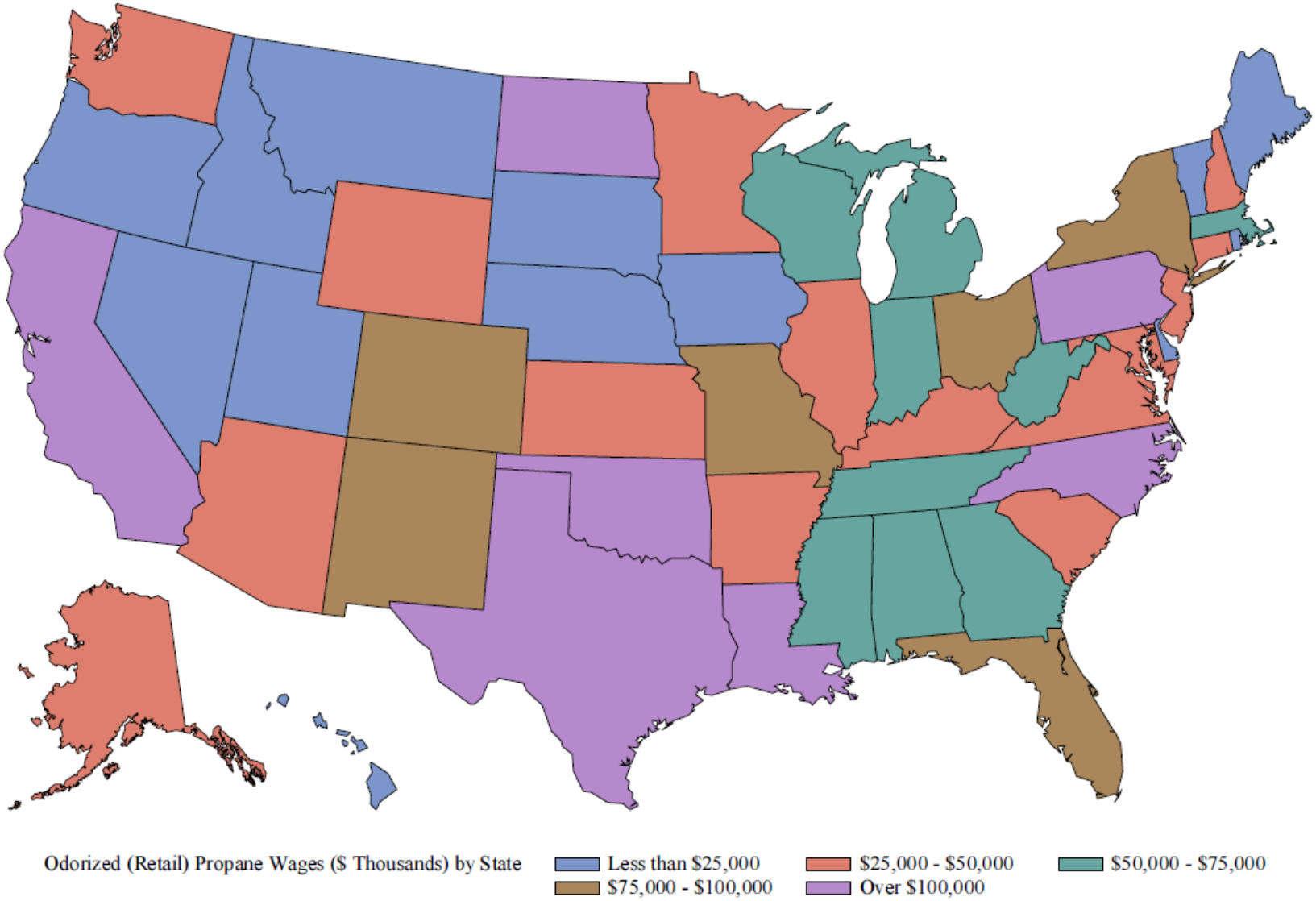
3.2. Odorized (Retail) Propane Employment by State

Figure 15. Odorized (Retail) Propane Employment by State



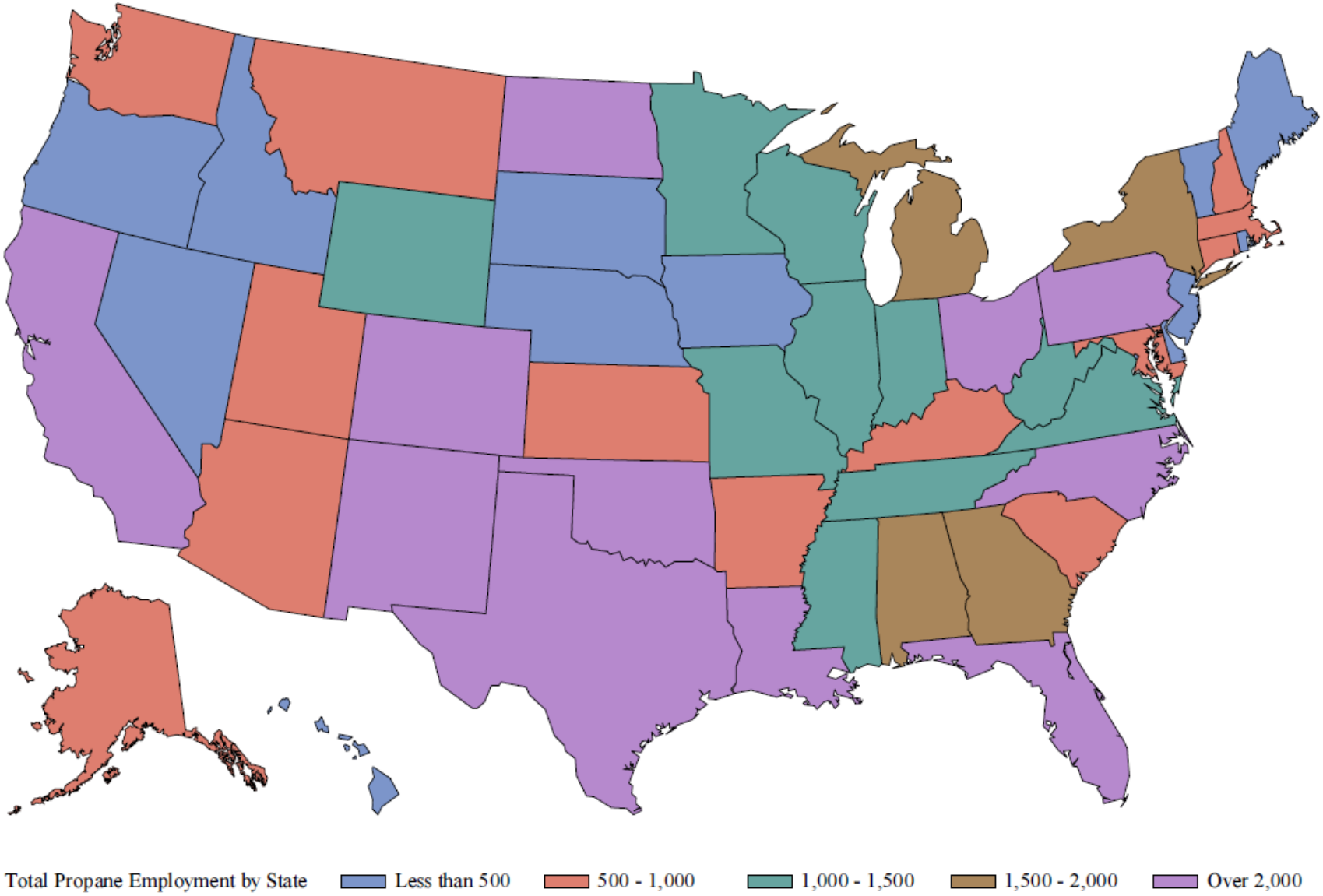
3.3. Odorized (Retail) Propane Wages ($ Thousands) by State

Figure 16. Odorized (Retail) Propane Wages ($ Thousands) by State



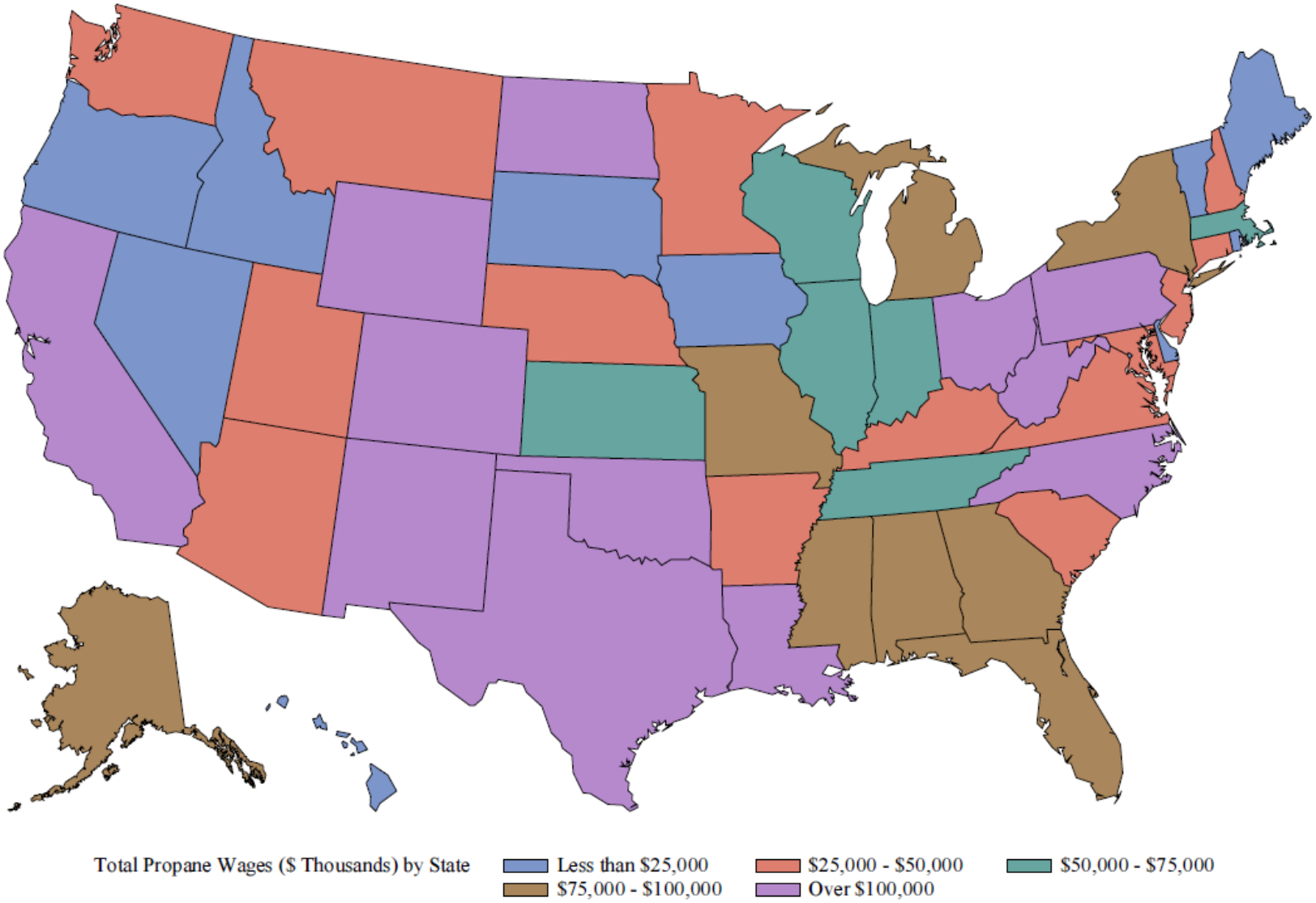
3.4. Total Propane Employment by State

Figure 17. Total Propane Employment by State



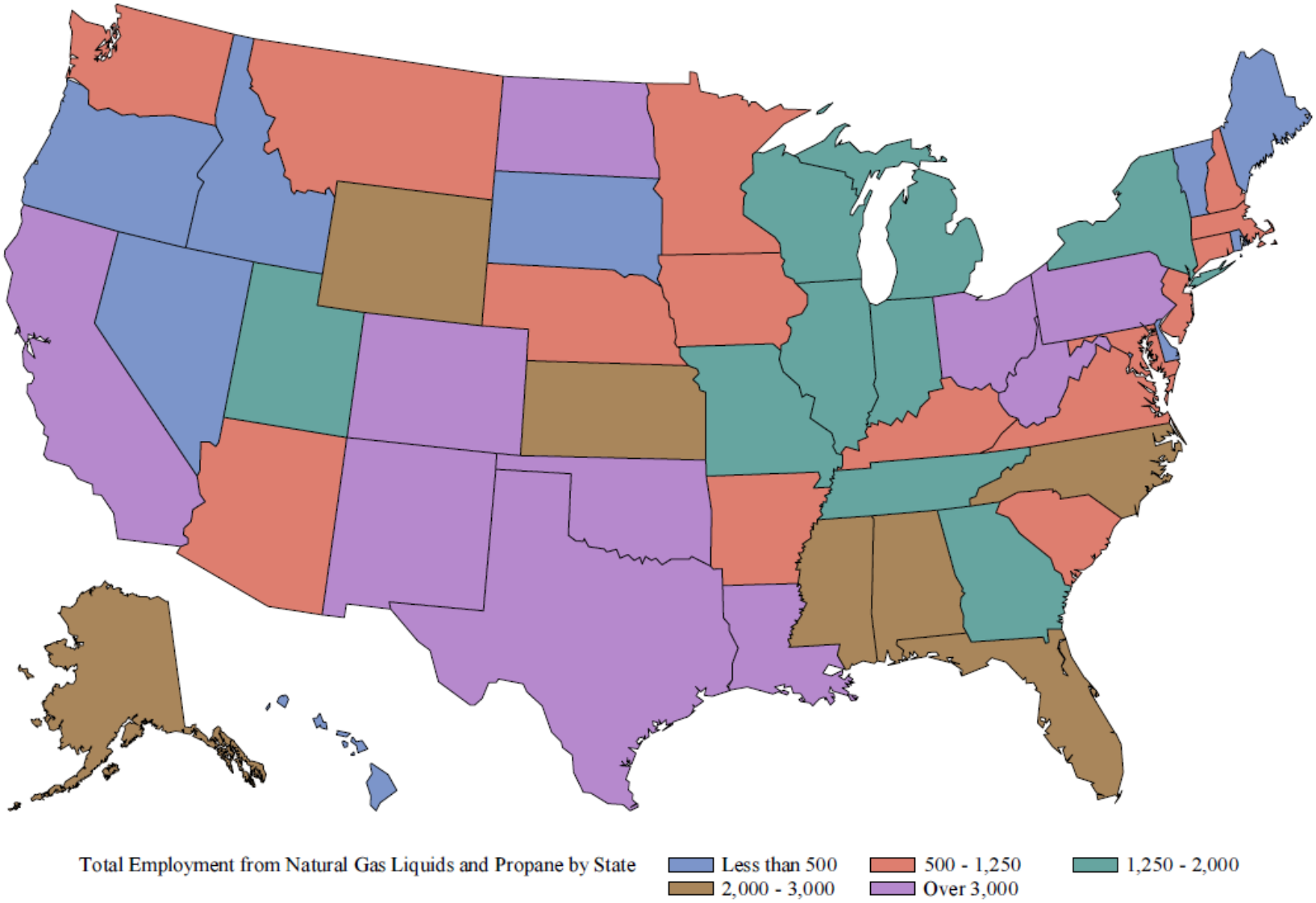
3.5. Total Propane Wages ($ Thousands) by State

Figure 18. Total Propane Wages ($ Thousands) by State



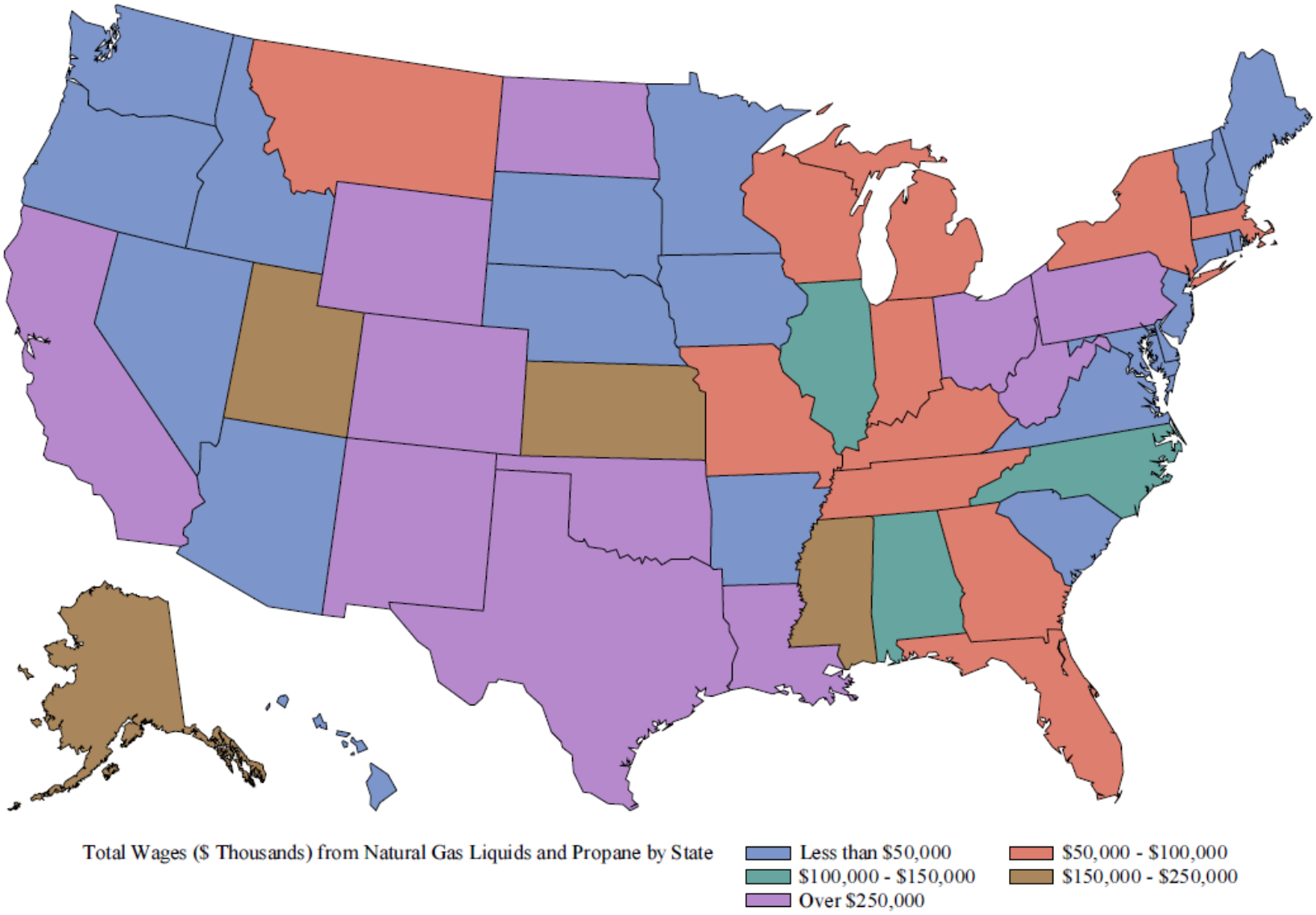
3.6. Total Employment from Natural Gas Liquids and Propane by State

Figure 19. Total Employment from Natural Gas Liquids and Propane by State



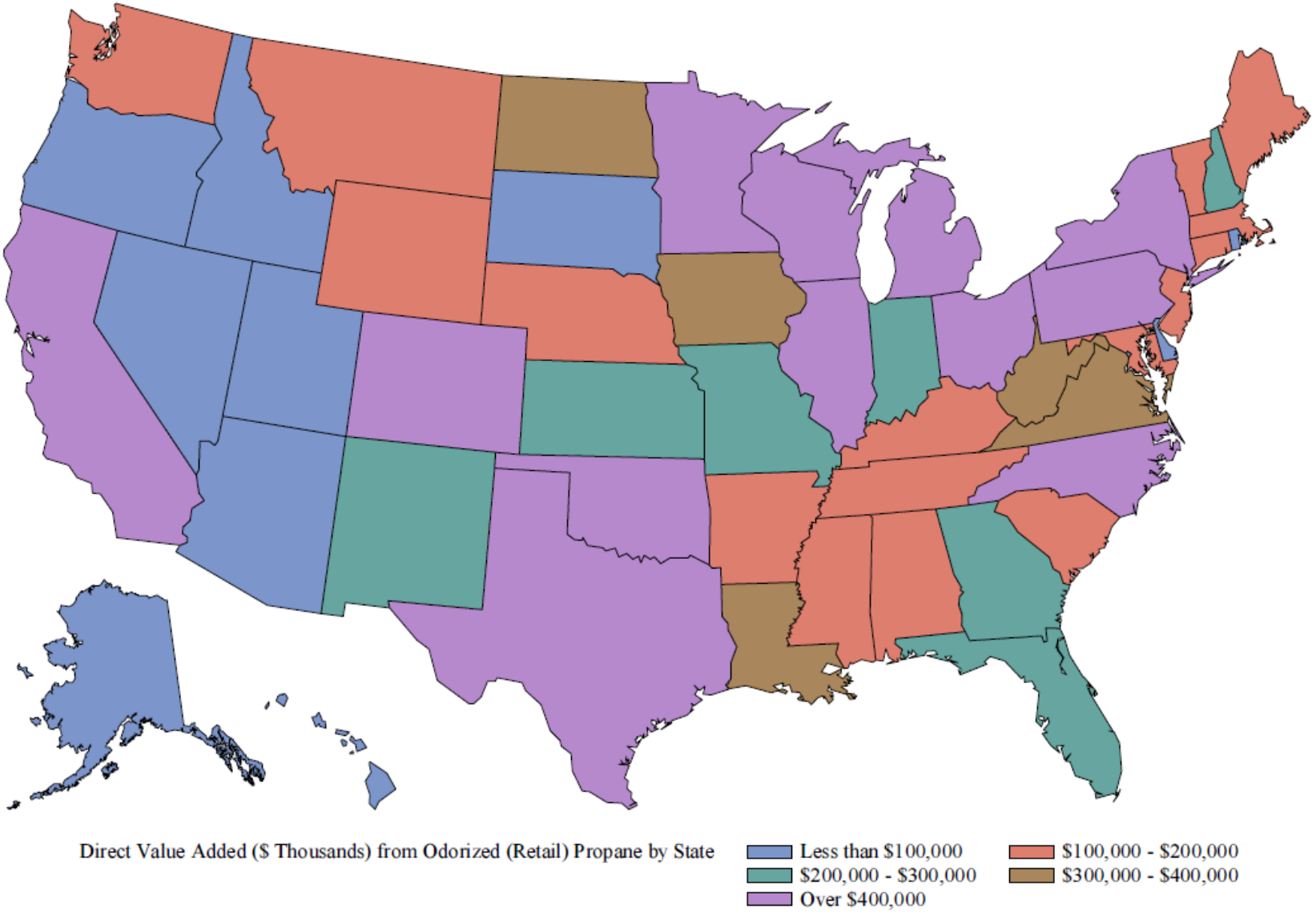
3.7. Total Wages ($ Thousands) from Natural Gas Liquids and Propane by State

Figure 20. Total Wages ($ Thousands) from Natural Gas Liquids and Propane by State



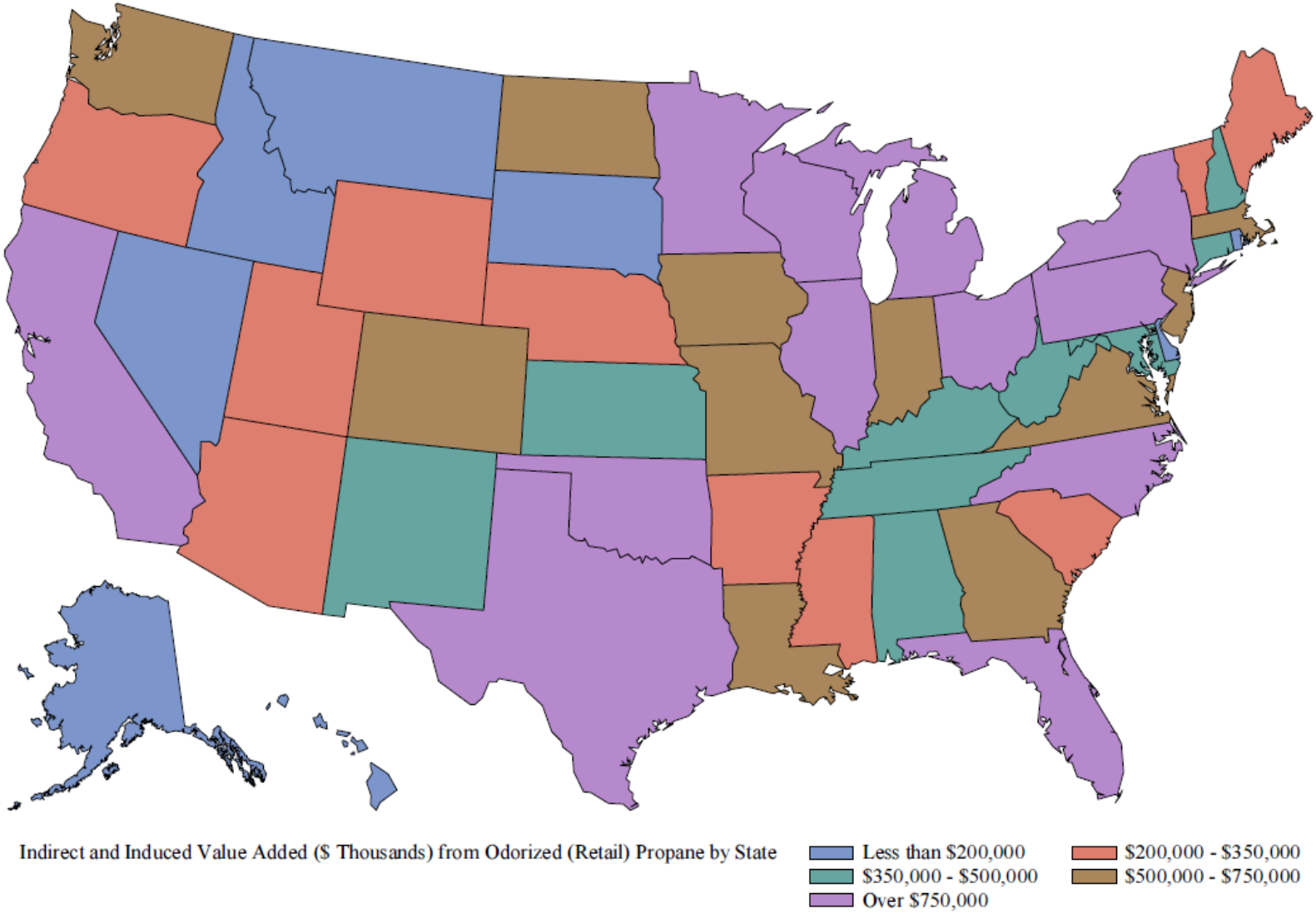
3.8. Direct Added Value from Odorized (Retail) Propane by State

Figure 21. Direct Added Value from Odorized (Retail) Propane by State



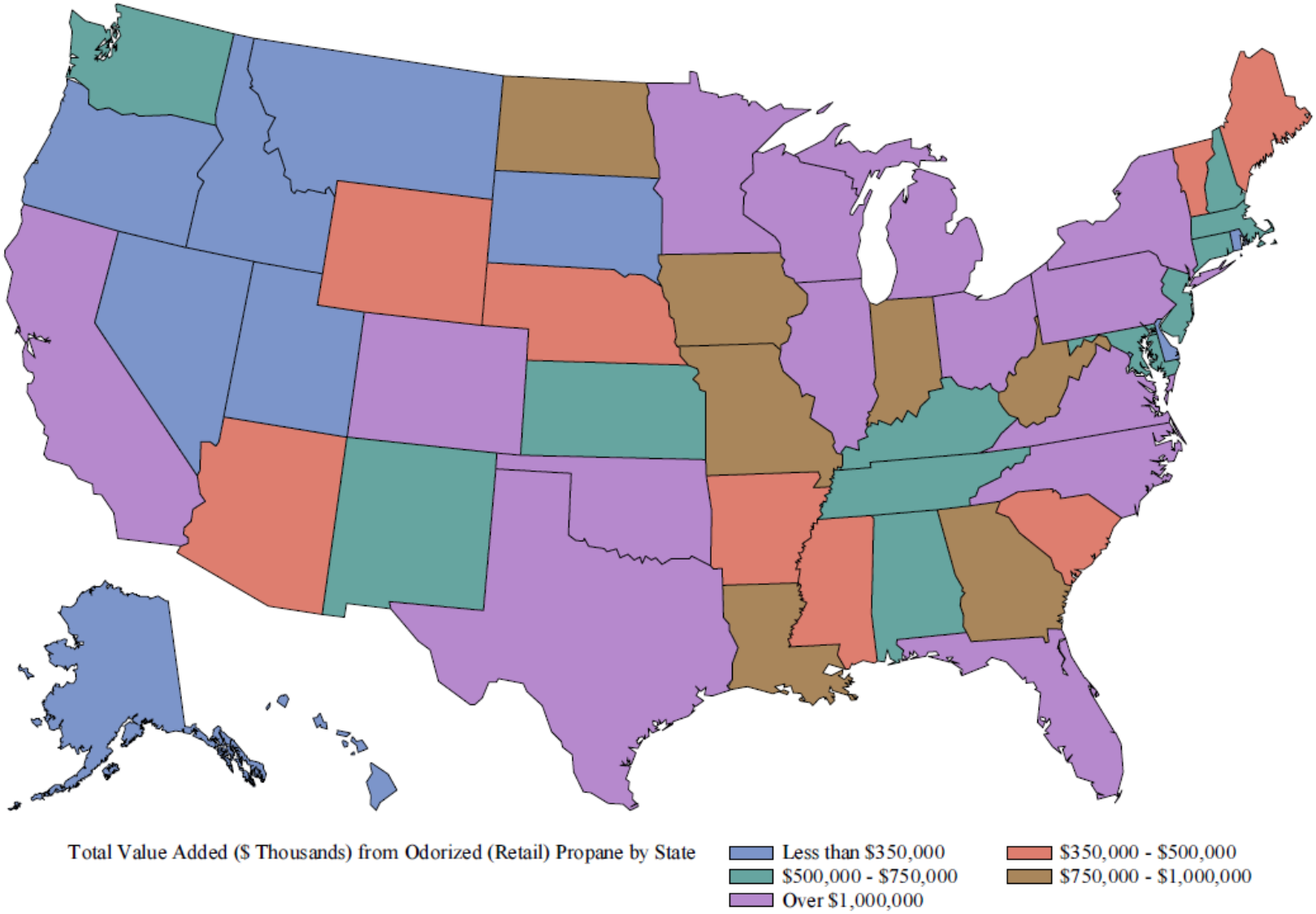
3.9. Indirect and Induced Added Value from Odorized (Retail) Propane by State

Figure 22. Indirect and Induced Added Value from Odorized (Retail) Propane by State



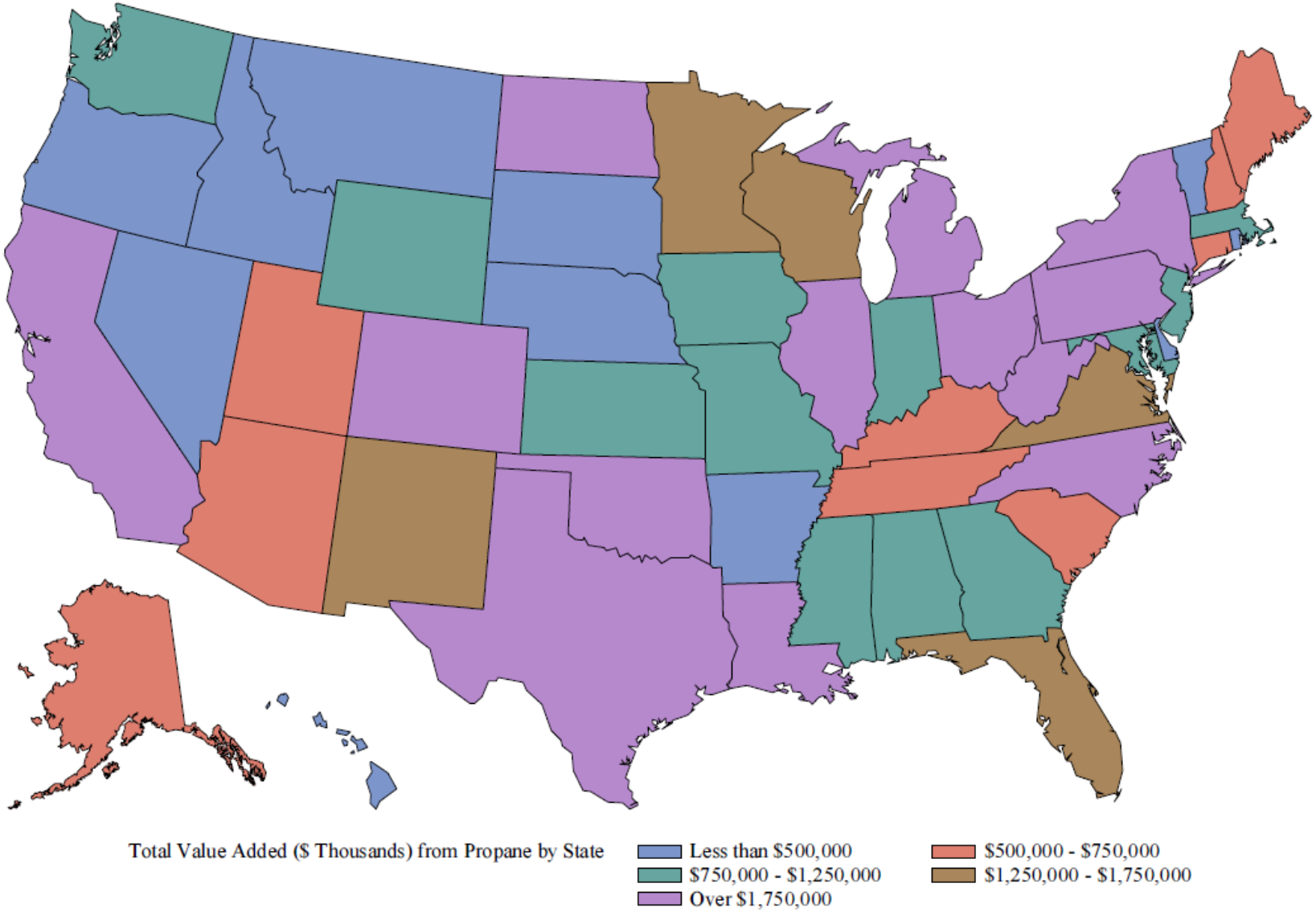
3.10. Total Added Value from Odorized (Retail) Propane by State

Figure 23. Total Added Value from Odorized (Retail) Propane by State



3.11. Total Added Value from Propane by State

Figure 24. Total Added Value from Propane by State



4. Odorized Propane Industry's Impact on the U.S. Economy by State

The tables on the following pages present the detailed findings of the value chain analysis at the national and state level.

The top left table on each page shows total odorized propane sales for the region (numbers may not add to total due to independent rounding). These sales are split by end use, with the total number of households using propane for primary space heating shown below.

The top right table shows the odorized propane industry's total contribution to GDP. For the national total, this includes a calculation for domestic and imported direct value. At the state level, the difference between the top-line Total Market Value and the Total Direct Value Added is the difference between in-state propane production and odorized propane brought in from, or sent out to, other states. The final two lines in the table show the indirect and induced value added, as calculated by ICF and allocated to the state level, and the total contribution to national/state/district GDP.

The two boxes in the middle of the page show total employment and wages attributed to odorized propane, allocated by sector. In addition, the first page, showing the U.S. total, shows ICF's estimates for indirect and induced labor and wages at the national level.

The box at the bottom of the page shows production details. At the state level, only refinery and gas processing plant production is shown. For each state, that state's contribution to total U.S. odorized propane production is also shown. Nationally, production is further split into the share of odorized propane coming from domestic and imported feedstock, including Canadian and non-North American crude as well as Canadian "wet" natural gas. The two right-most boxes on the U.S. total table show for every source of odorized propane the share produced from domestic and North American feedstock, including the final share at the bottom.

As illustrated in the Total U.S. table below, odorized propane consumed in the United States is primarily a North American energy resource. Over 80 percent of the product used in the retail propane segment is sourced domestically, with 12 percent imported from Canada, and the remaining 6 percent of propane supply sourced from imported crude oil. As a result of the sharp increase in domestic propane supplies from natural gas production the U.S. now has a much higher

degree of domestically supplies propane relative to crude oil, the feedstock for gasoline and distillate, which still imports over 40 percent of the domestic consumption.

End-Use Categories, as defined by API

Residential – Propane sold for use in private households primarily for use in space heating, water heating, and cooking. Sales for RV use also included in this category.

Commercial – Sales for use in commercial establishments such as motels, churches, restaurants, and laundries, primarily for use in commercial space heating, water heating, and cooking.

Sales to Retail Dispensers (Cylinder) – Include sales to bottle fillers and for cylinder exchange programs, campgrounds, hardware stores, and so on.

Internal-Combustion Engine Fuel – Propane used in highway vehicles, non-agricultural forklifts, oil-field drilling and production equipment, and so on.

Industrial – Include propane sold to manufacturing plants for such purposes as standby fuel, space heating, flame cutting, and metallurgical furnaces.

Agricultural – Propane used in the production, harvesting, and processing of agricultural products.

4.1. Odorized Propane's Impact on Total U.S. Economy

2015 Odorized Propane Sales Breakout	(1,000 Gal.)	(% of Total)
Residential	4,589,366	54.3%
Commercial	1,618,633	19.2%
Cylinder	284,314	3.4%
Internal Combustion	623,153	7.4%
Industrial	468,912	5.5%
Agricultural	866,426	10.3%
Total United States Odorized Propane Demand	**8,450,800**	**100.0%**
Total Propane-Heated Households	**5,576,248**	
Propane Share of United States Home Heating		4.72%

2015 Contribution to the U.S. Economy	($1,000)
Total Market Value of Odorized Propane Sold in the United States	**$15,679,560**
Value in Imported Product and Feedstock	-$1,069,229
Total Market Value of Odorized Propane of Domestic Origin Sold in the United States	**$14,610,331**
Supply	$4,398,756
Transportation, Storage, and Wholesale	$2,409,955
Retail	$7,758,036
Total Direct Value Added in United States	**$14,566,746**
Indirect and Induced Value Added	30,590,168
Total Odorized Propane Industry Contribution to United States GDP	**$45,156,914**

2015 Employment	
Production	9,709
Transportation, Storage, and Wholesale	2,284
Retail	41,972
Direct United States Employment Related to Odorized Propane	**53,964**
Indirect and Induced Labor	37,775
Total United States Employment Related to Odorized Propane	**91,739**

2015 Labor Income	($1,000)
Production	$1,109,503
Transportation, Storage, and Wholesale	$193,855
Retail	$1,948,650
Direct Labor Income in United States Odorized Propane Industry	**$3,252,008**
Indirect and Induced Labor	$4,065,010
Total Labor Income in the United States Related to Odorized Propane	**$7,317,018**

2015 Odorized Propane Supply	(1,000 Gal.)				Share of Supply (%)	
	Domestic	Canadian	From Outside N. America	Total	From U.S.	From N. America
Odorized Propane from Crude	906,931	301,499	455,157	1,663,587	10.73%	14.30%
Odorized Propane from Natural Gas	6,213,654	225,760	-	6,439,414	73.53%	76.20%
Total Odorized Propane Produced in the United States	**7,120,585**	**527,259**	**455,157**	**8,103,001**	**84.26%**	**90.50%**
Odorized Propane Imports		451,684	48,185	499,869	0.00%	5.34%
Inventory Changes	(152,066)			(152,066)	-1.80%	-1.80%
Total Supply of Odorized Propane in the United States	**6,968,519**	**978,943**	**503,342**	**8,450,804**	**82.46%**	**94.04%**

Source: Total Home Heating Market Share for Propane includes Single and Multi-Family Housing, as well as Boats, RVs, and other Full-time Residences.

4.2. Odorized Propane's Impact on Total U.S. Economy

	In-State Production		In-State Consumption		Economic Impact		Propane Heated Households	
State	Total Volume (1,000 Gal)	Share of U.S. Total (%)	Total Volume (1,000 Gal)	Share of U.S. Total (%)	Direct Labor	Total Value Added ($1,000)	Households	Market Share (%)
Alabama	52,582	0.67%	98,208	1.16%	1,259	519,545	114,106	6.18%
Alaska	48,975	0.62%	11,747	0.14%	325	204,522	3,713	1.48%
Arizona	-	0.00%	82,588	0.98%	694	391,602	65,811	2.67%
Arkansas	3,129	0.04%	91,640	1.08%	681	362,553	76,481	6.68%
California	125,336	1.59%	468,810	5.55%	3,569	2,999,061	399,275	3.10%
Colorado	427,989	5.43%	175,525	2.08%	1,251	1,210,531	97,415	4.70%
Connecticut	-	0.00%	128,677	1.52%	542	546,144	51,915	3.86%
Delaware	16,808	0.21%	58,319	0.69%	298	237,461	36,295	10.29%
District of Columbia	-	0.00%	4,876	0.06%	17	76,015	3,343	1.19%
Florida	980	0.01%	190,328	2.25%	2,008	919,702	71,936	0.96%
Georgia	-	0.00%	205,709	2.43%	1,818	835,303	170,705	4.67%
Hawaii	7,086	0.09%	31,362	0.37%	109	117,863	4,349	0.98%
Idaho	-	0.00%	52,776	0.62%	244	186,388	27,508	4.60%
Illinois	91,206	1.16%	335,475	3.97%	1,051	1,741,158	191,916	4.00%
Indiana	39,485	0.50%	216,996	2.57%	1,222	864,298	177,999	7.08%
Iowa	-	0.00%	342,717	4.06%	542	978,853	162,877	13.06%
Kansas	94,410	1.20%	129,090	1.53%	491	611,448	86,149	7.75%
Kentucky	46,065	0.58%	133,078	1.57%	728	512,379	104,751	6.10%
Louisiana	693,108	8.80%	45,365	0.54%	1,379	969,528	37,623	2.16%
Maine	-	0.00%	151,331	1.79%	264	452,729	50,511	9.26%
Maryland	-	0.00%	128,988	1.53%	568	605,633	72,692	3.34%
Massachusetts	-	0.00%	123,993	1.47%	832	680,763	79,528	3.11%
Michigan	21,348	0.27%	459,852	5.44%	1,500	1,552,801	314,724	8.16%
Minnesota	21,274	0.27%	379,950	4.50%	1,027	1,183,160	225,549	10.50%
Mississippi	83,467	1.06%	105,917	1.25%	1,084	487,474	130,201	11.79%
Missouri	-	0.00%	260,751	3.09%	1,273	867,321	211,223	8.90%
Montana	14,455	0.18%	98,205	1.16%	473	323,150	49,552	11.95%
Nebraska	-	0.00%	104,039	1.23%	269	366,065	58,229	7.82%
Nevada	90	0.00%	44,804	0.53%	351	198,585	25,153	2.41%
New Hampshire	-	0.00%	201,759	2.39%	652	664,637	78,670	15.20%
New Jersey	40,126	0.51%	82,019	0.97%	427	617,051	61,082	1.92%
New Mexico	295,881	3.76%	76,913	0.91%	1,203	666,045	60,267	7.91%
New York	-	0.00%	361,562	4.28%	1,702	1,964,345	265,224	3.67%
North Carolina	-	0.00%	393,676	4.66%	2,460	1,373,296	271,792	7.07%
North Dakota	400,812	5.09%	117,137	1.39%	1,006	967,672	41,709	13.31%
Ohio	276,123	3.51%	286,844	3.39%	1,608	1,513,314	244,024	5.30%
Oklahoma	808,436	10.26%	115,698	1.37%	1,578	1,356,123	95,737	6.53%
Oregon	-	0.00%	66,622	0.79%	313	342,745	26,882	1.73%
Pennsylvania	181,571	2.31%	339,295	4.01%	1,860	1,726,895	200,754	4.05%
Rhode Island	-	0.00%	22,071	0.26%	111	95,083	11,955	2.93%
South Carolina	-	0.00%	100,918	1.19%	898	398,538	75,921	4.09%
South Dakota	-	0.00%	68,793	0.81%	190	203,311	53,053	15.63%
Tennessee	18,467	0.23%	110,253	1.30%	1,445	505,378	99,323	3.93%
Texas	3,286,934	41.73%	391,361	4.63%	7,858	7,004,357	293,458	3.11%
Utah	70,669	0.90%	45,792	0.54%	307	310,651	19,320	2.08%
Vermont	-	0.00%	116,879	1.38%	406	366,595	40,280	15.80%
Virginia	-	0.00%	253,604	3.00%	1,010	947,225	134,535	4.33%
Washington	31,521	0.40%	158,120	1.87%	655	714,289	83,835	3.07%
West Virginia	465,203	5.91%	45,852	0.54%	622	782,576	34,766	4.73%
Wisconsin	2,127	0.03%	389,343	4.61%	1,296	1,216,194	259,440	11.18%
Wyoming	211,577	2.69%	45,177	0.53%	489	418,558	22,692	9.91%
U.S. Total	**7,877,250**	**100.00%**	**8,450,804**	**100.00%**	**53,960**	**45,156,914**	**5,576,248**	**4.72%**

4.3. Odorized Propane's Impact on Alabama Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	56,390,000	57.4%
Commercial	18,404,000	18.7%
Cylinder	2,605,000	2.7%
Internal Combustion	7,166,000	7.3%
Industrial	5,152,000	5.2%
Agricultural	8,491,000	8.6%
Total Alabama Odorized Propane Demand	**98,208,000**	**100.0%**
Total Propane-Heated Households	**114,106**	
Propane Share of Alabama Home Heating		6.18%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Alabama ($1,000)	**$189,252**
Supply	$33,268
Transportation, Storage, and Wholesale	$26,847
Retail	$102,916
Total Direct Value Added in Alabama	**$163,031**
Indirect and Induced	$356,513
Total Odorized Propane Industry Contribution to Alabama GDP	**$519,545**

2015 Employment	
Production	121
Transportation, Storage, and Wholesale	19
Retail	1,119
Direct Alabama Employment Related to Odorized Propane	**1,259**

2015 Labor Income	($1,000)
Production	$13,702
Transportation, Storage, and Wholesale	$1,609
Retail	$41,087
Direct Labor Income in Alabama Odorized Propane Industry	**$56,398**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	10,265,000	0.62%
Gas Processing Plants	42,317,000	0.68%
Total Alabama Odorized Propane Production	**52,582,000**	**0.67%**

4.4. Odorized Propane's Impact on Alaska Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	2,365,000	20.1%
Commercial	7,000,000	59.6%
Cylinder	1,514,000	12.9%
Internal Combustion	867,000	7.4%
Industrial	-	0.0%
Agricultural	-	0.0%
Total Alaska Odorized Propane Demand	**11,746,000**	**100.0%**
Total Propane-Heated Households	**3,713**	
Propane Share of Alaska Home Heating		1.48%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Alaska ($1,000)	**$20,626**
Supply	$63,201
Transportation, Storage, and Wholesale	$3,826
Retail	$9,795
Total Direct Value Added in Alaska	**$76,822**
Indirect and Induced	$127,701
Total Odorized Propane Industry Contribution to Alaska GDP	**$204,522**

2015 Employment	
Production	260
Transportation, Storage, and Wholesale	5
Retail	59
Direct Alaska Employment Related to Odorized Propane	**325**

2015 Labor Income	($1,000)
Production	$29,511
Transportation, Storage, and Wholesale	$476
Retail	$3,287
Direct Labor Income in Alaska Odorized Propane Industry	**$33,273**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	7,117,000	0.43%
Gas Processing Plants	41,858,000	0.67%
Total Alaska Odorized Propane Production	**48,975,000**	**0.62%**

4.5. Odorized Propane's Impact on Arizona Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	29,153,000	35.3%
Commercial	17,926,000	21.7%
Cylinder	9,202,000	11.1%
Internal Combustion	15,421,000	18.7%
Industrial	6,917,000	8.4%
Agricultural	3,970,000	4.8%
Total Arizona Odorized Propane Demand	**82,589,000**	**100.0%**
Total Propane-Heated Households	**65,811**	
Propane Share of Arizona Home Heating		2.67%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Arizona ($1,000)	**$150,076**
Supply	$8
Transportation, Storage, and Wholesale	$20,867
Retail	$73,965
Total Direct Value Added in Arizona	**$94,840**
Indirect and Induced	$296,762
Total Odorized Propane Industry Contribution to Arizona GDP	**$391,602**

2015 Employment	
Production	0
Transportation, Storage, and Wholesale	15
Retail	680
Direct Arizona Employment Related to Odorized Propane	**694**

2015 Labor Income	($1,000)
Production	$6
Transportation, Storage, and Wholesale	$3,003
Retail	$27,318
Direct Labor Income in Arizona Odorized Propane Industry	**$30,327**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total Arizona Odorized Propane Production	**-**	**0.00%**

4.6. Odorized Propane's Impact on Arkansas Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	44,073,000	48.1%
Commercial	13,627,000	14.9%
Cylinder	1,835,000	2.0%
Internal Combustion	5,638,000	6.2%
Industrial	3,945,000	4.3%
Agricultural	22,522,000	24.6%
Total Arkansas Odorized Propane Demand	**91,640,000**	**100.0%**
Total Propane-Heated Households	**76,481**	
Propane Share of Arkansas Home Heating		6.68%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Arkansas ($1,000)	**$173,561**
Supply	$2,172
Transportation, Storage, and Wholesale	$26,852
Retail	$92,969
Total Direct Value Added in Arkansas	**$121,993**
Indirect and Induced	$240,560
Total Odorized Propane Industry Contribution to Arkansas GDP	**$362,553**

2015 Employment	
Production	10
Transportation, Storage, and Wholesale	21
Retail	649
Direct Arkansas Employment Related to Odorized Propane	**681**

2015 Labor Income	($1,000)
Production	$1,096
Transportation, Storage, and Wholesale	$1,778
Retail	$24,056
Direct Labor Income in Arkansas Odorized Propane Industry	**$26,930**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	1,130,000	0.07%
Gas Processing Plants	1,999,000	0.03%
Total Arkansas Odorized Propane Production	**3,129,000**	**0.04%**

4.7. Odorized Propane's Impact on California Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	201,447,000	43.0%
Commercial	87,504,000	18.7%
Cylinder	29,547,000	6.3%
Internal Combustion	60,948,000	13.0%
Industrial	29,935,000	6.4%
Agricultural	59,429,000	12.7%
Total California Odorized Propane Demand	**468,810,000**	**100.0%**
Total Propane-Heated Households	**399,275**	
Propane Share of California Home Heating		3.10%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in California ($1,000)	**$866,133**
Supply	$59,889
Transportation, Storage, and Wholesale	$121,589
Retail	$434,229
Total Direct Value Added in California	**$615,707**
Indirect and Induced	$2,383,353
Total Odorized Propane Industry Contribution to California GDP	**$2,999,061**

2015 Employment	
Production	315
Transportation, Storage, and Wholesale	72
Retail	3,182
Direct California Employment Related to Odorized Propane	**3,569**

2015 Labor Income	($1,000)
Production	$35,928
Transportation, Storage, and Wholesale	$5,843
Retail	$161,660
Direct Labor Income in California Odorized Propane Industry	**$203,432**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	99,959,000	6.01%
Gas Processing Plants	25,377,000	0.41%
Total California Odorized Propane Production	**125,336,000**	**1.59%**

4.8. Odorized Propane's Impact on Colorado Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	111,076,000	63.3%
Commercial	24,264,000	13.8%
Cylinder	6,479,000	3.7%
Internal Combustion	14,641,000	8.3%
Industrial	16,533,000	9.4%
Agricultural	2,532,000	1.4%
Total Colorado Odorized Propane Demand	**175,525,000**	**100.0%**
Total Propane-Heated Households	**97,415**	
Propane Share of Colorado Home Heating		4.70%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Colorado ($1,000)	**$315,218**
Supply	$224,007
Transportation, Storage, and Wholesale	$56,609
Retail	$165,797
Total Direct Value Added in Colorado	**$446,414**
Indirect and Induced	$764,117
Total Odorized Propane Industry Contribution to Colorado GDP	**$1,210,531**

2015 Employment	
Production	471
Transportation, Storage, and Wholesale	60
Retail	720
Direct Colorado Employment Related to Odorized Propane	**1,251**

2015 Labor Income	($1,000)
Production	$53,852
Transportation, Storage, and Wholesale	$5,317
Retail	$32,346
Direct Labor Income in Colorado Odorized Propane Industry	**$91,515**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	4,298,000	0.26%
Gas Processing Plants	423,690,000	6.82%
Total Colorado Odorized Propane Production	**427,988,000**	**5.43%**

4.9. Odorized Propane's Impact on Connecticut Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	75,224,000	58.5%
Commercial	37,197,000	28.9%
Cylinder	6,323,000	4.9%
Internal Combustion	5,548,000	4.3%
Industrial	3,561,000	2.8%
Agricultural	824,000	0.6%
Total Connecticut Odorized Propane Demand	**128,677,000**	**100.0%**
Total Propane-Heated Households	**51,915**	
Propane Share of Connecticut Home Heating		3.86%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Connecticut ($1,000)	**$277,295**
Supply	$0
Transportation, Storage, and Wholesale	$32,512
Retail	$135,697
Total Direct Value Added in Connecticut	**$168,209**
Indirect and Induced	$377,935
Total Odorized Propane Industry Contribution to Connecticut GDP	**$546,144**

2015 Employment	
Production	-
Transportation, Storage, and Wholesale	17
Retail	525
Direct Connecticut Employment Related to Odorized Propane	**542**

2015 Labor Income	($1,000)
Production	$0
Transportation, Storage, and Wholesale	$1,376
Retail	$30,288
Direct Labor Income in Connecticut Odorized Propane Industry	**$31,664**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total Connecticut Odorized Propane Production	**-**	**0.00%**

4.10. Odorized Propane's Impact on Delaware Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	34,610,000	59.3%
Commercial	14,654,000	25.1%
Cylinder	688,000	1.2%
Internal Combustion	885,000	1.5%
Industrial	209,000	0.4%
Agricultural	7,273,000	12.5%
Total Delaware Odorized Propane Demand	**58,319,000**	**100.0%**
Total Propane-Heated Households	**36,295**	
Propane Share of Delaware Home Heating		10.29%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Delaware ($1,000)	**$127,051**
Supply	$5,524
Transportation, Storage, and Wholesale	$15,201
Retail	$65,135
Total Direct Value Added in Delaware	**$85,859**
Indirect and Induced	$151,601
Total Odorized Propane Industry Contribution to Delaware GDP	**$237,461**

2015 Employment	
Production	2
Transportation, Storage, and Wholesale	9
Retail	288
Direct Delaware Employment Related to Odorized Propane	**298**

2015 Labor Income	($1,000)
Production	$218
Transportation, Storage, and Wholesale	$716
Retail	$16,782
Direct Labor Income in Delaware Odorized Propane Industry	**$17,715**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	16,808,000	1.01%
Gas Processing Plants	-	0.00%
Total Delaware Odorized Propane Production	**16,808,000**	**0.21%**

4.11. Odorized Propane's Impact on District of Columbia Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	3,359,000	68.9%
Commercial	6,000	0.1%
Cylinder	776,000	15.9%
Internal Combustion	691,000	14.2%
Industrial	43,000	0.9%
Agricultural	-	0.0%
Total District of Columbia Odorized Propane Demand	**4,875,000**	**100.0%**
Total Propane-Heated Households	**3,343**	
Propane Share of District of Columbia Home Heating		1.19%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in District of Columbia ($1,000)	**$10,922**
Supply	$0
Transportation, Storage, and Wholesale	$1,232
Retail	$5,749
Total Direct Value Added in District of Columbia	**$6,980**
Indirect and Induced	$69,035
Total Odorized Propane Industry Contribution to District of Columbia GDP	**$76,015**

2015 Employment	
Production	-
Transportation, Storage, and Wholesale	1
Retail	15
Direct District of Columbia Employment Related to Odorized Propane	**16**

2015 Labor Income	($1,000)
Production	$0
Transportation, Storage, and Wholesale	$52
Retail	$749
Direct Labor Income in District of Columbia Odorized Propane Industry	**$801**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total District of Columbia Odorized Propane Production	**-**	**0.00%**

4.12. Odorized Propane's Impact on Florida Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	45,322,000	23.8%
Commercial	83,579,000	43.9%
Cylinder	11,464,000	6.0%
Internal Combustion	26,883,000	14.1%
Industrial	14,752,000	7.8%
Agricultural	8,328,000	4.4%
Total Florida Odorized Propane Demand	**190,328,000**	**100.0%**
Total Propane-Heated Households	**71,936**	
Propane Share of Florida Home Heating		0.96%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Florida ($1,000)	**$343,082**
Supply	$991
Transportation, Storage, and Wholesale	$48,103
Retail	$136,249
Total Direct Value Added in Florida	**$185,342**
Indirect and Induced	$734,360
Total Odorized Propane Industry Contribution to Florida GDP	**$919,702**

2015 Employment	
Production	4
Transportation, Storage, and Wholesale	26
Retail	1,978
Direct Florida Employment Related to Odorized Propane	**2,008**

2015 Labor Income	($1,000)
Production	$423
Transportation, Storage, and Wholesale	$2,042
Retail	$86,025
Direct Labor Income in Florida Odorized Propane Industry	**$88,489**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	980,000	0.02%
Total Florida Odorized Propane Production	**980,000**	**0.01%**

4.13. Odorized Propane's Impact on Georgia Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	87,113,000	42.3%
Commercial	34,236,000	16.6%
Cylinder	6,379,000	3.1%
Internal Combustion	28,778,000	14.0%
Industrial	13,022,000	6.3%
Agricultural	36,181,000	17.6%
Total Georgia Odorized Propane Demand	**205,709,000**	**100.0%**
Total Propane-Heated Households	**170,705**	
Propane Share of Georgia Home Heating		4.67%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Georgia ($1,000)	**$392,176**
Supply	$0
Transportation, Storage, and Wholesale	$56,855
Retail	$168,834
Total Direct Value Added in Georgia	**$225,689**
Indirect and Induced	$609,614
Total Odorized Propane Industry Contribution to Georgia GDP	**$835,303**

2015 Employment	
Production	-
Transportation, Storage, and Wholesale	40
Retail	1,778
Direct Georgia Employment Related to Odorized Propane	**1,818**

2015 Labor Income	($1,000)
Production	$0
Transportation, Storage, and Wholesale	$3,243
Retail	$69,088
Direct Labor Income in Georgia Odorized Propane Industry	**$72,332**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total Georgia Odorized Propane Production	**-**	**0.00%**

4.14. Odorized Propane's Impact on Hawaii Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	3,720,000	11.9%
Commercial	25,359,000	80.9%
Cylinder	1,800,000	5.7%
Internal Combustion	482,000	1.5%
Industrial	-	0.0%
Agricultural	-	0.0%
Total Hawaii Odorized Propane Demand	**31,361,000**	**100.0%**
Total Propane-Heated Households	**4,349**	
Propane Share of Hawaii Home Heating		0.98%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Hawaii ($1,000)	**$54,038**
Supply	$0
Transportation, Storage, and Wholesale	$8,120
Retail	$25,108
Total Direct Value Added in Hawaii	**$33,228**
Indirect and Induced	$84,635
Total Odorized Propane Industry Contribution to Hawaii GDP	**$117,863**

2015 Employment	
Production	1
Transportation, Storage, and Wholesale	5
Retail	104
Direct Hawaii Employment Related to Odorized Propane	**109**

2015 Labor Income	($1,000)
Production	$102
Transportation, Storage, and Wholesale	$374
Retail	$5,486
Direct Labor Income in Hawaii Odorized Propane Industry	**$5,962**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	7,086,000	0.43%
Gas Processing Plants	-	0.00%
Total Hawaii Odorized Propane Production	**7,086,000**	**0.09%**

4.15. Odorized Propane's Impact on Idaho Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	30,305,000	57.4%
Commercial	13,537,000	25.6%
Cylinder	3,188,000	6.0%
Internal Combustion	2,041,000	3.9%
Industrial	2,161,000	4.1%
Agricultural	1,544,000	2.9%
Total Idaho Odorized Propane Demand	**52,776,000**	**100.0%**
Total Propane-Heated Households	**27,508**	
Propane Share of Idaho Home Heating		4.60%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Idaho ($1,000)	**$94,427**
Supply	$0
Transportation, Storage, and Wholesale	$13,335
Retail	$49,496
Total Direct Value Added in Idaho	**$62,831**
Indirect and Induced	$123,556
Total Odorized Propane Industry Contribution to Idaho GDP	**$186,388**

2015 Employment	
Production	-
Transportation, Storage, and Wholesale	7
Retail	237
Direct Idaho Employment Related to Odorized Propane	**244**

2015 Labor Income	($1,000)
Production	$0
Transportation, Storage, and Wholesale	$564
Retail	$8,932
Direct Labor Income in Idaho Odorized Propane Industry	**$9,496**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total Idaho Odorized Propane Production	**-**	**0.00%**

4.16. Odorized Propane's Impact on Illinois Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	201,641,000	60.1%
Commercial	26,716,000	8.0%
Cylinder	8,759,000	2.6%
Internal Combustion	30,916,000	9.2%
Industrial	17,503,000	5.2%
Agricultural	49,940,000	14.9%
Total Illinois Odorized Propane Demand	**335,475,000**	**100.0%**
Total Propane-Heated Households	**191,916**	
Propane Share of Illinois Home Heating		4.00%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Illinois ($1,000)	**$566,413**
Supply	$152,345
Transportation, Storage, and Wholesale	$98,531
Retail	$283,324
Total Direct Value Added in Illinois	**$534,200**
Indirect and Induced	$1,206,959
Total Odorized Propane Industry Contribution to Illinois GDP	**$1,741,158**

2015 Employment	
Production	26
Transportation, Storage, and Wholesale	97
Retail	928
Direct Illinois Employment Related to Odorized Propane	**1,051**

2015 Labor Income	($1,000)
Production	$3,155
Transportation, Storage, and Wholesale	$7,962
Retail	$39,235
Direct Labor Income in Illinois Odorized Propane Industry	**$50,353**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	82,077,000	4.93%
Gas Processing Plants	9,129,000	0.15%
Total Illinois Odorized Propane Production	**91,206,000**	**1.16%**

4.17. Odorized Propane's Impact on Indiana Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	123,211,000	56.8%
Commercial	27,185,000	12.5%
Cylinder	4,141,000	1.9%
Internal Combustion	15,767,000	7.3%
Industrial	14,885,000	6.9%
Agricultural	31,807,000	14.7%
Total Indiana Odorized Propane Demand	**216,996,000**	**100.0%**
Total Propane-Heated Households	**177,999**	
Propane Share of Indiana Home Heating		7.08%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Indiana ($1,000)	**$365,598**
Supply	$468
Transportation, Storage, and Wholesale	$62,676
Retail	$182,479
Total Direct Value Added in Indiana	**$245,624**
Indirect and Induced	$618,674
Total Odorized Propane Industry Contribution to Indiana GDP	**$864,298**

2015 Employment	
Production	6
Transportation, Storage, and Wholesale	48
Retail	1,168
Direct Indiana Employment Related to Odorized Propane	**1,222**

2015 Labor Income	($1,000)
Production	$762
Transportation, Storage, and Wholesale	$3,983
Retail	$51,388
Direct Labor Income in Indiana Odorized Propane Industry	**$56,132**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	39,485,000	2.37%
Gas Processing Plants	-	0.00%
Total Indiana Odorized Propane Production	**39,485,000**	**0.50%**

4.18. Odorized Propane's Impact on Iowa Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	161,552,000	47.1%
Commercial	21,017,000	6.1%
Cylinder	2,819,000	0.8%
Internal Combustion	10,251,000	3.0%
Industrial	9,328,000	2.7%
Agricultural	137,750,000	40.2%
Total Iowa Odorized Propane Demand	**342,717,000**	**100.0%**
Total Propane-Heated Households	**162,877**	
Propane Share of Iowa Home Heating		13.06%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Iowa ($1,000)	**$571,143**
Supply	$0
Transportation, Storage, and Wholesale	$87,610
Retail	$281,870
Total Direct Value Added in Iowa	**$369,481**
Indirect and Induced	$609,372
Total Odorized Propane Industry Contribution to Iowa GDP	**$978,853**

2015 Employment	
Production	-
Transportation, Storage, and Wholesale	70
Retail	471
Direct Iowa Employment Related to Odorized Propane	**542**

2015 Labor Income	($1,000)
Production	$0
Transportation, Storage, and Wholesale	$5,595
Retail	$17,781
Direct Labor Income in Iowa Odorized Propane Industry	**$23,376**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total Iowa Odorized Propane Production	**-**	**0.00%**

4.19. Odorized Propane's Impact on Kansas Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	87,441,000	67.7%
Commercial	16,513,000	12.8%
Cylinder	1,899,000	1.5%
Internal Combustion	6,437,000	5.0%
Industrial	12,675,000	9.8%
Agricultural	4,125,000	3.2%
Total Kansas Odorized Propane Demand	**129,090,000**	**100.0%**
Total Propane-Heated Households	**86,149**	
Propane Share of Kansas Home Heating		7.75%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Kansas ($1,000)	**$219,977**
Supply	$62,524
Transportation, Storage, and Wholesale	$48,305
Retail	$111,064
Total Direct Value Added in Kansas	**$221,893**
Indirect and Induced	$389,555
Total Odorized Propane Industry Contribution to Kansas GDP	**$611,448**

2015 Employment	
Production	118
Transportation, Storage, and Wholesale	57
Retail	316
Direct Kansas Employment Related to Odorized Propane	**491**

2015 Labor Income	($1,000)
Production	$13,577
Transportation, Storage, and Wholesale	$4,885
Retail	$12,560
Direct Labor Income in Kansas Odorized Propane Industry	**$31,022**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	24,912,000	1.50%
Gas Processing Plants	69,498,000	1.12%
Total Kansas Odorized Propane Production	**94,410,000**	**1.20%**

4.20. Odorized Propane's Impact on Kentucky Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	85,723,000	64.4%
Commercial	14,641,000	11.0%
Cylinder	1,576,000	1.2%
Internal Combustion	10,590,000	8.0%
Industrial	7,123,000	5.4%
Agricultural	13,425,000	10.1%
Total Kentucky Odorized Propane Demand	**133,078,000**	**100.0%**
Total Propane-Heated Households	**104,751**	
Propane Share of Kentucky Home Heating		6.10%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Kentucky ($1,000)	**$225,573**
Supply	$11,573
Transportation, Storage, and Wholesale	$34,617
Retail	$113,284
Total Direct Value Added in Kentucky	**$159,474**
Indirect and Induced	$352,905
Total Odorized Propane Industry Contribution to Kentucky GDP	**$512,379**

2015 Employment	
Production	23
Transportation, Storage, and Wholesale	21
Retail	685
Direct Kentucky Employment Related to Odorized Propane	**728**

2015 Labor Income	($1,000)
Production	$2,678
Transportation, Storage, and Wholesale	$1,669
Retail	$28,716
Direct Labor Income in Kentucky Odorized Propane Industry	**$33,063**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	24,680,000	1.48%
Gas Processing Plants	21,384,000	0.34%
Total Kentucky Odorized Propane Production	**46,064,000**	**0.58%**

4.21. Odorized Propane's Impact on Louisiana Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	16,399,000	36.1%
Commercial	8,606,000	19.0%
Cylinder	3,124,000	6.9%
Internal Combustion	6,080,000	13.4%
Industrial	4,090,000	9.0%
Agricultural	7,066,000	15.6%
Total Louisiana Odorized Propane Demand	**45,365,000**	**100.0%**
Total Propane-Heated Households	**37,623**	
Propane Share of Louisiana Home Heating		2.16%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Louisiana ($1,000)	**$84,114**
Supply	$264,366
Transportation, Storage, and Wholesale	$31,638
Retail	$44,201
Total Direct Value Added in Louisiana	**$340,205**
Indirect and Induced	$629,323
Total Odorized Propane Industry Contribution to Louisiana GDP	**$969,528**

2015 Employment	
Production	630
Transportation, Storage, and Wholesale	114
Retail	635
Direct Louisiana Employment Related to Odorized Propane	**1,379**

2015 Labor Income	($1,000)
Production	$72,487
Transportation, Storage, and Wholesale	$9,712
Retail	$21,422
Direct Labor Income in Louisiana Odorized Propane Industry	**$103,620**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	405,532,000	24.38%
Gas Processing Plants	287,576,000	4.63%
Total Louisiana Odorized Propane Production	**693,108,000**	**8.80%**

4.22. Odorized Propane's Impact on Maine Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	68,791,000	45.5%
Commercial	76,019,000	50.2%
Cylinder	1,782,000	1.2%
Internal Combustion	1,382,000	0.9%
Industrial	3,165,000	2.1%
Agricultural	192,000	0.1%
Total Maine Odorized Propane Demand	**151,331,000**	**100.0%**
Total Propane-Heated Households	**50,511**	
Propane Share of Maine Home Heating		9.26%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Maine ($1,000)	**$309,881**
Supply	$0
Transportation, Storage, and Wholesale	$38,236
Retail	$143,197
Total Direct Value Added in Maine	**$181,433**
Indirect and Induced	$271,296
Total Odorized Propane Industry Contribution to Maine GDP	**$452,729**

2015 Employment	
Production	-
Transportation, Storage, and Wholesale	20
Retail	244
Direct Maine Employment Related to Odorized Propane	**264**

2015 Labor Income	($1,000)
Production	$0
Transportation, Storage, and Wholesale	$1,618
Retail	$11,115
Direct Labor Income in Maine Odorized Propane Industry	**$12,733**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total Maine Odorized Propane Production	**-**	**0.00%**

4.23. Odorized Propane's Impact on Maryland Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	73,096,000	56.7%
Commercial	27,791,000	21.5%
Cylinder	6,002,000	4.7%
Internal Combustion	5,405,000	4.2%
Industrial	4,722,000	3.7%
Agricultural	11,973,000	9.3%
Total Maryland Odorized Propane Demand	**128,989,000**	**100.0%**
Total Propane-Heated Households	**72,692**	
Propane Share of Maryland Home Heating		3.34%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Maryland ($1,000)	**$278,552**
Supply	$0
Transportation, Storage, and Wholesale	$32,591
Retail	$141,584
Total Direct Value Added in Maryland	**$174,175**
Indirect and Induced	$431,458
Total Odorized Propane Industry Contribution to Maryland GDP	**$605,633**

2015 Employment	
Production	-
Transportation, Storage, and Wholesale	17
Retail	551
Direct Maryland Employment Related to Odorized Propane	**568**

2015 Labor Income	($1,000)
Production	$0
Transportation, Storage, and Wholesale	$1,379
Retail	$26,917
Direct Labor Income in Maryland Odorized Propane Industry	**$28,297**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total Maryland Odorized Propane Production	**-**	**0.00%**

4.24. Odorized Propane's Impact on Massachusetts Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	76,282,000	61.5%
Commercial	30,899,000	24.9%
Cylinder	6,845,000	5.5%
Internal Combustion	6,816,000	5.5%
Industrial	2,623,000	2.1%
Agricultural	528,000	0.4%
Total Massachusetts Odorized Propane Demand	**123,993,000**	**100.0%**
Total Propane-Heated Households	**79,528**	
Propane Share of Massachusetts Home Heating		3.11%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Massachusetts ($1,000)	**$270,257**
Supply	$0
Transportation, Storage, and Wholesale	$31,329
Retail	$133,843
Total Direct Value Added in Massachusetts	**$165,172**
Indirect and Induced	$515,592
Total Odorized Propane Industry Contribution to Massachusetts GDP	**$680,763**

2015 Employment	
Production	-
Transportation, Storage, and Wholesale	17
Retail	815
Direct Massachusetts Employment Related to Odorized Propane	**832**

2015 Labor Income	($1,000)
Production	$0
Transportation, Storage, and Wholesale	$1,326
Retail	$50,392
Direct Labor Income in Massachusetts Odorized Propane Industry	**$51,718**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total Massachusetts Odorized Propane Production	**-**	**0.00%**

4.25. Odorized Propane's Impact on Michigan Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	348,710,000	75.8%
Commercial	30,752,000	6.7%
Cylinder	11,746,000	2.6%
Internal Combustion	24,892,000	5.4%
Industrial	16,986,000	3.7%
Agricultural	26,766,000	5.8%
Total Michigan Odorized Propane Demand	**459,852,000**	**100.0%**
Total Propane-Heated Households	**314,724**	
Propane Share of Michigan Home Heating		8.16%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Michigan ($1,000)	**$786,743**
Supply	$5,810
Transportation, Storage, and Wholesale	$117,666
Retail	$398,799
Total Direct Value Added in Michigan	**$522,274**
Indirect and Induced	$1,030,527
Total Odorized Propane Industry Contribution to Michigan GDP	**$1,552,801**

2015 Employment	
Production	16
Transportation, Storage, and Wholesale	66
Retail	1,418
Direct Michigan Employment Related to Odorized Propane	**1,500**

2015 Labor Income	($1,000)
Production	$1,874
Transportation, Storage, and Wholesale	$5,249
Retail	$64,785
Direct Labor Income in Michigan Odorized Propane Industry	**$71,908**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	11,365,000	0.68%
Gas Processing Plants	9,984,000	0.16%
Total Michigan Odorized Propane Production	**21,349,000**	**0.27%**

4.26. Odorized Propane's Impact on Minnesota Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	217,578,000	57.3%
Commercial	41,482,000	10.9%
Cylinder	5,732,000	1.5%
Internal Combustion	13,966,000	3.7%
Industrial	17,722,000	4.7%
Agricultural	83,470,000	22.0%
Total Minnesota Odorized Propane Demand	**379,950,000**	**100.0%**
Total Propane-Heated Households	**225,549**	
Propane Share of Minnesota Home Heating		10.50%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Minnesota ($1,000)	**$639,681**
Supply	$0
Transportation, Storage, and Wholesale	$97,608
Retail	$319,044
Total Direct Value Added in Minnesota	**$416,652**
Indirect and Induced	$766,508
Total Odorized Propane Industry Contribution to Minnesota GDP	**$1,183,160**

2015 Employment	
Production	2
Transportation, Storage, and Wholesale	55
Retail	970
Direct Minnesota Employment Related to Odorized Propane	**1,027**

2015 Labor Income	($1,000)
Production	$231
Transportation, Storage, and Wholesale	$4,397
Retail	$38,255
Direct Labor Income in Minnesota Odorized Propane Industry	**$42,884**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	21,274,000	1.28%
Gas Processing Plants	-	0.00%
Total Minnesota Odorized Propane Production	**21,274,000**	**0.27%**

4.27. Odorized Propane's Impact on Mississippi Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	58,409,000	55.1%
Commercial	21,112,000	19.9%
Cylinder	1,157,000	1.1%
Internal Combustion	4,031,000	3.8%
Industrial	3,462,000	3.3%
Agricultural	17,746,000	16.8%
Total Mississippi Odorized Propane Demand	**105,917,000**	**100.0%**
Total Propane-Heated Households	**130,201**	
Propane Share of Mississippi Home Heating		11.79%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Mississippi ($1,000)	**$203,171**
Supply	$40,259
Transportation, Storage, and Wholesale	$29,640
Retail	$110,048
Total Direct Value Added in Mississippi	**$179,947**
Indirect and Induced	$307,527
Total Odorized Propane Industry Contribution to Mississippi GDP	**$487,474**

2015 Employment	
Production	142
Transportation, Storage, and Wholesale	22
Retail	920
Direct Mississippi Employment Related to Odorized Propane	**1,084**

2015 Labor Income	($1,000)
Production	$16,146
Transportation, Storage, and Wholesale	$1,865
Retail	$35,283
Direct Labor Income in Mississippi Odorized Propane Industry	**$53,294**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	40,358,000	2.43%
Gas Processing Plants	43,108,000	0.69%
Total Mississippi Odorized Propane Production	**83,466,000**	**1.06%**

4.28. Odorized Propane's Impact on Missouri Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	150,392,000	57.7%
Commercial	39,668,000	15.2%
Cylinder	6,108,000	2.3%
Internal Combustion	21,313,000	8.2%
Industrial	28,264,000	10.8%
Agricultural	15,006,000	5.8%
Total Missouri Odorized Propane Demand	**260,751,000**	**100.0%**
Total Propane-Heated Households	**211,223**	
Propane Share of Missouri Home Heating		8.90%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Missouri ($1,000)	**$440,596**
Supply	$31
Transportation, Storage, and Wholesale	$71,385
Retail	$220,566
Total Direct Value Added in Missouri	**$291,983**
Indirect and Induced	$575,339
Total Odorized Propane Industry Contribution to Missouri GDP	**$867,321**

2015 Employment	
Production	1
Transportation, Storage, and Wholesale	49
Retail	1,223
Direct Missouri Employment Related to Odorized Propane	**1,272**

2015 Labor Income	($1,000)
Production	$22
Transportation, Storage, and Wholesale	$3,965
Retail	$71,753
Direct Labor Income in Missouri Odorized Propane Industry	**$75,740**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total Missouri Odorized Propane Production	**-**	**0.00%**

4.29. Odorized Propane's Impact on Montana Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	74,210,000	75.6%
Commercial	16,260,000	16.6%
Cylinder	2,303,000	2.3%
Internal Combustion	2,260,000	2.3%
Industrial	1,917,000	2.0%
Agricultural	1,255,000	1.3%
Total Montana Odorized Propane Demand	**98,205,000**	**100.0%**
Total Propane-Heated Households	**49,552**	
Propane Share of Montana Home Heating		11.95%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Montana ($1,000)	**$177,679**
Supply	$9,900
Transportation, Storage, and Wholesale	$25,136
Retail	$94,092
Total Direct Value Added in Montana	**$129,127**
Indirect and Induced	$194,023
Total Odorized Propane Industry Contribution to Montana GDP	**$323,150**

2015 Employment	
Production	43
Transportation, Storage, and Wholesale	14
Retail	416
Direct Montana Employment Related to Odorized Propane	**473**

2015 Labor Income	($1,000)
Production	$4,855
Transportation, Storage, and Wholesale	$1,145
Retail	$17,963
Direct Labor Income in Montana Odorized Propane Industry	**$23,962**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	8,566,000	0.51%
Gas Processing Plants	5,889,000	0.09%
Total Montana Odorized Propane Production	**14,455,000**	**0.18%**

4.30. Odorized Propane's Impact on Nebraska Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	67,112,000	64.5%
Commercial	6,195,000	6.0%
Cylinder	1,291,000	1.2%
Internal Combustion	4,051,000	3.9%
Industrial	2,317,000	2.2%
Agricultural	23,073,000	22.2%
Total Nebraska Odorized Propane Demand	**104,039,000**	**100.0%**
Total Propane-Heated Households	**58,229**	
Propane Share of Nebraska Home Heating		7.82%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Nebraska ($1,000)	**$176,075**
Supply	$611
Transportation, Storage, and Wholesale	$37,967
Retail	$88,286
Total Direct Value Added in Nebraska	**$126,865**
Indirect and Induced	$239,200
Total Odorized Propane Industry Contribution to Nebraska GDP	**$366,065**

2015 Employment	
Production	4
Transportation, Storage, and Wholesale	43
Retail	222
Direct Nebraska Employment Related to Odorized Propane	**269**

2015 Labor Income	($1,000)
Production	$434
Transportation, Storage, and Wholesale	$3,612
Retail	$6,760
Direct Labor Income in Nebraska Odorized Propane Industry	**$10,807**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total Nebraska Odorized Propane Production	**-**	**0.00%**

4.31. Odorized Propane's Impact on Nevada Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	19,611,000	43.8%
Commercial	14,918,000	33.3%
Cylinder	2,095,000	4.7%
Internal Combustion	3,860,000	8.6%
Industrial	3,357,000	7.5%
Agricultural	964,000	2.2%
Total Nevada Odorized Propane Demand	**44,805,000**	**100.0%**
Total Propane-Heated Households	**25,153**	
Propane Share of Nevada Home Heating		2.41%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Nevada ($1,000)	**$82,925**
Supply	$59
Transportation, Storage, and Wholesale	$11,323
Retail	$41,649
Total Direct Value Added in Nevada	**$53,031**
Indirect and Induced	$145,555
Total Odorized Propane Industry Contribution to Nevada GDP	**$198,585**

2015 Employment	
Production	0
Transportation, Storage, and Wholesale	6
Retail	344
Direct Nevada Employment Related to Odorized Propane	**351**

2015 Labor Income	($1,000)
Production	$43
Transportation, Storage, and Wholesale	$480
Retail	$17,036
Direct Labor Income in Nevada Odorized Propane Industry	**$17,559**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	90,000	0.01%
Gas Processing Plants	-	0.00%
Total Nevada Odorized Propane Production	**90,000**	**0.00%**

4.32. Odorized Propane's Impact on New Hampshire Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	124,167,000	61.5%
Commercial	69,784,000	34.6%
Cylinder	1,700,000	0.8%
Internal Combustion	1,372,000	0.7%
Industrial	2,754,000	1.4%
Agricultural	1,982,000	1.0%
Total New Hampshire Odorized Propane Demand	**201,759,000**	**100.0%**
Total Propane-Heated Households	**78,670**	
Propane Share of New Hampshire Home Heating		15.20%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in New Hampshire ($1,000)	**$439,679**
Supply	$0
Transportation, Storage, and Wholesale	$50,977
Retail	$217,707
Total Direct Value Added in New Hampshire	**$268,684**
Indirect and Induced	$395,953
Total Odorized Propane Industry Contribution to New Hampshire GDP	**$664,637**

2015 Employment	
Production	-
Transportation, Storage, and Wholesale	27
Retail	624
Direct New Hampshire Employment Related to Odorized Propane	**652**

2015 Labor Income	($1,000)
Production	$0
Transportation, Storage, and Wholesale	$2,157
Retail	$40,585
Direct Labor Income in New Hampshire Odorized Propane Industry	**$42,743**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total New Hampshire Odorized Propane Production	**-**	**0.00%**

4.33. Odorized Propane's Impact on New Jersey Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	41,446,000	50.5%
Commercial	13,220,000	16.1%
Cylinder	6,022,000	7.3%
Internal Combustion	13,483,000	16.4%
Industrial	5,619,000	6.9%
Agricultural	2,229,000	2.7%
Total New Jersey Odorized Propane Demand	**82,019,000**	**100.0%**
Total Propane-Heated Households	**61,082**	
Propane Share of New Jersey Home Heating		1.92%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in New Jersey ($1,000)	**$173,723**
Supply	$13,187
Transportation, Storage, and Wholesale	$21,836
Retail	$86,598
Total Direct Value Added in New Jersey	**$121,620**
Indirect and Induced	$495,430
Total Odorized Propane Industry Contribution to New Jersey GDP	**$617,051**

2015 Employment	
Production	4
Transportation, Storage, and Wholesale	14
Retail	410
Direct New Jersey Employment Related to Odorized Propane	**427**

2015 Labor Income	($1,000)
Production	$520
Transportation, Storage, and Wholesale	$1,097
Retail	$29,110
Direct Labor Income in New Jersey Odorized Propane Industry	**$30,726**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	40,126,000	2.41%
Gas Processing Plants	-	0.00%
Total New Jersey Odorized Propane Production	**40,126,000**	**0.51%**

4.34. Odorized Propane's Impact on New Mexico Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	46,195,000	60.1%
Commercial	12,560,000	16.3%
Cylinder	1,537,000	2.0%
Internal Combustion	12,334,000	16.0%
Industrial	3,814,000	5.0%
Agricultural	473,000	0.6%
Total New Mexico Odorized Propane Demand	**76,913,000**	**100.0%**
Total Propane-Heated Households	**60,267**	
Propane Share of New Mexico Home Heating		7.91%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in New Mexico ($1,000)	**$148,918**
Supply	$157,649
Transportation, Storage, and Wholesale	$28,356
Retail	$81,310
Total Direct Value Added in New Mexico	**$267,314**
Indirect and Induced	$398,731
Total Odorized Propane Industry Contribution to New Mexico GDP	**$666,045**

2015 Employment	
Production	466
Transportation, Storage, and Wholesale	38
Retail	698
Direct New Mexico Employment Related to Odorized Propane	**1,203**

2015 Labor Income	($1,000)
Production	$53,088
Transportation, Storage, and Wholesale	$3,529
Retail	$30,520
Direct Labor Income in New Mexico Odorized Propane Industry	**$87,137**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	5,075,000	0.31%
Gas Processing Plants	290,806,000	4.68%
Total New Mexico Odorized Propane Production	**295,881,000**	**3.76%**

4.35. Odorized Propane's Impact on New York Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	233,545,000	64.6%
Commercial	79,457,000	22.0%
Cylinder	12,117,000	3.4%
Internal Combustion	15,957,000	4.4%
Industrial	12,034,000	3.3%
Agricultural	8,452,000	2.3%
Total New York Odorized Propane Demand	**361,562,000**	**100.0%**
Total Propane-Heated Households	**265,224**	
Propane Share of New York Home Heating		3.67%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in New York ($1,000)	**$799,445**
Supply	$59
Transportation, Storage, and Wholesale	$91,353
Retail	$415,696
Total Direct Value Added in New York	**$507,108**
Indirect and Induced	$1,457,237
Total Odorized Propane Industry Contribution to New York GDP	**$1,964,345**

2015 Employment	
Production	0
Transportation, Storage, and Wholesale	49
Retail	1,652
Direct New York Employment Related to Odorized Propane	**1,702**

2015 Labor Income	($1,000)
Production	$42
Transportation, Storage, and Wholesale	$3,866
Retail	$91,025
Direct Labor Income in New York Odorized Propane Industry	**$94,934**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total New York Odorized Propane Production	**-**	**0.00%**

4.36. Odorized Propane's Impact on North Carolina Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	179,125,000	45.5%
Commercial	84,615,000	21.5%
Cylinder	10,140,000	2.6%
Internal Combustion	21,267,000	5.4%
Industrial	12,447,000	3.2%
Agricultural	86,082,000	21.9%
Total North Carolina Odorized Propane Demand	**393,676,000**	**100.0%**
Total Propane-Heated Households	**271,792**	
Propane Share of North Carolina Home Heating		7.07%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in North Carolina ($1,000)	**$758,055**
Supply	$0
Transportation, Storage, and Wholesale	$104,060
Retail	$330,706
Total Direct Value Added in North Carolina	**$434,766**
Indirect and Induced	$938,530
Total Odorized Propane Industry Contribution to North Carolina GDP	**$1,373,296**

2015 Employment	
Production	-
Transportation, Storage, and Wholesale	64
Retail	2,396
Direct North Carolina Employment Related to Odorized Propane	**2,460**

2015 Labor Income	($1,000)
Production	$0
Transportation, Storage, and Wholesale	$5,192
Retail	$96,928
Direct Labor Income in North Carolina Odorized Propane Industry	**$102,120**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total North Carolina Odorized Propane Production	**-**	**0.00%**

4.37. Odorized Propane's Impact on North Dakota Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	57,445,000	49.0%
Commercial	25,083,000	21.4%
Cylinder	2,299,000	2.0%
Internal Combustion	5,810,000	5.0%
Industrial	15,083,000	12.9%
Agricultural	11,417,000	9.7%
Total North Dakota Odorized Propane Demand	**117,137,000**	**100.0%**
Total Propane-Heated Households	**41,709**	
Propane Share of North Dakota Home Heating		13.31%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in North Dakota ($1,000)	**$196,609**
Supply	$272,295
Transportation, Storage, and Wholesale	$36,480
Retail	$97,752
Total Direct Value Added in North Dakota	**$406,527**
Indirect and Induced	$561,145
Total Odorized Propane Industry Contribution to North Dakota GDP	**$967,672**

2015 Employment	
Production	851
Transportation, Storage, and Wholesale	40
Retail	115
Direct North Dakota Employment Related to Odorized Propane	**1,006**

2015 Labor Income	($1,000)
Production	$96,689
Transportation, Storage, and Wholesale	$3,698
Retail	$4,424
Direct Labor Income in North Dakota Odorized Propane Industry	**$104,811**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	5,226,000	0.31%
Gas Processing Plants	395,586,000	6.37%
Total North Dakota Odorized Propane Production	**400,812,000**	**5.09%**

4.38. Odorized Propane's Impact on Ohio Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	173,689,000	60.6%
Commercial	34,840,000	12.1%
Cylinder	7,421,000	2.6%
Internal Combustion	29,195,000	10.2%
Industrial	19,132,000	6.7%
Agricultural	22,567,000	7.9%
Total Ohio Odorized Propane Demand	**286,844,000**	**100.0%**
Total Propane-Heated Households	**244,024**	
Propane Share of Ohio Home Heating		5.30%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Ohio ($1,000)	**$484,870**
Supply	$133,504
Transportation, Storage, and Wholesale	$88,188
Retail	$242,823
Total Direct Value Added in Ohio	**$464,515**
Indirect and Induced	$1,048,800
Total Odorized Propane Industry Contribution to Ohio GDP	**$1,513,314**

2015 Employment	
Production	215
Transportation, Storage, and Wholesale	80
Retail	1,313
Direct Ohio Employment Related to Odorized Propane	**1,608**

2015 Labor Income	($1,000)
Production	$24,776
Transportation, Storage, and Wholesale	$6,848
Retail	$57,193
Direct Labor Income in Ohio Odorized Propane Industry	**$88,817**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	49,193,000	2.96%
Gas Processing Plants	226,931,000	3.65%
Total Ohio Odorized Propane Production	**276,124,000**	**3.51%**

4.39. Odorized Propane's Impact on Oklahoma Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	71,204,000	61.5%
Commercial	16,952,000	14.7%
Cylinder	4,786,000	4.1%
Internal Combustion	9,903,000	8.6%
Industrial	5,185,000	4.5%
Agricultural	7,668,000	6.6%
Total Oklahoma Odorized Propane Demand	**115,698,000**	**100.0%**
Total Propane-Heated Households	**95,737**	
Propane Share of Oklahoma Home Heating		6.53%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Oklahoma ($1,000)	**$195,519**
Supply	$386,445
Transportation, Storage, and Wholesale	$54,993
Retail	$97,890
Total Direct Value Added in Oklahoma	**$539,328**
Indirect and Induced	$816,796
Total Odorized Propane Industry Contribution to Oklahoma GDP	**$1,356,123**

2015 Employment	
Production	858
Transportation, Storage, and Wholesale	92
Retail	629
Direct Oklahoma Employment Related to Odorized Propane	**1,578**

2015 Labor Income	($1,000)
Production	$98,072
Transportation, Storage, and Wholesale	$8,459
Retail	$23,705
Direct Labor Income in Oklahoma Odorized Propane Industry	**$130,236**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	36,842,000	2.21%
Gas Processing Plants	771,593,000	12.42%
Total Oklahoma Odorized Propane Production	**808,435,000**	**10.26%**

4.40. Odorized Propane's Impact on Oregon Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	16,734,000	25.1%
Commercial	14,456,000	21.7%
Cylinder	4,356,000	6.5%
Internal Combustion	13,197,000	19.8%
Industrial	13,415,000	20.1%
Agricultural	4,464,000	6.7%
Total Oregon Odorized Propane Demand	**66,622,000**	**100.0%**
Total Propane-Heated Households	**26,882**	
Propane Share of Oregon Home Heating		1.73%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Oregon ($1,000)	**$118,431**
Supply	$0
Transportation, Storage, and Wholesale	$16,833
Retail	$57,009
Total Direct Value Added in Oregon	**$73,842**
Indirect and Induced	$268,903
Total Odorized Propane Industry Contribution to Oregon GDP	**$342,745**

2015 Employment	
Production	-
Transportation, Storage, and Wholesale	9
Retail	304
Direct Oregon Employment Related to Odorized Propane	**313**

2015 Labor Income	($1,000)
Production	$0
Transportation, Storage, and Wholesale	$712
Retail	$12,626
Direct Labor Income in Oregon Odorized Propane Industry	**$13,338**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total Oregon Odorized Propane Production	**-**	**0.00%**

4.41. Odorized Propane's Impact on Pennsylvania Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	180,985,000	53.3%
Commercial	85,611,000	25.2%
Cylinder	18,358,000	5.4%
Internal Combustion	18,819,000	5.5%
Industrial	16,830,000	5.0%
Agricultural	18,692,000	5.5%
Total Pennsylvania Odorized Propane Demand	**339,295,000**	**100.0%**
Total Propane-Heated Households	**200,754**	
Propane Share of Pennsylvania Home Heating		4.05%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Pennsylvania ($1,000)	**$725,163**
Supply	$93,973
Transportation, Storage, and Wholesale	$91,857
Retail	$364,807
Total Direct Value Added in Pennsylvania	**$550,637**
Indirect and Induced	$1,176,258
Total Odorized Propane Industry Contribution to Pennsylvania GDP	**$1,726,895**

2015 Employment	
Production	114
Transportation, Storage, and Wholesale	62
Retail	1,684
Direct Pennsylvania Employment Related to Odorized Propane	**1,860**

2015 Labor Income	($1,000)
Production	$13,202
Transportation, Storage, and Wholesale	$5,159
Retail	$101,017
Direct Labor Income in Pennsylvania Odorized Propane Industry	**$119,378**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	48,408,000	2.91%
Gas Processing Plants	133,163,000	2.14%
Total Pennsylvania Odorized Propane Production	**181,571,000**	**2.31%**

4.42. Odorized Propane's Impact on Rhode Island Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	10,166,000	46.1%
Commercial	4,591,000	20.8%
Cylinder	1,437,000	6.5%
Internal Combustion	2,165,000	9.8%
Industrial	3,648,000	16.5%
Agricultural	64,000	0.3%
Total Rhode Island Odorized Propane Demand	**22,071,000**	**100.0%**
Total Propane-Heated Households	**11,955**	
Propane Share of Rhode Island Home Heating		2.93%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Rhode Island ($1,000)	**$45,544**
Supply	$0
Transportation, Storage, and Wholesale	$5,577
Retail	$21,237
Total Direct Value Added in Rhode Island	**$26,814**
Indirect and Induced	$68,269
Total Odorized Propane Industry Contribution to Rhode Island GDP	**$95,083**

2015 Employment	
Production	-
Transportation, Storage, and Wholesale	3
Retail	108
Direct Rhode Island Employment Related to Odorized Propane	**111**

2015 Labor Income	($1,000)
Production	$0
Transportation, Storage, and Wholesale	$236
Retail	$5,909
Direct Labor Income in Rhode Island Odorized Propane Industry	**$6,145**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total Rhode Island Odorized Propane Production	**-**	**0.00%**

4.43. Odorized Propane's Impact on South Carolina Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	39,513,000	39.2%
Commercial	29,170,000	28.9%
Cylinder	3,916,000	3.9%
Internal Combustion	9,743,000	9.7%
Industrial	6,647,000	6.6%
Agricultural	11,929,000	11.8%
Total South Carolina Odorized Propane Demand	**100,918,000**	**100.0%**
Total Propane-Heated Households	**75,921**	
Propane Share of South Carolina Home Heating		4.09%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in South Carolina ($1,000)	**$190,589**
Supply	$0
Transportation, Storage, and Wholesale	$30,091
Retail	$81,003
Total Direct Value Added in South Carolina	**$111,094**
Indirect and Induced	$287,443
Total Odorized Propane Industry Contribution to South Carolina GDP	**$398,538**

2015 Employment	
Production	-
Transportation, Storage, and Wholesale	25
Retail	873
Direct South Carolina Employment Related to Odorized Propane	**898**

2015 Labor Income	($1,000)
Production	$0
Transportation, Storage, and Wholesale	$2,061
Retail	$36,978
Direct Labor Income in South Carolina Odorized Propane Industry	**$39,040**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total South Carolina Odorized Propane Production	**-**	**0.00%**

4.44. Odorized Propane's Impact on South Dakota Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	41,478,000	60.3%
Commercial	7,715,000	11.2%
Cylinder	1,485,000	2.2%
Internal Combustion	2,876,000	4.2%
Industrial	2,232,000	3.2%
Agricultural	13,007,000	18.9%
Total South Dakota Odorized Propane Demand	**68,793,000**	**100.0%**
Total Propane-Heated Households	**53,053**	
Propane Share of South Dakota Home Heating		15.63%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in South Dakota ($1,000)	**$116,048**
Supply	$352
Transportation, Storage, and Wholesale	$17,382
Retail	$57,996
Total Direct Value Added in South Dakota	**$75,730**
Indirect and Induced	$127,582
Total Odorized Propane Industry Contribution to South Dakota GDP	**$203,311**

2015 Employment	
Production	2
Transportation, Storage, and Wholesale	9
Retail	179
Direct South Dakota Employment Related to Odorized Propane	**190**

2015 Labor Income	($1,000)
Production	$250
Transportation, Storage, and Wholesale	$737
Retail	$6,510
Direct Labor Income in South Dakota Odorized Propane Industry	**$7,496**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total South Dakota Odorized Propane Production	**-**	**0.00%**

4.45. Odorized Propane's Impact on Tennessee Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	68,162,000	61.8%
Commercial	16,434,000	14.9%
Cylinder	2,113,000	1.9%
Internal Combustion	13,016,000	11.8%
Industrial	6,548,000	5.9%
Agricultural	3,980,000	3.6%
Total Tennessee Odorized Propane Demand	**110,253,000**	**100.0%**
Total Propane-Heated Households	**99,323**	
Propane Share of Tennessee Home Heating		3.93%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Tennessee ($1,000)	**$186,508**
Supply	$780
Transportation, Storage, and Wholesale	$28,348
Retail	$93,475
Total Direct Value Added in Tennessee	**$122,602**
Indirect and Induced	$382,776
Total Odorized Propane Industry Contribution to Tennessee GDP	**$505,378**

2015 Employment	
Production	3
Transportation, Storage, and Wholesale	16
Retail	1,426
Direct Tennessee Employment Related to Odorized Propane	**1,445**

2015 Labor Income	($1,000)
Production	$371
Transportation, Storage, and Wholesale	$1,280
Retail	$50,214
Direct Labor Income in Tennessee Odorized Propane Industry	**$51,864**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	16,860,000	1.01%
Gas Processing Plants	1,608,000	0.03%
Total Tennessee Odorized Propane Production	**18,468,000**	**0.23%**

4.46. Odorized Propane's Impact on Texas Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	174,812,000	44.7%
Commercial	94,069,000	24.0%
Cylinder	33,774,000	8.6%
Internal Combustion	48,664,000	12.4%
Industrial	27,803,000	7.1%
Agricultural	12,239,000	3.1%
Total Texas Odorized Propane Demand	**391,361,000**	**100.0%**
Total Propane-Heated Households	**293,458**	
Propane Share of Texas Home Heating		3.11%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Texas ($1,000)	**$737,002**
Supply	$2,000,517
Transportation, Storage, and Wholesale	$168,026
Retail	$392,784
Total Direct Value Added in Texas	**$2,561,327**
Indirect and Induced	$4,443,030
Total Odorized Propane Industry Contribution to Texas GDP	**$7,004,357**

2015 Employment	
Production	4,270
Transportation, Storage, and Wholesale	537
Retail	3,051
Direct Texas Employment Related to Odorized Propane	**7,858**

2015 Labor Income	($1,000)
Production	$487,598
Transportation, Storage, and Wholesale	$46,440
Retail	$176,453
Direct Labor Income in Texas Odorized Propane Industry	**$710,491**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	607,652,000	36.53%
Gas Processing Plants	2,679,282,000	43.12%
Total Texas Odorized Propane Production	**3,286,934,000**	**41.73%**

4.47. Odorized Propane's Impact on Utah Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	13,291,000	29.0%
Commercial	20,597,000	45.0%
Cylinder	3,284,000	7.2%
Internal Combustion	3,842,000	8.4%
Industrial	2,440,000	5.3%
Agricultural	2,338,000	5.1%
Total Utah Odorized Propane Demand	**45,792,000**	**100.0%**
Total Propane-Heated Households	**19,320**	
Propane Share of Utah Home Heating		2.08%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Utah ($1,000)	**$80,490**
Supply	$37,356
Transportation, Storage, and Wholesale	$14,932
Retail	$41,492
Total Direct Value Added in Utah	**$93,779**
Indirect and Induced	$216,872
Total Odorized Propane Industry Contribution to Utah GDP	**$310,651**

2015 Employment	
Production	98
Transportation, Storage, and Wholesale	15
Retail	193
Direct Utah Employment Related to Odorized Propane	**307**

2015 Labor Income	($1,000)
Production	$11,137
Transportation, Storage, and Wholesale	$1,348
Retail	$7,631
Direct Labor Income in Utah Odorized Propane Industry	**$20,116**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	7,661,000	0.46%
Gas Processing Plants	63,007,000	1.01%
Total Utah Odorized Propane Production	**70,668,000**	**0.90%**

4.48. Odorized Propane's Impact on Vermont Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	66,860,000	57.2%
Commercial	45,941,000	39.3%
Cylinder	718,000	0.6%
Internal Combustion	669,000	0.6%
Industrial	1,481,000	1.3%
Agricultural	1,210,000	1.0%
Total Vermont Odorized Propane Demand	**116,879,000**	**100.0%**
Total Propane-Heated Households	**40,280**	
Propane Share of Vermont Home Heating		15.80%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Vermont ($1,000)	**$250,534**
Supply	$0
Transportation, Storage, and Wholesale	$29,531
Retail	$121,906
Total Direct Value Added in Vermont	**$151,437**
Indirect and Induced	$215,158
Total Odorized Propane Industry Contribution to Vermont GDP	**$366,595**

2015 Employment	
Production	-
Transportation, Storage, and Wholesale	16
Retail	390
Direct Vermont Employment Related to Odorized Propane	**406**

2015 Labor Income	($1,000)
Production	$0
Transportation, Storage, and Wholesale	$1,250
Retail	$20,864
Direct Labor Income in Vermont Odorized Propane Industry	**$22,114**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total Vermont Odorized Propane Production	**-**	**0.00%**

4.49. Odorized Propane's Impact on Virginia Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	129,579,000	51.1%
Commercial	76,319,000	30.1%
Cylinder	4,860,000	1.9%
Internal Combustion	11,065,000	4.4%
Industrial	10,387,000	4.1%
Agricultural	21,394,000	8.4%
Total Virginia Odorized Propane Demand	**253,604,000**	**100.0%**
Total Propane-Heated Households	**134,535**	
Propane Share of Virginia Home Heating		4.33%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Virginia ($1,000)	**$496,115**
Supply	$2
Transportation, Storage, and Wholesale	$64,076
Retail	$220,894
Total Direct Value Added in Virginia	**$284,972**
Indirect and Induced	$662,252
Total Odorized Propane Industry Contribution to Virginia GDP	**$947,225**

2015 Employment	
Production	0
Transportation, Storage, and Wholesale	34
Retail	975
Direct Virginia Employment Related to Odorized Propane	**1,010**

2015 Labor Income	($1,000)
Production	$2
Transportation, Storage, and Wholesale	$2,712
Retail	$43,401
Direct Labor Income in Virginia Odorized Propane Industry	**$46,115**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total Virginia Odorized Propane Production	**-**	**0.00%**

4.50. Odorized Propane's Impact on Washington Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	55,830,000	35.3%
Commercial	30,571,000	19.3%
Cylinder	8,318,000	5.3%
Internal Combustion	19,562,000	12.4%
Industrial	22,134,000	14.0%
Agricultural	21,705,000	13.7%
Total Washington Odorized Propane Demand	**158,120,000**	**100.0%**
Total Propane-Heated Households	**83,835**	
Propane Share of Washington Home Heating		3.07%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Washington ($1,000)	**$287,413**
Supply	$0
Transportation, Storage, and Wholesale	$40,825
Retail	$141,695
Total Direct Value Added in Washington	**$182,520**
Indirect and Induced	$531,769
Total Odorized Propane Industry Contribution to Washington GDP	**$714,289**

2015 Employment	
Production	3
Transportation, Storage, and Wholesale	23
Retail	628
Direct Washington Employment Related to Odorized Propane	**655**

2015 Labor Income	($1,000)
Production	$454
Transportation, Storage, and Wholesale	$1,863
Retail	$27,724
Direct Labor Income in Washington Odorized Propane Industry	**$30,041**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	31,521,000	1.89%
Gas Processing Plants	-	0.00%
Total Washington Odorized Propane Production	**31,521,000**	**0.40%**

4.51. Odorized Propane's Impact on West Virginia Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	32,568,000	71.0%
Commercial	6,574,000	14.3%
Cylinder	606,000	1.3%
Internal Combustion	2,234,000	4.9%
Industrial	1,491,000	3.3%
Agricultural	2,379,000	5.2%
Total West Virginia Odorized Propane Demand	**45,852,000**	**100.0%**
Total Propane-Heated Households	**34,766**	
Propane Share of West Virginia Home Heating		4.73%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in West Virginia ($1,000)	**$94,805**
Supply	$252,221
Transportation, Storage, and Wholesale	$22,787
Retail	$45,094
Total Direct Value Added in West Virginia	**$320,102**
Indirect and Induced	$462,474
Total Odorized Propane Industry Contribution to West Virginia GDP	**$782,576**

2015 Employment	
Production	357
Transportation, Storage, and Wholesale	40
Retail	225
Direct West Virginia Employment Related to Odorized Propane	**622**

2015 Labor Income	($1,000)
Production	$41,045
Transportation, Storage, and Wholesale	$3,718
Retail	$8,894
Direct Labor Income in West Virginia Odorized Propane Industry	**$53,656**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	450,000	0.03%
Gas Processing Plants	464,753,000	7.48%
Total West Virginia Odorized Propane Production	**465,203,000**	**5.91%**

4.52. Odorized Propane's Impact on Wisconsin Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	255,459,000	65.6%
Commercial	36,760,000	9.4%
Cylinder	4,891,000	1.3%
Internal Combustion	28,990,000	7.4%
Industrial	28,947,000	7.4%
Agricultural	34,296,000	8.8%
Total Wisconsin Odorized Propane Demand	**389,343,000**	**100.0%**
Total Propane-Heated Households	**259,440**	
Propane Share of Wisconsin Home Heating		11.18%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Wisconsin ($1,000)	**$661,382**
Supply	$0
Transportation, Storage, and Wholesale	$98,432
Retail	$332,875
Total Direct Value Added in Wisconsin	**$431,306**
Indirect and Induced	$784,887
Total Odorized Propane Industry Contribution to Wisconsin GDP	**$1,216,194**

2015 Employment	
Production	0
Transportation, Storage, and Wholesale	53
Retail	1,243
Direct Wisconsin Employment Related to Odorized Propane	**1,296**

2015 Labor Income	($1,000)
Production	$23
Transportation, Storage, and Wholesale	$4,175
Retail	$49,402
Direct Labor Income in Wisconsin Odorized Propane Industry	**$53,600**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	2,127,000	0.13%
Gas Processing Plants	-	0.00%
Total Wisconsin Odorized Propane Production	**2,127,000**	**0.03%**

4.53. Odorized Propane's Impact on Wyoming Economy

2015 Odorized Propane Sales Breakout	(Gallons)	(% of State)
Residential	22,798,000	50.5%
Commercial	16,247,000	36.0%
Cylinder	997,000	2.2%
Internal Combustion	984,000	2.2%
Industrial	2,472,000	5.5%
Agricultural	1,679,000	3.7%
Total Wyoming Odorized Propane Demand	**45,177,000**	**100.0%**
Total Propane-Heated Households	**22,692**	
Propane Share of Wyoming Home Heating		9.91%

2015 Contribution to State Economy	($1,000)
Total Market Value of Odorized Propane Sold in Wyoming ($1,000)	**$80,484**
Supply	$113,411
Transportation, Storage, and Wholesale	$16,811
Retail	$42,019
Total Direct Value Added in Wyoming	**$172,241**
Indirect and Induced	$246,317
Total Odorized Propane Industry Contribution to Wyoming GDP	**$418,558**

2015 Employment	
Production	273
Transportation, Storage, and Wholesale	23
Retail	193
Direct Wyoming Employment Related to Odorized Propane	**489**

2015 Labor Income	($1,000)
Production	$31,136
Transportation, Storage, and Wholesale	$2,081
Retail	$9,072
Direct Labor Income in Wyoming Odorized Propane Industry	**$42,290**

2015 Odorized Propane Production	(Gallons)	(% of U.S. Total)
Refineries	7,442,000	0.45%
Gas Processing Plants	204,134,000	3.29%
Total Wyoming Odorized Propane Production	**211,576,000**	**2.69%**

5. Household Heating Fuels, By State and Division

ICF's estimates of county-level households and primary space heating fuels are based on the U.S. Census Bureau's 2015 American Community Survey (ACS). The ACS survey is performed annually, and covers approximately 2 percent of U.S. households each year. These annual results provide data for all fifty states.

Table 18 and Table 19 below present the U.S. Census Bureau's estimates for household heating fuel by census region and state. Census Bureau's definition of "Heating Fuels", while mostly self-explanatory, does come with the caveat that utility gas, though primarily natural gas (methane), may also include a small number of households which receive odorized propane through underground pipes. These housing units include single and multi-family site built units, as well as manufactured homes, boats, mobile homes, and any other dwelling unit that serves as a primary residence.

In addition, because the purpose of the survey is to determine the primary household heating fuel, numbers in the tables may understate the prevalence of certain fuels for secondary space heating, which in some part of the country constitute a large portion of total energy used for space heating.

Table 18: Primary Space Heating Fuel, by Household, by Census Region, 2015

Census Region	Total Households in Region	Natural Gas	Propane	Electricity	Distillate[24]	Wood	Other/None[25]
East North Central	18,094,391	12,796,192	1,188,103	3,265,983	226,522	386,719	230,872
East South Central	7,197,189	2,315,090	448,381	4,229,103	30,700	131,581	42,334
Middle Atlantic	15,377,694	9,150,542	527,060	2,298,157	2,786,164	297,249	318,522
Mountain	8,513,747	4,820,352	367,718	2,921,949	26,266	254,567	122,895
New England	5,628,844	2,179,569	312,859	754,528	2,054,116	231,195	96,577
Pacific	17,874,256	9,926,129	518,054	5,863,148	188,478	448,698	929,749
South Atlantic	23,474,851	5,728,640	871,985	15,724,944	593,402	295,379	260,501
West North Central	8,277,344	4,855,047	838,789	2,205,352	73,778	196,680	107,698
West South Central	13,769,934	5,211,007	503,299	7,839,365	12,641	118,746	84,876
Total U.S.	118,208,250	56,982,568	5,576,248	45,102,529	5,992,067	2,360,814	2,194,024

Source: US Census American Community Survey

[24] *Distillate includes Fuel Oil and Diesel Home Heated Households.*
[25] *Includes Coal, Solar, Other, and No Fuel Households.*

Table 19: Primary Space Heating Fuel, by Household, by State, 2015

State	Total Households in State	Natural Gas	Propane	Electricity	Distillate	Wood	Other/None
Alabama	1,846,390	508,335	114,106	1,191,229	3,176	20,342	9,202
Alaska	250,185	122,946	3,713	32,857	71,730	13,928	5,011
Arizona	2,463,008	803,620	65,811	1,490,766	2,114	50,238	50,459
Arkansas	1,144,663	449,516	76,481	565,461	469	45,025	7,711
California	12,896,357	8,252,070	399,275	3,427,206	30,962	218,185	568,659
Colorado	2,074,735	1,438,590	97,415	470,730	2,431	40,734	24,835
Connecticut	1,343,703	471,195	51,915	214,414	561,996	29,530	14,653
Delaware	352,595	145,437	36,295	114,947	47,187	4,581	4,148
Dis. of Columbia	281,787	154,113	3,343	113,514	5,066	0	5,751
Florida	7,463,184	325,205	71,936	6,900,036	10,710	12,848	142,449
Georgia	3,656,407	1,454,703	170,705	1,976,609	5,839	31,762	16,789
Hawaii	445,936	8,107	4,349	126,207	119	850	306,304
Idaho	597,421	307,083	27,508	201,596	8,511	45,444	7,279
Illinois	4,794,523	3,764,432	191,916	749,605	7,685	22,839	58,046
Indiana	2,515,143	1,517,830	177,999	726,852	18,388	51,692	22,382
Iowa	1,247,249	758,106	162,877	283,022	7,202	18,554	17,488
Kansas	1,111,582	731,194	86,149	265,326	1,451	19,819	7,643
Kentucky	1,716,168	643,384	104,751	889,890	15,589	46,453	16,101
Louisiana	1,737,908	599,691	37,623	1,081,439	439	11,443	7,273
Maine	545,226	37,624	50,511	35,138	336,337	70,767	14,849
Maryland	2,177,934	968,764	72,692	883,862	197,050	29,110	26,456
Massachusetts	2,559,951	1,306,073	79,528	403,279	690,548	38,927	41,596
Michigan	3,858,532	2,958,300	314,724	356,677	45,398	129,857	53,576
Minnesota	2,147,262	1,420,349	225,549	366,326	41,930	51,735	41,373
Mississippi	1,104,371	338,181	130,201	614,013	2,122	14,941	4,913
Missouri	2,374,180	1,212,347	211,223	840,114	5,223	88,827	16,446
Montana	414,804	224,376	49,552	98,131	4,243	32,691	5,811
Nebraska	744,159	440,046	58,229	224,922	2,828	9,628	8,506
Nevada	1,042,065	622,936	25,153	361,369	6,529	14,312	11,766
New Hampshire	517,615	103,292	78,670	46,002	232,674	42,472	14,505
New Jersey	3,187,963	2,398,744	61,082	385,792	299,222	14,398	28,725
New Mexico	761,797	507,367	60,267	134,640	692	46,945	11,886
New York	7,233,694	4,202,413	265,224	808,370	1,649,860	141,016	166,811
North Carolina	3,843,745	934,170	271,792	2,407,444	134,297	74,765	21,277

Source: US Census American Community Survey

State	Total Households in State	Natural Gas	Propane	Electricity	Distillate	Wood	Other/None
North Dakota	313,475	130,987	41,709	123,653	8,473	1,440	7,213
Ohio	4,606,655	3,040,522	244,024	1,071,606	100,929	88,143	61,431
Oklahoma	1,465,951	770,876	95,737	555,238	2,382	26,956	14,762
Oregon	1,553,205	595,662	26,882	774,393	31,373	106,585	18,310
Pennsylvania	4,956,037	2,549,385	200,754	1,103,995	837,082	141,835	122,986
Rhode Island	407,484	216,129	11,955	43,085	124,029	7,228	5,058
South Carolina	1,857,768	410,455	75,921	1,322,225	20,409	18,149	10,609
South Dakota	339,437	162,018	53,053	101,989	6,671	6,677	9,029
Tennessee	2,530,260	825,190	99,323	1,533,971	9,813	49,845	12,118
Texas	9,421,412	3,390,924	293,458	5,637,227	9,351	35,322	55,130
Utah	930,980	780,746	19,320	111,094	1,297	11,431	7,092
Vermont	254,865	45,256	40,280	12,610	108,532	42,271	5,916
Virginia	3,106,895	1,029,797	134,535	1,687,103	153,039	79,382	23,039
Washington	2,728,573	947,344	83,835	1,502,485	54,294	109,150	31,465
West Virginia	734,536	305,996	34,766	319,204	19,805	44,782	9,983
Wisconsin	2,319,538	1,515,108	259,440	361,243	54,122	94,188	35,437
Wyoming	228,937	135,634	22,692	53,623	449	12,772	3,767
U.S. Total	118,208,250	56,982,568	5,576,248	45,102,529	5,992,067	2,360,814	2,194,024

Source: US Census American Community Survey

A. Appendix: NAICS Codes and Definitions

Table 20. NAICS Codes and Definitions

Industry	NAICS Code	Description
Crude Petroleum and Natural Gas Extraction	211111	Engaged in (1) the exploration, development, and/or the production of petroleum from wells in which the hydrocarbons will initially flow or can be produced using normal or enhanced drilling and extraction techniques or (2) the production of crude petroleum from surface shales or tar sands or from reservoirs in which the hydrocarbons are semisolids.
Natural Gas Liquid Extraction	211112	Engaged in drilling oil and gas wells for others on a contract or fee basis. This industry includes contractors that specialize in spudding in, drilling in, redrilling, and directional drilling.
Drilling Oil & Gas Wells	213111	Engaged in drilling oil and gas wells for others on a contract or fee basis.
Support Activities for Oil and Gas Operations	213112	Engaged in performing support activities on a contract or fee basis for oil and gas operations (except site preparation and related construction activities). Services included are exploration (except geophysical surveying and mapping); excavating slush pits and cellars, well surveying; running, cutting, and pulling casings, tubes, and rods; cementing wells, shooting wells; perforating well casings; acidizing and chemically treating wells; and cleaning out, bailing, and swabbing wells.
Petroleum Refineries	32411	Engaged in refining crude petroleum into refined petroleum. Petroleum refining involves one or more of the following activities: (1) fractionation; (2) straight distillation of crude oil; and (3) cracking.
Crude Pipelines	4861	Primarily engaged in the pipeline transportation of crude oil.
Refined Petroleum Product Pipelines	48691	Engaged in the pipeline transportation of refined petroleum products.
Natural Gas Pipelines	4862	Primarily engaged in the pipeline transportation of natural gas from processing plants to local distribution systems. This industry includes the storage of natural gas because the storage is usually done by the pipeline establishment and because a pipeline is inherently a network in which all the nodes are interdependent.
Wholesale Petroleum Trade	4247	Primarily engaged in the merchant wholesale distribution of petroleum and petroleum products, including liquefied petroleum gas.
Petroleum Bulk Stations and Terminals	424710	Establishments with bulk liquid storage facilities primarily engaged in the merchant wholesale distribution of crude petroleum and petroleum products, including liquefied petroleum gas
Petroleum and Petroleum Products Merchant Wholesalers (except Bulk Stations and Terminals)	424720	Establishments primarily engaged in the merchant wholesale distribution of petroleum and petroleum products (except from bulk liquid storage facilities).
Gasoline Stations	447	Industries in the Gasoline Stations subsector retail automotive fuels (e.g., gasoline, diesel fuel, gasohol, alternative fuels) and automotive oils or retail these products in combination with convenience store items. These establishments have specialized equipment for storing and dispensing automotive fuels.
Fuel Dealers	45431	Primarily engaged in retailing heating oil, liquefied petroleum (LP) gas, and other fuels via direct selling.
Heating Oil Dealers	454311	Primarily engaged in retailing heating oil via direct selling. This NAICS code was merged into 454310 (see above) in the second half of 2011.
LPG Dealers[26]	454312	Engaged in retailing liquefied petroleum (LP) gas via direct selling. This NAICS code was merged into 454310 (see above) in the second half of 2011.

Source: U.S. Census 2012 & 2017 NAICS Manuals

[26] *The North American Industry Classification System (NAICS) suspended separate reporting of economic activity in the LPG Dealers (454312) and Heating Oil Dealers (454311) classifications starting in the 2nd quarter of 2011, merging both into the Fuel Dealers (45431) classification. 2012 employment figures are estimates derived from total 45431 reported data using historical trends in LPG Dealers and Heating Oil Dealers share of total Fuel Dealers, total number of gallons sold and customers served, state-level relationships between customer and employee numbers, and state-level economic conditions.*

B. Appendix: Acronyms

API	American Petroleum Institute
BEA	Bureau of Economic Analysis (U.S. Department of Commerce)
BLS	Bureau of Labor Statistics (U.S. Department of Labor)
EIA	Energy Information Administration (U.S. Department of Energy)
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
LRG	Liquefied Refinery Gas
NAICS	North American Industry Classification System is the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy.
NEB	National Energy Board (Canada)
NGL	Natural Gas Liquid
NPGA	National Propane Gas Association
PADD	Petroleum Administration for Defense Districts PADD 1 (East Coast) is composed of the following three sub-districts: 1A (New England): Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont. 1B (Central Atlantic): Delaware, District of Columbia, Maryland, New Jersey, New York, Pennsylvania. 1C (Lower Atlantic): Florida, Georgia, North Carolina, South Carolina, Virginia, West Virginia. PADD 2 (Midwest): Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, Ohio, Oklahoma, Tennessee, Wisconsin. PADD 3 (Gulf Coast): Alabama, Arkansas, Louisiana, Mississippi, New Mexico, Texas. PADD 4 (Rocky Mountain): Colorado, Idaho, Montana, Utah, Wyoming. PADD5 (West Coast): Alaska, Arizona, California, Hawaii, Nevada, Oregon, Washington.
PERC	Propane Education & Research Council
QCEW	Quarterly Census of Employment and Wages (performed by the BLS)
RACC	Refiner Acquisition Cost of Crude
WTI	West Texas Intermediate crude, a futures contract traded on the New York Mercantile Exchange (NYMEX), is a blend of several U.S. domestic streams of light sweet crude oil. For WTI crude oil, the delivery point is Cushing, Oklahoma.

C. Appendix: Major Public Data Sources

1) *2015 Residential Energy Consumption Survey,* Energy Information Administration
2) *2015 American Community Survey,* U.S. Census Bureau
3) *2015 Petroleum Supply Annual,* Energy Information Administration
4) *2015 Petroleum Marketing Annual,* Energy Information Administration
5) *2015 Natural Gas Annual,* Energy Information Administration
6) *2015 Sales of Natural Gas Liquids and Liquefied Refinery Gases,* American Petroleum Institute, January 2017
7) *Interactive Tariff and Trade DataWab,* United States International Trade Commission
8) *Bloomberg, various pricing reports and financial data*
9) *Monthly Natural Gas Liquids Report,* Energy Information Administration
10) *Natural Gas Liquids Statistics,* National Energy Board of Canada
11) *Quarterly Census of Employment and Wages,* Bureau of Labor Statistics
12) *Natural Gas Processing Capacity (2012 & 2014),* Energy Information Administration *757 Survey*
13) *Propane (Consumer Grade) Prices by Sales Type,* Energy Information Administration (Program reporting was suspended in 2010)
14) *State Heating Oil and Propane Price,* Energy Information Administration
15) *State Energy Data Systems, Consumption & Expenditures Data,* Energy Information Administration
16) Harry Vidas, Bruce Henning, and Bob Hugman, Study of the Propane Industry's Impact on U.S. and State Economics, Energy and Environmental Analysis, Inc., Arlington, VA, November 2004
17) Wilczewski, Warren; Sloan, Michael, Propane Industry Impact on U.S. and State Economies, ICF, Fairfax, VA, November 2011
18) Wilczewski, Warren; Sloan, Michael, Propane Industry Impact on U.S. and State Economies, ICF, Fairfax, VA, March 2014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