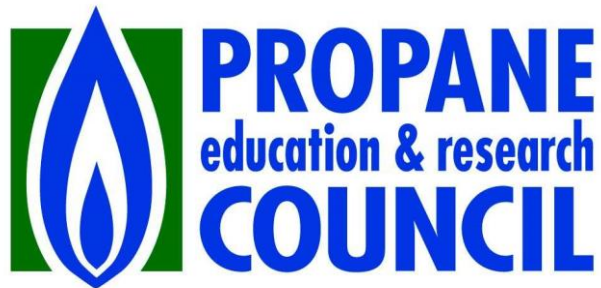


# 2021 Propane Industry's Economic Impact Report

Impact of the U.S. Consumer Propane  
Industry on U.S. and State Economies  
in 2021

December 2023

Prepared for the Propane  
Education & Research  
Council (PERC)



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# Table of Contents

- 1. Introduction and Summary.....1**
  - 1.1. Introduction .....1
  - 1.2. Change from 2018 to 2021 .....2
- 2. Methodology and Scope of Analysis .....8**
  - 2.1. Impact from Production, Transportation and Consumption.....8
    - 2.1.1 Production .....8
    - 2.1.2 Midstream.....9
    - 2.1.3 Downstream .....9
    - 2.1.4 Propane Retailer Capital Spending.....10
  - 2.2. Direct Economic Impact from the Purchase and Manufacture of Propane Equipment, Engines, and Appliances .....10
- 3. Employment and Wages Results.....11**
  - 3.1. Employment and Wages in the Odorized Propane Industry .....11
    - 3.1.1 Direct Employment from Production, Transportation, and Consumption .....11
    - 3.1.2 Direct Wages.....13
    - 3.1.3 Indirect and Induced Employment and Wages .....14
  - 3.2. Manufacturing of Propane Equipment, Engines, and Appliances .....19
- 4. Direct Economic Impact Results .....21**
  - 4.1. Economic Impact from Production, Transportation, and Consumption.....21
    - 4.1.1 Upstream .....21
    - 4.1.2 Midstream.....22
    - 4.1.3 Downstream .....24
    - 4.1.4 Retailer Spending.....25
  - 4.2. Summary Results of the Propane Value Chain Analysis .....32
  - 4.3. Economic Impact from the Manufacture of Propane Appliances and Engines .....48
    - 4.3.1 Residential Sector Propane Equipment Usage .....48
    - 4.3.2 Commercial Sector Propane Equipment Installations .....52
    - 4.3.3 Propane Internal Combustion Engines .....54
    - 4.3.4 Other Agricultural Products .....60
    - 4.3.5 Industrial Sector.....60
- 5. National Overview by State .....61**
  - 5.1. Residential Propane Accounts and Primary Heated Households by State.....62
  - 5.2. Retail Propane Employment by State.....63
  - 5.3. Retail Propane Wages (Million Dollars) by State .....64
  - 5.4. Total Propane Employment by State .....65
  - 5.5. Total Propane Wages (Million dollars) by State .....66
  - 5.6. Total Employment from Natural Gas Liquids and Propane by State .....67
  - 5.7. Total Wages (Million Dollars) from Natural Gas Liquids and Propane by State .....68
  - 5.8. Direct Added Value from Odorized (Retail) Propane by State .....69
  - 5.9. Indirect and Induced Added Value (Million Dollars) from Retail Propane by State.....70

- 5.10. Total Added Value (Million Dollars) from Retail Propane by State.....71
- 5.11. Total Added Value (Million Dollars) from Propane by State.....72
- A. Appendix: Odorized Propane Industry’s Impact on the U.S. Economy by State .....73**
- B. Appendix: Residential Sector, By State and Division .....128**
- C. Appendix: NAICS Codes and Definitions .....131**
- D. Appendix: Acronyms .....132**
- E. Appendix: Major Public Data Sources .....133**

## List of Figures

Figure 1. U.S. Residential Propane Price and Mont Belvieu Propane Prices .....	4
Figure 2. Direct Value Added from Propane Value Chain Components .....	5
Figure 3. Odorized Propane (Retail) Value Added by U.S. Census Region and Year .....	6
Figure 4. U.S. Propane/Propylene Imports and Export as Share of Total Supply <sup>9</sup> .....	7
Figure 5. Manufacturing Employment Percentages by State.....	19
Figure 6. Share of propane production from gas processing and refineries over the total production .....	23
Figure 7. Share of 2021 Retail Propane Sales by Company Type .....	25
Figure 8. Value Chain for Odorized Propane, 2021 (Million Dollars) .....	33
Figure 9. Volume Chain for Odorized Propane, 2021 (Thousand Gallons).....	34
Figure 10. Value Chain for All Purity Propane (C <sub>3</sub> H <sub>8</sub> ), 2021 (Million Dollars).....	35
Figure 11. Volume Chain for All Purity Propane (C <sub>3</sub> H <sub>8</sub> ), 2021 (Thousand Gallons) .....	36
Figure 12. Value Chain for Butanes (C <sub>4</sub> H <sub>10</sub> ), 2021 (Million Dollars).....	37
Figure 13. Volume Chain for Butanes (C <sub>4</sub> H <sub>10</sub> ), 2021 (Thousand Gallons) .....	38
Figure 14. Value Chain for Ethane (C <sub>2</sub> H <sub>6</sub> ), 2021 (Million Dollars).....	39
Figure 15. Volume Chain for Ethane (C <sub>2</sub> H <sub>6</sub> ), 2021 (Thousand Gallons) .....	40
Figure 16. Value Chain for All NGLs and LRGs, 2021 (Million Dollars) .....	41
Figure 17. Volume Chain for All NGLs and LRGs, 2021 (Thousand Gallons).....	42
Figure 18. Residential Odorized Propane Consumption by End-Use .....	49
Figure 19. Residential Appliance Installations by Type and Construction Status.....	50
Figure 20. Number of Households with New Propane Appliances by State.....	52
Figure 21. New Commercial Businesses that Use Propane by Industry Type (2018).....	54
Figure 22. Number of Public Propane Fueling Stations by State.....	55
Figure 23. Number of Propane-fueled School Buses and Share of Total School Bus Fleet by State .....	57
Figure 24. New U.S. Forklift Shipments by Class.....	58
Figure 25. Number of 2021 Propane Forklift Shipments by State.....	59
Figure 26. Residential Propane Accounts and Primary Heated Households by State and Share of households using propane as primary heat source .....	62
Figure 27. Retail Propane Employment by State (Section 3) .....	63
Figure 28. Retail Propane Wages (Million dollars) by State (Section 3) .....	64
Figure 29. Total Propane Employment by State (Section 3).....	65
Figure 30. Total Propane Wages (Million dollars) by State (Section 3).....	66
Figure 31. Total Employment from Natural Gas Liquids and Propane by State (Section 3).....	67
Figure 32. Total Wages (Million Dollars) from Natural Gas Liquids and Propane by State (Section 3) .....	68
Figure 33. Direct Added Value from Odorized (Retail) Propane by State (Section 4) .....	69
Figure 34. Indirect and Induced Added Value (Million Dollars) from Retail Propane by State (Section 4) .....	70
Figure 35. Total Added Value (Million Dollars) from Retail Propane by State (Section 4).....	71
Figure 36. Total Added Value (Million Dollars) from Propane by State (Section 4).....	72

## List of Tables

Table 1: Propane Production and Consumption.....	3
Table 2: 2021 National Summary of Direct Employment and Wages Associated with Odorized Propane.....	13
Table 3: Employment and Wages in Odorized Propane and Related Industries, 2021.....	15
Table 4: Odorized Propane Employment and Wages Summary, 2021.....	16
Table 5: Propane Employment and Wages Summary, 2021.....	17
Table 6: Total NGLs / LRGs Employment and Wages Summary, 2021.....	18
Table 7: Employment from Manufacturing Activities in 2021.....	20
Table 8: 2021 National-Level Odorized Propane Consumption and Expenditures by Sector.....	21
Table 9: State Value Added, Employment, and Wages for Odorized Propane, 2021.....	27
Table 10: State Production of Odorized Propane, 2021.....	28
Table 11: State Level Value Summary for Odorized Propane, 2021.....	29
Table 12: State Level Value Summary for Propane (C <sub>3</sub> H <sub>8</sub> ), 2021.....	30
Table 13: State Level Value Summary for Total NGLs / LRGs, 2021.....	31
Table 14: National Value Summary for Odorized Propane, 2021.....	43
Table 15: National Value Summary for All Purity Propane (C <sub>3</sub> H <sub>8</sub> ), 2021.....	44
Table 16: National Value Summary for Butanes (C <sub>4</sub> H <sub>10</sub> ), 2021.....	45
Table 17: National Value Summary for Ethane (C <sub>2</sub> H <sub>6</sub> ), 2021.....	46
Table 18: National Value Summary for Total NGL and LRG, 2021.....	47
Table 19: Economic Impact from Manufacturing Activities (Million Dollars).....	48
Table 20: 2021 Residential Households Primary Space Heating Fuels by Division.....	128
Table 21: 2021 Residential Households Primary Space Heating Fuels (1).....	129
Table 22: 2021 Residential Households Primary Space Heating Fuels (contd.).....	130
Table 23: NAICS Codes and Definitions.....	131

# 1. Introduction and Summary

## 1.1. Introduction

Propane is third most widely used fuel in the U.S. based on the number of households, second to electricity and natural gas. Propane is used in over 50 million American homes, with 11.1 million households using propane for either space or water heating, 7.7 million of which depend on propane as their primary space heating fuel.<sup>1</sup> In addition, over 42 million homes use propane for outdoor grilling activities.<sup>2</sup>

In addition to the significant role propane plays in the residential sector, the propane industry directly serves 1.1 million commercial accounts, 128,766 industrial accounts, and 589,377 agricultural accounts.<sup>3</sup> 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 behind gasoline and diesel.

Transportation demand accounts for 8 percent of global propane consumption,<sup>4</sup> while in the U.S. internal combustion demand accounts for 7 percent of domestic retail consumption. The growth in propane demand in the transportation sector highlights the mass appeal of this clean burning and less expensive alternative to traditional transportation fuels like gasoline and diesel. As per the Propane Education and Research Council (PERC), there were 19,470 active propane buses as of June 2022 which transported close to 1 million students daily. Propane is the third most widely used transportation fuel globally<sup>5</sup> and, in the U.S., nearly 60,000 vehicles used propane as fuel in 2021 as per PERC.

In recognition of the important role propane plays in the U.S. energy marketplace, the PERC has commissioned ICF to perform what is now the sixth 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), in 2014 (reporting estimates for 2012), in 2017 (reporting estimates for 2015) and in 2020 (reporting estimates for 2018).<sup>6</sup> Each of these studies has been conducted independent of the previous versions, using the best available data at the time of the study. The numbers in the tables in this study have been rounded for presentation purposes and the totals might not add up. As with past releases, the focus of this report is to estimate the aggregate GDP impacts due to odorized 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. This iteration of the study also includes a

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<sup>1</sup> *American Community Survey 2021 5-year estimates*, U.S. Census Bureau, Washington, DC, December 2022.

<sup>2</sup> Estimate based on data from the *Residential Energy Consumption Survey (2020)*, Energy Information Administration, Washington, DC, March 2023.

<sup>3</sup> *2021 Annual Retail Propane Sales Report*, ICF and the Propane Education and Research Council, Washington, DC January 2020.

<sup>4</sup> Guide to New Autogas Markets, page 16, <https://online.fliphtml5.com/addge/whce/#p=1>, December 2021.

<sup>5</sup> [Autogas Incentive Policies 2022 \(fliphtml5.com\)](https://online.fliphtml5.com/addge/whce/#p=1)

<sup>6</sup> 2018 *Study of the Propane Industry's Impact on U.S. and State Economies*, ICF.

supplemental assessment of capital spending for the retail propane sector and purchases of propane appliances by consumers.

## 1.2. Change from 2018 to 2021

Relative to 2018, the odorized propane industry's total economic impact increased, from \$53.7 billion, to \$64.8 billion in 2021 – a 20.6 percent increase in nominal terms. The total employee count and wages attributed to the odorized propane industry varies on a yearly basis and have witnessed an increasing trend over the past ten years. The total employee count and wages for the odorized propane industry reached 58,928 and \$4.12 billion respectively in 2021.

The increases were primarily attributable to growth in the value of domestic component of the odorized propane market, a sector whose value increased from \$52.5 billion in 2018 to \$63.7 billion in 2021. The value of gallons imported have gone down slightly from \$1.2 billion in 2018 to \$1.1 billion in 2021.

COVID-19 pandemic had a mixed impact on the odorized propane industry. The total domestic consumption of propane witnessed a modest increase between the 2018 to 2021 period largely driven by increased commercial, internal combustion and resellers demand. This was offset by small declines in the residential, industrial, and agricultural sectors. Commercial propane use increased in the period due to propane's use in hospitals and prisons, where the added cleaning requirements due to COVID greatly increased hot water usage. Propane use in the internal combustion sector also increased mainly because of an increase in material handling/forklifts as the consumer buying habits changed during COVID and impacted distribution. However, propane use in the residential and industrial sector declined and was mainly driven by warmer weather. Agricultural propane usage also dropped in the period as precipitation in 2021 was lower than 2018<sup>7</sup>.

The overall impact of COVID-19 pandemic on propane demand was short-lived and was not quantitatively determined but is not expected to be a significant continuing factor compared to weather, which remains the dominant factor for determining the year-to-year changes in domestic demand.

The number of propane heated households increased by 5 percent during this period, from 5.68 million in 2018 to 5.96 million in 2021 as reported by the American community survey 5-year estimates for 2021. The reported odorized propane sales of 9.55 billion gallons (as per the 2021 Annual Retail Propane Sales Report published by PERC), were roughly 226 million gallons or 2.4 percent higher in 2021 compared to 2018.

As per the 2021 Annual Retail Propane Sales report, demand in commercial sector increased by 23.3 percent compared to 2018 to reach 2.37 billion gallons in 2021. Demand from internal combustion sector also increased by 41.9 percent compared to 2018 to reach 680 million gallons in

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<sup>7</sup> NOAA National Centers for Environmental information, Climate at a Glance: National Time Series, published May 2023 [https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/national/time-series/110/pcp/12/12/1895-2021?base\\_prd=true&firstbaseyear=1901&lastbaseyear=2000](https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/national/time-series/110/pcp/12/12/1895-2021?base_prd=true&firstbaseyear=1901&lastbaseyear=2000)



2021. Factors influencing commercial sector likely include steady economic growth, including the rebound from COVID in 2021. However, the industrial sector demand was down by 37.4 percent compared to the 2018 levels to reach 258 million gallons in 2021. This was mainly driven by warmer weather in 2021 along with an increase in propane prices and a slower rebound from COVID related declines due to supply chain disruptions.

Agricultural demand experienced a decrease of 2.5 percent from 2018 to 2021, to reach a total of 942 million gallons in 2021 as reported by PERC. Due to lesser precipitation in 2021 compared to 2018, propane use for grain drying declined. Compared to 2018, weather in 2021 was also somewhat warmer with temperatures in 2021 being 4.5 percent warmer than the 20-year average, while in 2018 they were closer to the five-year average of 4,363 heating degree days (HDDs).<sup>8</sup>

Table 1: Propane Production and Consumption<sup>9</sup>

<i>Million Gallons</i>	2009	2012	2015	2018	2021	Change from 2018 to 2021
Domestic Propane/Propylene Production	16,607	19,447	26,111	30,585	35,455	15.9%
Propane Imports	2,254	1,783	1,896	2,403	1,966	-18.2%
Propane Exports	1,299	2,625	9,426	14,553	20,339	39.8%
Propane Consumption	9,600	7,739	8,451	9,320	9,546	2.4%
Residential	5,565	4,074	4,579	5,184	4,924	-5.0%
Commercial	1,499	1,482	1,619	1,924	2,373	23.3%
Industrial	501	508	469	412	258	-37.4%
Agricultural	1,188	809	866	966	942	-2.5%
Internal Combustion	484	615	623	479	680	41.9%
Cylinder Markets (Resell)	361	251	284	354	370	4.4%
Heating Degree Days (Annual)	4,488	3,792	4,111	4,333	4,167	-3.8%
Mont Belvieu Propane Price (cents/gallon)	84.06	100.15	45.70	87.80	104.52	19.0%

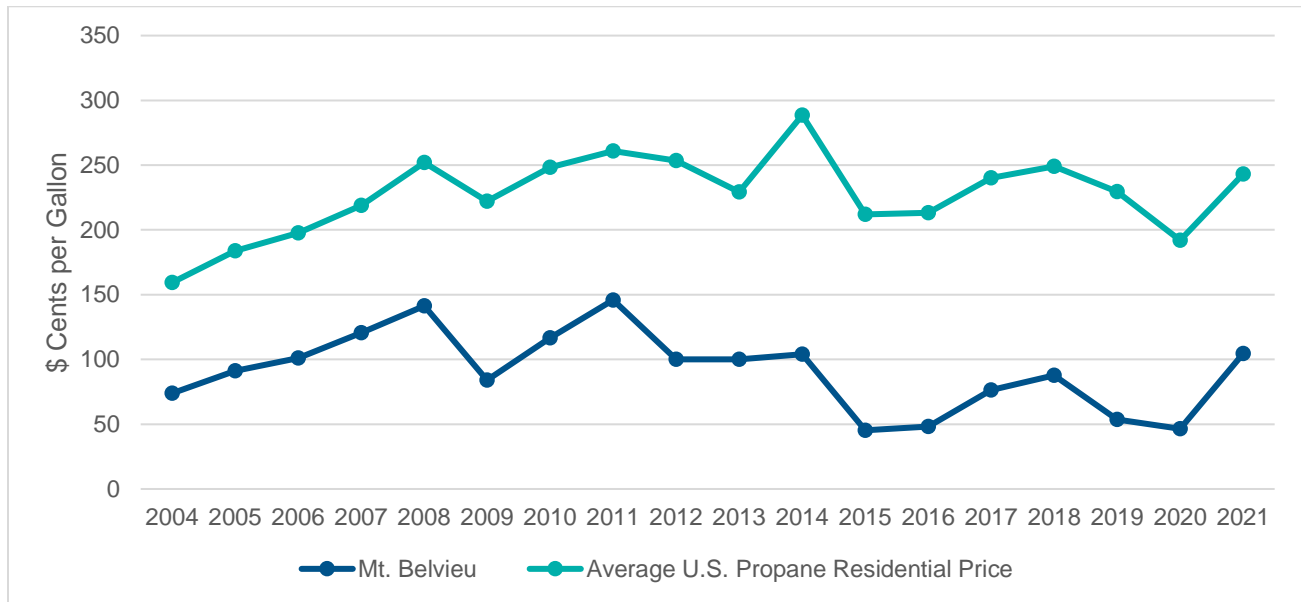
Source: PERC, EIA, API, ICF, Bloomberg, NOAA

From 2018 to 2021, Mont Belvieu propane prices increased by 19 percent, from 87.80 cents/gallon in 2018 to 104.52 cents/gallon in 2021. This was driven by higher exports and shrinking propane storage inventories with production not responding in tandem. This increased price in wholesale propane supplies was not directly passed on to consumers, in fact, the average national residential price for propane decreased by 6 cents/gallon to average 243 cents/gallon in 2021. The prices in the residential sector declined while the wholesale Mont Belvieu prices increased due to increased global exports in the Gulf Coast changing the pricing relationship.

<sup>8</sup> 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](http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/cdus/degree_days/ddayexp.shtml).

<sup>9</sup> Propane and Propylene are Natural Gas Liquids (NGLs) extracted from natural gas processing and crude oil refineries. Propane is separated out from the propane-propylene mix to form consumer grade propane. Propane companies add mercaptan to this consumer grade propane to give it its distinctive odor and it is called odorized propane. Hence while referencing to propane in the upstream or midstream segments, propane is accompanied by propylene while the retail sector only uses consumer grade propane or odorized propane. Production, imports, and exports of propane includes small quantities of propylene. The domestic consumption of propane doesn’t include propylene.

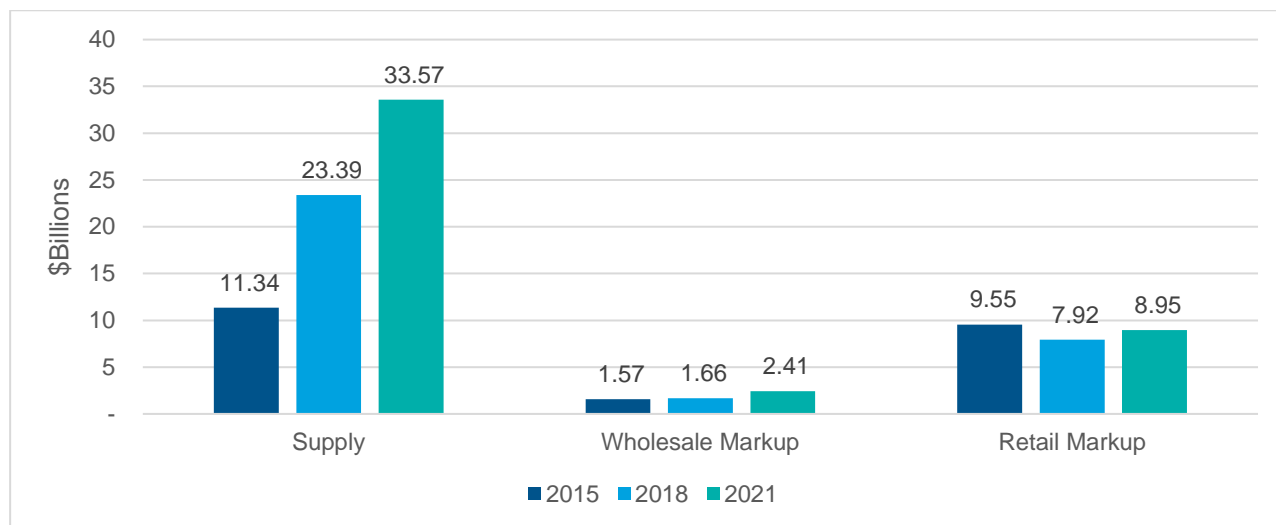
Figure 1. U.S. Residential Propane Price and Mont Belvieu Propane Prices



Source: EIA

In 2021, most of the value addition generated by the propane industry to the national economy has been concentrated in the upstream sector, with the direct value added from the propane supply sector witnessing a significant increase from \$23.4 billion in 2018 to \$33.6 billion in 2021. The wholesale sector also experienced an increase in the direct value added to the national economy from \$1.7 billion direct value added in 2018 to \$2.4 billion in 2021. The retail sector experienced an increase in the direct value added from \$7.9 billion in 2018 to \$8.9 billion in 2021. Propane supply remained the largest contributor of direct value by the propane sector, accounting for 75 percent of the sector’s direct added value in 2021, 4 percent up from 2018 levels. The wholesale sector accounts for 5 percent of the total direct value added, keeping the same as 2018 levels. The retail sector of the propane industry accounts for 20 percent of total direct value added in the propane sector, which is 4 percent lower than the 2018 levels.

Figure 2. Direct Value Added from Propane Value Chain Components



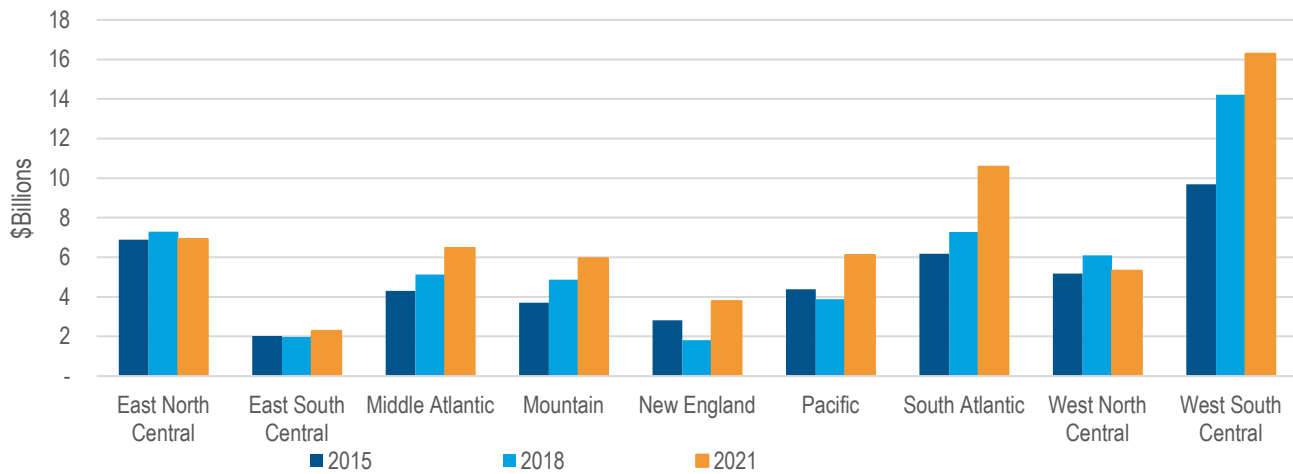
Source: ICF Propane Value Study (2015, 2018 and 2021)

The shift in value generation was also geographic in nature, with increases in the value added from retail propane increasing most dramatically in the South, Northeast and West region, while the West North Central and East North Central states experienced declines. Texas, where a large portion of the U.S. fractionation capacity and gas processing capacity are located, captured 20 percent of total domestic value added from odorized propane in 2021 followed by California with 7 percent of the total value additions. Texas remained the state with the highest contribution to GDP of any state, with \$12.6 billion of added value, followed by California with \$4.3 billion and New York with \$2.9 billion.

Relative to 2018, propane exports have increased sharply while production lags and the storage levels remain below the five-year average leading to an increase in the wholesale propane prices. As a result, upstream sector now accounts for 75 percent of the value-added activities than those associated with midstream or retail.

The moderate decline in residential demand due to warmer weather in 2021 relative to 2018 was more than offset by the increases in commercial and internal combustion demand. The south and the west region experienced large increases in total retail propane consumption and economic added value. In particular, the Pacific and South Atlantic census regions saw the added economic value from odorized propane increase by 58 percent and 45 percent respectively between 2018 and 2021. These were regions that witnessed higher wholesale and end-use prices which drove the value additions higher compared to the other regions.

Figure 3. Odorized Propane (Retail) Value Added by U.S. Census Region and Year



Source: ICF Propane Value Study (2015, 2018 and 2021)

The domestic contribution or the value generated in the U.S. from the U.S. resources in the odorized propane industry continues to grow.

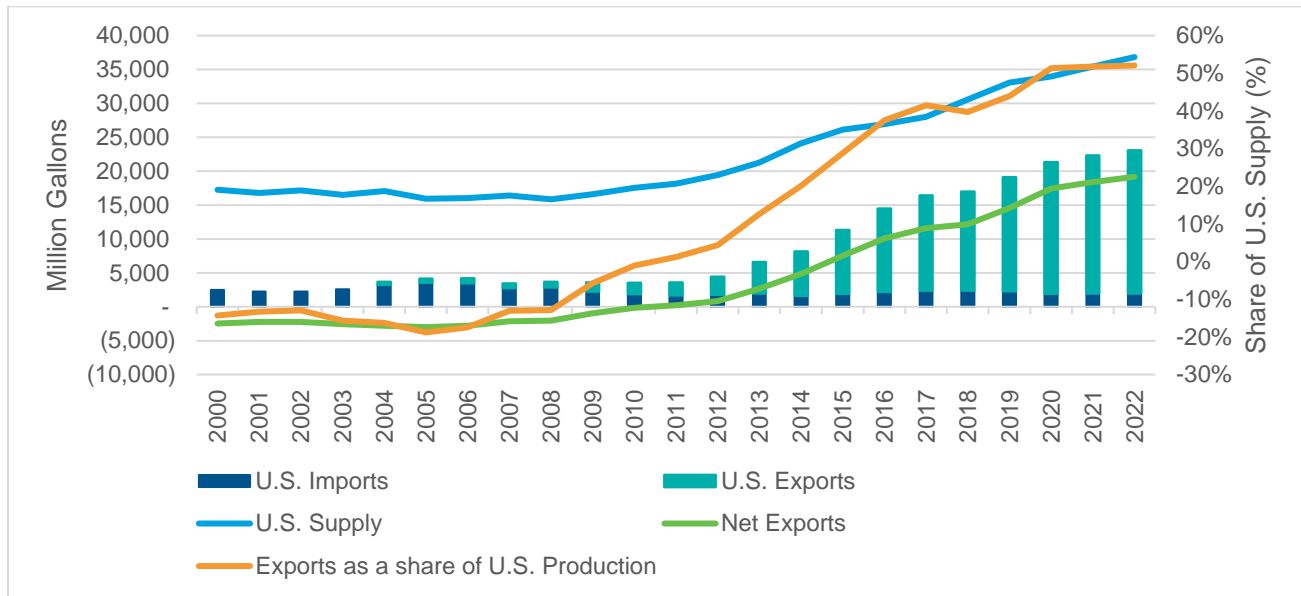
- The total value added in the odorized propane industry, generated in the U.S. from U.S. resources increased from 93 percent in 2018 to 95 percent 2021. Including Canada, value added in the odorized propane industry attributable to North American labor and resources remained largely flat at 99 percent in 2021.
- Share of volumes of odorized propane consumed in the U.S. produced from U.S. resources increased from 85 percent in 2018 to 89 percent in 2021. When imports of Canadian purity propane<sup>10</sup> and refining and gas plant feedstock are included, North American contribution to volumes increased from 95 percent in 2018 to 97 percent in 2021, with the remaining propane volume derived from imported crude oil.

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. As the production of domestically produced natural gas and oil increases, so too will the domestic value-added contribution by the odorized propane industry to the U.S. economy. U.S. propane production from gas processing plants grew by 25 percent from 2018 to 2021 and totaled 26.7 billion gallons in 2021.

Following the rise in domestically produced propane, exports have increased from 14.5 billion gallons in 2018 to reach over 20.3 billion gallons in 2021, becoming the largest source of propane demand. Propane exports are expected to continue to increase both in volume and in the share of domestic production that they support.

<sup>10</sup> All purity propane refers to all grades of propane obtained during the fractionation process.

Figure 4. U.S. Propane/Propylene Imports and Export as Share of Total Supply<sup>9</sup>



Source: EIA, ICF

## 2. Methodology and Scope of Analysis

### 2.1. Impact from Production, Transportation and Consumption

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 consumers 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<sup>11</sup> level, or in some cases at the refining district level<sup>12</sup>, the data reported by the EIA was allocated to the state level by ICF. For this task, ICF employed several sources, both proprietary and public.

Furthermore, 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 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.

#### 2.1.1 Production

This study is focused solely on natural gas liquids purity products.<sup>13</sup> 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.

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<sup>11</sup> 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>)

<sup>12</sup> 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>.

<sup>13</sup> Natural Gas Liquids purity products include Ethane, Ethylene, Propane, Propylene, Normal Butane, Iso-Butane, Butylene, and Pentanes Plus.

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.

### 2.1.2 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 purity NGLs, then to all purity propane<sup>10</sup>, and in the end to the odorized propane component of the market. Values allocated to the states include:

- All inter- and intra-state pipelines, 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, which is an integrated Canadian and U.S. natural gas transmission pipeline system.
- All activities associated with the shipment of all 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.

### 2.1.3 Downstream

The retail sector is the largest source of employment directly attributable to the odorized propane industry. It also generates 44 percent of all value added for the retail propane sector and 20 percent for the entire propane sector.

LPG dealers are responsible for close to 95 percent of all value at the retail level, with gasoline stations contributing less than a percent, 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).

### **2.1.4 Propane Retailer Capital Spending**

The approximately 3,100 domestic propane retailers are made up of primarily small, private companies that operate from between one and three locations. There are also several cooperatives and larger private regional operators as well as several large national retailers. It is beyond the scope of this study to fully evaluate the capital and operating and maintenance spending of the retail propane sector by component and state. Instead, the study assessed the economic and employment impacts of the direct spending through the impacts of the Downstream Sector of the retail propane value chain analysis.

This approach has been taken to ensure that the economic impact of the retail propane sector is properly captured, given the lack of transparency of the propane retailers, and to ensure that the impacts are not counted twice. ICF has prepared an estimate of the capital and O&M spending by propane retailers for 2021. However, these spending estimates are not included in the analysis of the economic and employment impacts of the sector.

## **2.2. Direct Economic Impact from the Purchase and Manufacture of Propane Equipment, Engines, and Appliances**

This study uses a very detailed bottom-up estimate of the capital spending in 2021 by retail propane consumers for equipment, engines, and appliances that use odorized propane. This spending is separate from the spending on the purchase of the fuel sector's capital spending across the various components of the industry. This approach has been taken in such a detailed manner to ensure that the true economic impact of the retail propane sector is properly captured given the non-traditional sources of capital spending and lack of public data of the propane retailers.

The purchase of propane appliances and engines is primarily undertaken in an unregulated market, either through direct appliance purchases by consumers or spending by propane retailers, which are largely private enterprises. Due to the relatively small share of company operations that propane engines and appliances account for, most companies do not provide a readily transparent accounting of the numbers built and sold each year. Furthermore, the reporting of commercial manufacturing activity for the U.S. Census' Annual Survey of Manufactures does not distinguish between the primary fuel types for most appliances and engines.



## 3. Employment and Wages Results

### 3.1. Employment and Wages in the Odorized Propane Industry

#### 3.1.1 Direct Employment from Production, Transportation, and Consumption

This study assesses the level of employment in the propane industry by state for 2021. 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 2021. All the wages described in this section are on an annual basis.

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 2002, 2009, 2012, 2015 and 2018 reports, as well as the current report based on 2021 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 several 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 addressed 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 up 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 used the Distillate fuel oil consumption estimates from EIA and the LPG (propane retail gallon sales) consumption data provided by PERC to estimate the percentage of LPG usage over the total fuel oil and LPG usage in the residential and commercial sector. ICF also considered other reported propane employment reports, including the LP Gas Top 50<sup>14</sup>, and macro-level economic drivers in its determination of state-level wage and employment data for the LPG dealers.

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<sup>14</sup> LP Gas Top 50 issue released in February 2022.

For the 2021 report, ICF also included 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)

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.

Table 2 below summarizes the employment and wages directly associated with the odorized propane industry at every step in the value chain. The employee and wage count at each step in the value chain is derived by summing up the employee and wages for the respective NAICS categories in the production, transportation, or retail segments in the value chain. For state-by-state details, see Table 4 through Table 6.

Total wages for the 11 classifications in 2021 were nearly \$94 billion, \$11.2 million lower than the wages in 2018. Decline in wages was concentrated primarily in the upstream segment of the overall industry (See Table 2). Of the total wages for these industries, production accounts for 53 percent, followed by 30 percent from the retail sector and 17 percent in the transportation sector. Wages attributed to the odorized propane sector, the retail component accounts for most wages with a total of 65 percent, followed by the production sector with 29 percent and 5 percent in the transportation sector. From 2018 to 2021, wages attributable to the odorized propane sector decreased by 2 percent to \$4.1 billion.

Table 2: 2021 National Summary of Direct Employment and Wages Associated with Odorized Propane

Employee Count	Production	Transportation, Storage, Wholesale	Retail	Total Direct
	Employees	Employees	Employees	Employees
All 11 NAICS Categories	391,146	146,188	977,446	1,514,779
Total NGL's	74,434	26,555	47,187	148,176
Propane/Propylene	38,545	7,991	47,187	93,723
Propane Only	33,451	7,101	47,187	87,739
<b>Odorized Propane</b>	<b>9,685</b>	<b>2,056</b>	<b>47,187</b>	<b>58,928</b>

Wages	Production	Transportation, Storage, Wholesale	Retail	Total Direct
	(Thousand \$)	(Thousand \$)	(Thousand \$)	(Thousand \$)
All 11 NAICS Categories	49,800,624	16,066,330	27,724,199	93,591,152
Total NGL/LRG	9,237,318	2,741,201	2,694,299	14,672,818
Propane/Propylene	4,794,802	854,179	2,694,299	8,343,280
Propane Only	4,154,393	763,684	2,694,299	7,612,376
<b>Odorized Propane</b>	<b>1,202,848</b>	<b>221,114</b>	<b>2,694,299</b>	<b>4,118,261</b>

Accounting for odorized propane industry's contribution to total value, an estimated total of 58,928 full-time employment positions are directly attributable to the production, transportation, and distribution of odorized propane, accounting for 3.9 percent of all employees in the 11 industrial categories. The majority of these jobs (80 percent) are on the retail, or distribution, side of industry.

### 3.1.2 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 2021 wages per sector attributable to NGLs, all 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 11 NAICS codes included in the study. These estimates are found in Table 3 below. Summary totals for each product by industry segment are shown in Table 2 above. More detailed estimates of national-level wages by NAICS code are shown in the rightmost columns of Table 3, while state-level data for total Production, Transportation, and Retail can be found in Table 4 through Table 6.

As shown in Table 3 on the following page, direct wages generated by the odorized propane industry totaled \$2.6 billion in 2021, representing 9.7 percent of all wages generated by the 11 employment categories included in the odorized propane value chain, and employees 4.8 percent of the total employment for the 11 categories. This relationship between the 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 2018, per-employee average wages for upstream, midstream, and retail sectors in all 11 NAICS Categories have gone up with the retail sector witnessing the highest growth followed by the upstream and the midstream sector. In nominal terms, the average annual per employee wage in all

11 NAICS Categories is up from roughly \$24,300 in 2018 to \$28,400 in 2021 for the retail sector. The average annual per-employee wage in the retail segment of the propane sector decreased from \$63,300 in 2018 to \$57,100 in 2021. However, it has increased by \$11,800 and \$22,500 for the upstream and the midstream sector, reaching \$124,200 and \$107,500 in 2021 compared to the 2018 levels as the U.S. exports of NGLs and LRG increased.

### **3.1.3 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.

Direct jobs refer to the employment that is created directly by core activities without considering the inputs required by the sector/industry. Indirect jobs refer to the employment that is created to supply and support the core activities. For instance, truck drivers of propane materials or propane suppliers are all part of the indirect employees. Induced jobs refer to the employment created by personal spending of indirect and direct workers. The direct or indirect employees spend their incomes on a variety of items such as food, clothing, transportation and entertainment, their expenditure gives rise to induced employment.

ICF estimates that for 2021, in addition to the 58,928 jobs directly created by the odorized propane industry, another 37,475 indirect and induced full-time jobs can be attributed to the industry, with indirect and induced wages adding another \$2.9 billion to the total wages that can be attributed to the odorized propane industry in addition to the \$4.1 billion from direct wages.

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2021

Table 3: Employment and Wages in Odorized Propane and Related Industries, 2021

Description	NAICS Code	2021 Total Employees			Total Wages (\$1,000)			Average Weekly Wages			2021 Employee Counts Allocated to:				2021 Wages (\$1,000) Allocated to:			
		Private	Government	Total	Private	Government	Total	Private	Government	Total	All NGLs	Propane/Propylene	Consumer-Grade Propane (C3H8)	Odorized Propane	All NGLs	Propane/Propylene	Consumer-Grade Propane (C3H8)	Odorized Propane
Oil and Gas Extraction	211111	112,603	-	112,603	\$20,168,878	\$ -	\$ 20,168,878	\$3,445	-	\$3,445	24,562	12,569	10,991	3,182	4,399,342	2,251,231	1,968,602	569,982
NGL Extraction	211112	4,271	-	4,271	\$ 622,791	\$ -	\$ 622,791	\$2,805	-	\$2,805	2,178	1,115	1,115	323	317,690	162,568	162,568	47,069
Drilling Oil & Gas Wells	213111	37,043	-	37,043	\$ 3,831,817	\$ -	\$ 3,831,817	\$1,989	-	\$1,989	8,080	4,135	3,616	1,047	835,816	427,704	374,008	108,289
Support Activities for O&G Operations	213112	176,513	-	176,513	\$16,132,296	\$ -	\$ 16,132,296	\$1,758	-	\$1,758	38,502	19,702	17,229	4,988	3,518,861	1,800,672	1,574,607	455,906
Petroleum Refineries	32411	60,716	-	60,716	\$ 9,044,842	\$ -	\$ 9,044,842	\$2,865	-	\$2,865	1,112	1,025	501	145	165,609	152,628	74,608	21,602
Asphalt, Paving & Roofing Manf.	32412	27,919	-	27,919	\$ -	\$ -	\$ -	\$0	-	\$0	-	-	-	-	-	-	-	-
Crude Pipelines	4861	11,192	-	11,192	\$ 1,437,222	\$ -	\$ 1,437,222	\$2,470	-	\$2,470	205	189	92	27	26,315	24,253	11,855	3,432
Refined Petroleum Product Pipelines	48691	7,422	-	7,422	\$ 931,125	\$ -	\$ 931,125	\$2,413	-	\$2,413	1,223	329	288	83	153,394	41,332	36,143	10,465
Natural Gas Pipelines	4862	30,016	774	30,790	\$ 4,259,126	\$ 54,542	\$ 4,313,668	\$2,729	\$1,355	\$2,694	2,899	1,484	1,484	430	406,188	207,855	207,855	60,181
Wholesale Petroleum Trade	4247	96,749	35	96,784	\$ 9,384,315	\$ -	\$ 9,384,315	\$1,865	\$0	\$1,865	22,228	5,989	5,237	1,516	2,155,303	580,741	507,832	147,036
Gasoline Stations	447	933,392	1,918	935,310	\$25,108,021	\$ 57,797	\$ 25,165,818	\$517	\$579	\$517	5,052	5,052	5,052	5,052	135,918	135,918	135,918	135,918
Heating Oil Dealers	454311	29,305	-	29,305	\$ 4,525,574	\$ -	\$ 4,525,574	\$2,970	-	\$2,970	-	-	-	-	-	-	-	-
LPG Dealers	454312	42,136	-	42,136	\$ 2,558,381	\$ -	\$ 2,558,381	\$1,168	-	\$1,168	42,136	42,136	42,136	42,136	2,558,381	2,558,381	2,558,381	2,558,381
Natural Gas Distributors	2212	110,844	-	110,844	\$13,823,761	\$ -	\$ 13,823,761	\$2,398	-	\$2,398	-	-	-	-	-	-	-	-
<b>Total</b>		<b>1,680,121</b>	<b>2,727</b>	<b>1,682,848</b>	<b>111,828,148</b>	<b>112,339</b>	<b>111,940,487</b>	<b>1,280</b>	<b>792</b>	<b>1,279</b>	<b>148,176</b>	<b>93,723</b>	<b>87,739</b>	<b>58,928</b>	<b>14,672,818</b>	<b>8,343,280</b>	<b>7,612,376</b>	<b>4,118,261</b>

Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages

Table 4: Odorized Propane Employment and Wages Summary, 2021

State	Production		Trans., Stor., Wholesaling		Retail		Total	
	Employee Count	Wages (Thousand \$)	Employee Count	Wages (Thousand \$)	Employee Count	Wages (Thousand \$)	Employee Count	Wages (Thousand \$)
Alabama	29	3,561	12	1,216	862	39,917	903	44,694
Alaska	175	21,506	4	514	134	4,319	313	26,339
Arizona	1	1	8	811	666	33,353	675	34,165
Arkansas	5	600	8	812	449	23,142	462	24,554
California	151	18,849	47	4,628	2,680	162,316	2,878	185,793
Colorado	585	72,570	94	10,558	698	37,947	1,376	121,075
Connecticut	0	0	9	901	1,115	87,247	1,125	88,148
Delaware	2	317	5	487	482	29,994	490	30,798
District of Columbia	0	0	1	8	24	928	25	936
Florida	2	234	16	1,590	1,897	107,372	1,915	109,196
Georgia	0	0	19	1,870	1,808	84,925	1,827	86,795
Hawaii	0	0	3	322	57	7,355	60	7,677
Idaho	1	8	6	545	239	12,270	246	12,822
Illinois	36	4,617	67	6,701	1,004	51,002	1,107	62,320
Indiana	6	783	42	4,097	1,162	60,638	1,209	65,518
Iowa	0	0	26	2,557	461	21,678	487	24,236
Kansas	79	9,830	80	8,113	306	13,399	465	31,342
Kentucky	14	1,781	11	1,121	512	25,270	537	28,172
Louisiana	200	25,752	58	6,129	371	14,835	629	46,716
Maine	0	0	11	1,086	1,104	58,071	1,115	59,157
Maryland	0	0	10	957	1,044	72,598	1,054	73,554
Massachusetts	0	0	10	991	1,013	73,137	1,023	74,128
Michigan	7	890	39	3,800	1,758	96,332	1,804	101,022
Minnesota	3	411	37	3,632	1,445	76,199	1,485	80,242
Mississippi	53	6,661	16	1,681	730	31,997	799	40,340
Missouri	1	7	23	2,274	1,132	68,845	1,157	71,126
Montana	22	2,700	9	921	249	14,020	281	17,641
Nebraska	2	210	72	7,203	175	7,484	249	14,897
Nevada	1	27	4	380	276	16,401	281	16,808
New Hampshire	0	0	12	1,162	1,040	71,413	1,052	72,575
New Jersey	4	561	8	826	768	51,012	780	52,399
New Mexico	856	105,773	59	7,076	556	24,156	1,471	137,005
New York	1	18	32	3,077	3,083	222,999	3,116	226,093
North Carolina	0	0	31	3,046	2,942	158,281	2,973	161,327
North Dakota	807	99,847	64	7,630	102	4,836	974	112,314
Ohio	112	14,003	84	8,592	1,421	68,277	1,617	90,872
Oklahoma	796	98,799	153	17,159	591	28,833	1,540	144,791
Oregon	0	0	7	691	324	16,933	331	17,625
Pennsylvania	203	25,318	62	6,711	2,622	147,350	2,888	179,380
Rhode Island	0	0	2	195	239	14,501	241	14,696
South Carolina	0	0	12	1,153	1,023	59,275	1,034	60,428
South Dakota	1	126	6	575	232	10,025	239	10,726
Tennessee	2	315	10	982	710	37,392	722	38,689
Texas	4,664	578,717	511	59,361	2,837	178,148	8,012	816,226
Utah	55	6,858	10	1,026	219	12,647	284	20,531
Vermont	0	0	8	769	611	37,396	618	38,165
Virginia	1	1	19	1,820	1,566	90,899	1,585	92,720
Washington	2	316	16	1,589	812	47,251	831	49,156
West Virginia	602	74,857	143	15,957	130	6,542	876	97,356
Wisconsin	1	37	33	3,198	1,327	62,659	1,361	65,893
Wyoming	210	25,986	23	2,617	181	10,480	413	39,082
<b>US Total</b>	<b>9,685</b>	<b>1,202,848</b>	<b>2,056</b>	<b>221,114</b>	<b>47,187</b>	<b>2,694,299</b>	<b>58,928</b>	<b>4,118,261</b>

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2021

Table 5: Propane Employment and Wages Summary, 2021

State	Production		Trans., Stor., Wholesaling		Retail		Total	
	Employee Count	Wages (Thousand \$)	Employee Count	Wages (Thousand \$)	Employee Count	Wages (Thousand \$)	Employee Count	Wages (Thousand \$)
Alabama	99	12,299	40	4,201	862	39,917	1,002	56,417
Alaska	603	74,279	15	1,775	134	4,319	752	80,373
Arizona	1	3	29	2,801	666	33,353	696	36,156
Arkansas	17	2,074	29	2,806	449	23,142	494	28,021
California	522	65,100	162	15,984	2,680	162,316	3,365	243,401
Colorado	2,020	250,643	323	36,466	698	37,947	3,041	325,056
Connecticut	0	0	32	3,110	1,115	87,247	1,148	90,358
Delaware	7	1,096	17	1,681	482	29,994	507	32,771
District of Columbia	0	0	1	28	24	928	25	955
Florida	7	809	57	5,490	1,897	107,372	1,960	113,671
Georgia	0	0	66	6,457	1,808	84,925	1,874	91,382
Hawaii	0	0	11	1,111	57	7,355	68	8,467
Idaho	1	27	19	1,882	239	12,270	260	14,179
Illinois	124	15,947	233	23,143	1,004	51,002	1,360	90,092
Indiana	19	2,706	143	14,149	1,162	60,638	1,325	77,493
Iowa	0	0	91	8,833	461	21,678	552	30,511
Kansas	272	33,950	277	28,022	306	13,399	855	75,370
Kentucky	48	6,150	39	3,873	512	25,270	599	35,293
Louisiana	691	88,944	201	21,168	371	14,835	1,263	124,947
Maine	0	0	39	3,751	1,104	58,071	1,142	61,822
Maryland	0	0	34	3,304	1,044	72,598	1,078	75,902
Massachusetts	0	0	35	3,423	1,013	73,137	1,048	76,561
Michigan	24	3,074	135	13,125	1,758	96,332	1,917	112,531
Minnesota	10	1,420	129	12,545	1,445	76,199	1,584	90,163
Mississippi	183	23,007	55	5,807	730	31,997	969	60,812
Missouri	1	25	81	7,853	1,132	68,845	1,214	76,723
Montana	75	9,324	32	3,180	249	14,020	357	26,524
Nebraska	6	724	250	24,876	175	7,484	431	33,085
Nevada	1	93	14	1,312	276	16,401	290	17,806
New Hampshire	0	0	41	4,014	1,040	71,413	1,082	75,427
New Jersey	13	1,938	29	2,853	768	51,012	810	55,803
New Mexico	2,958	365,318	202	24,439	556	24,156	3,716	413,913
New York	1	62	110	10,626	3,083	222,999	3,193	233,687
North Carolina	0	0	108	10,519	2,942	158,281	3,050	168,800
North Dakota	2,787	344,853	222	26,353	102	4,836	3,112	376,042
Ohio	386	48,363	291	29,676	1,421	68,277	2,098	146,316
Oklahoma	2,750	341,232	529	59,265	591	28,833	3,870	429,330
Oregon	0	0	25	2,387	324	16,933	348	19,320
Pennsylvania	702	87,444	216	23,179	2,622	147,350	3,540	257,974
Rhode Island	0	0	7	673	239	14,501	246	15,174
South Carolina	0	0	41	3,982	1,023	59,275	1,063	63,257
South Dakota	4	436	20	1,985	232	10,025	256	12,446
Tennessee	8	1,088	35	3,390	710	37,392	752	41,870
Texas	16,109	1,998,770	1,765	205,021	2,837	178,148	20,711	2,381,939
Utah	191	23,686	34	3,542	219	12,647	444	39,876
Vermont	0	0	27	2,658	611	37,396	638	40,053
Virginia	1	2	65	6,285	1,566	90,899	1,632	97,187
Washington	7	1,090	56	5,488	812	47,251	876	53,829
West Virginia	2,081	258,541	495	55,111	130	6,542	2,706	320,194
Wisconsin	1	127	114	11,045	1,327	62,659	1,441	73,831
Wyoming	725	89,749	78	9,039	181	10,480	984	109,268
<b>US Total</b>	<b>33,451</b>	<b>4,154,393</b>	<b>7,101</b>	<b>763,684</b>	<b>47,187</b>	<b>2,694,299</b>	<b>87,739</b>	<b>7,612,376</b>

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2021

Table 6: Total NGLs / LRGs Employment and Wages Summary, 2021

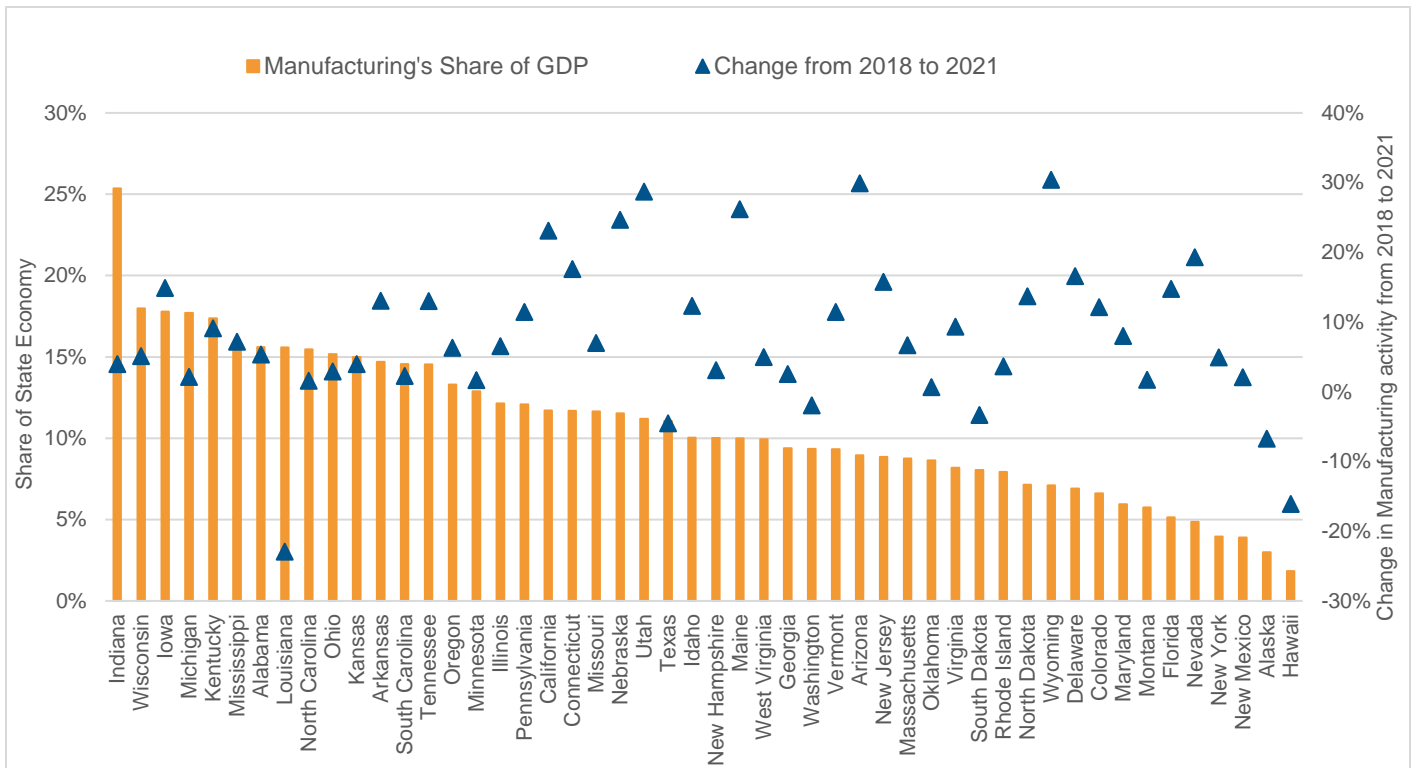
State	Production		Trans., Stor., Wholesaling		Retail		Total	
	Employee Count	Wages (Thousand \$)	Employee Count	Wages (Thousand \$)	Employee Count	Wages (Thousand \$)	Employee Count	Wages (Thousand \$)
Alabama	220	27,309	59	6,331	862	39,917	1,142	73,556
Alaska	1,346	165,817	55	5,997	134	4,319	1,535	176,133
Arizona	1	6	24	2,309	666	33,353	691	35,668
Arkansas	37	4,630	52	5,172	449	23,142	539	32,943
California	1,167	145,352	436	42,878	2,680	162,316	4,282	350,546
Colorado	4,490	556,522	2,013	206,228	698	37,947	7,201	800,697
Connecticut	0	0	26	2,564	1,115	87,247	1,142	89,811
Delaware	16	2,433	15	1,502	482	29,994	514	33,929
District of Columbia	0	0	1	23	24	928	25	950
Florida	15	1,804	47	4,561	1,897	107,372	1,958	113,737
Georgia	0	0	59	5,941	1,808	84,925	1,867	90,866
Hawaii	0	0	9	916	57	7,355	66	8,271
Idaho	1	59	16	1,554	239	12,270	256	13,884
Illinois	274	35,380	921	91,217	1,004	51,002	2,200	177,599
Indiana	42	6,016	349	34,863	1,162	60,638	1,554	101,517
Iowa	0	0	294	28,503	461	21,678	754	50,182
Kansas	605	75,389	1,863	184,448	306	13,399	2,774	273,235
Kentucky	107	13,652	122	12,100	512	25,270	741	51,023
Louisiana	1,535	197,348	1,200	120,483	371	14,835	3,106	332,666
Maine	0	0	32	3,092	1,104	58,071	1,136	61,163
Maryland	0	0	28	2,723	1,044	72,598	1,072	75,321
Massachusetts	0	0	29	2,822	1,013	73,137	1,042	75,959
Michigan	54	6,847	122	11,876	1,758	96,332	1,934	115,055
Minnesota	21	3,151	108	10,580	1,445	76,199	1,574	89,930
Mississippi	407	51,109	186	19,025	730	31,997	1,324	102,131
Missouri	1	57	98	9,628	1,132	68,845	1,231	78,530
Montana	168	20,812	29	2,951	249	14,020	447	37,783
Nebraska	13	1,618	717	72,178	175	7,484	906	81,281
Nevada	2	207	11	1,083	276	16,401	288	17,691
New Hampshire	0	0	34	3,309	1,040	71,413	1,074	74,722
New Jersey	29	4,302	264	25,678	768	51,012	1,061	80,992
New Mexico	6,593	813,945	489	57,429	556	24,156	7,638	895,530
New York	1	139	90	8,760	3,083	222,999	3,174	231,898
North Carolina	0	0	94	9,253	2,942	158,281	3,036	167,535
North Dakota	6,205	767,292	453	53,923	102	4,836	6,761	826,051
Ohio	858	107,312	786	80,186	1,421	68,277	3,065	255,775
Oklahoma	6,114	757,986	1,538	166,732	591	28,833	8,243	953,551
Oregon	0	0	20	1,968	324	16,933	344	18,901
Pennsylvania	1,559	193,824	1,505	150,851	2,622	147,350	5,686	492,025
Rhode Island	0	0	6	555	239	14,501	245	15,056
South Carolina	0	0	38	3,865	1,023	59,275	1,061	63,140
South Dakota	8	975	17	1,641	232	10,025	257	12,641
Tennessee	17	2,415	31	3,020	710	37,392	757	42,828
Texas	35,852	4,445,278	10,487	1,088,004	2,837	178,148	49,176	5,711,430
Utah	426	52,776	428	42,106	219	12,647	1,073	107,529
Vermont	0	0	23	2,191	611	37,396	633	39,586
Virginia	1	5	53	5,181	1,566	90,899	1,620	96,085
Washington	16	2,421	99	9,619	812	47,251	927	59,291
West Virginia	4,619	573,253	821	95,671	130	6,542	5,570	675,466
Wisconsin	2	282	94	9,104	1,327	62,659	1,422	72,045
Wyoming	1,613	199,598	263	28,607	181	10,480	2,057	238,685
<b>US Total</b>	<b>74,434</b>	<b>9,237,318</b>	<b>26,555</b>	<b>2,741,201</b>	<b>47,187</b>	<b>2,694,299</b>	<b>148,176</b>	<b>14,672,818</b>



### 3.2. Manufacturing of Propane Equipment, Engines, and Appliances

Manufacturing is a major economic driver of the U.S. economy, and according to the Bureau of Economic Analysis accounted for over 2.49 million jobs in 2021.<sup>15</sup> The total number of manufacturing jobs by state and the share that these jobs represent are shown in Figure 5 below. Across the U.S., manufacturing averages 10.8 percent of total jobs. Several Midwestern and Southern U.S. states represent the states where manufacturing accounts for the largest share of employment, including Indiana, Wisconsin, Iowa, and Michigan. California, Texas, Ohio, and Illinois have the largest number of manufacturing jobs, totaling 851,000 in 2021, roughly one-third of all manufacturing jobs.

Figure 5. Manufacturing Employment Percentages by State



Source: U.S. Census Annual Survey of Manufacturing, U.S. Bureau of Economic Analysis

#### Jobs Supported by the Manufacturing and Installation of Propane Equipment

The number of jobs supported by the manufacturing and installation of propane appliances and engines are estimated by the sector and type of equipment manufactured. The manufacturing and installation of equipment used by consumers of odorized propane supports a total of almost 36,000 jobs, including 13,000 direct manufacturing jobs. These manufacturing jobs in turn support an additional 23,000 indirect/induced jobs across the country.

The residential sector supports a total of about 31,000 jobs, including 11,000 manufacturing jobs and 20,000 supporting jobs. This estimate accounts for the share of propane appliances that were built overseas and imported into the U.S.<sup>16</sup> Table 7 shows the numbers of direct and indirect jobs

<sup>15</sup> <https://www.bea.gov/data/employment/employment-by-industry>

<sup>16</sup> The job impact of imported appliances and engines does not include the direct manufacturing activities but does include the distribution and installation of the propane equipment.

supported by the spending on new appliances, engines, and other applications that utilize odorized propane in 2021.

Table 7: Employment from Manufacturing Activities in 2021

<b>Manufacturing Category</b>	<b>Direct</b>	<b>Indirect</b>	<b>Induced</b>	<b>Total</b>
<b>Residential Sector</b>	<b>5,568</b>	<b>4,275</b>	<b>5,853</b>	<b>15,696</b>
New Construction	678	520	712	1,910
Conversions / Upgrades	798	612	838	2,248
Appliance Replacements	4,093	3,142	4,302	11,537
Propane BBQ Grills	5,806	4,457	6,102	16,365
<b>Commercial Sector</b>	<b>1,557</b>	<b>1,196</b>	<b>1,637</b>	<b>4,390</b>
New Construction	233	179	245	657
Appliance Replacements	1,324	1,017	1,392	3,733
<b>Internal Combustion Engines</b>	<b>1,353</b>	<b>1,039</b>	<b>1,422</b>	<b>3,813</b>
Forklifts	868	666	912	2,446
School Buses	144	111	152	407
LDV/MDVs	252	194	265	711
Irrigation	89	68	93	250
<b>Agricultural Products</b>	<b>62</b>	<b>48</b>	<b>65</b>	<b>176</b>
<b>Industrial / Other</b>	<b>74</b>	<b>57</b>	<b>78</b>	<b>210</b>
<b>Total Impact</b>	<b>8,615</b>	<b>6,613</b>	<b>9,056</b>	<b>24,283</b>

Source: ICF

## 4. Direct Economic Impact Results

### 4.1. Economic Impact from Production, Transportation, and Consumption

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 gases (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 consumers across all sources of production.

To estimate the state-level direct economic impact of the odorized propane industry, the study used the 2021 Annual Retail Propane Sales Report published by PERC for the odorized propane sales by sector,<sup>17</sup> to allocate the national direct economic impacts volumes among the states. A national summary of the sector specific retail propane consumption for 2021 is shown in Table 8 below.

Table 8: 2021 National-Level Odorized Propane Consumption and Expenditures by Sector

Retail Sector	Consumption (Million Gallon)	Percent of Total Consumption	Expenditures (\$Millions)	Percent of Total Expenditures
Residential	4,924	51.6%	12,038	55.1%
Commercial	2,373	24.9%	5,178	23.4%
Sales to Resellers	370	3.9%	782	2.3%
Internal Combustion	680	7.1%	1,423	5.6%
Industrial	258	2.7%	548	6.3%
Agricultural	942	9.9%	1,882	9.0%
<b>Total U.S. Odorized Propane Demand</b>	<b>9,546</b>		<b>21,852</b>	

Source: ICF, 2021 Annual Retail Propane Sales Report

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 propane 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 14 through Table 18. Detailed estimates of the impact of the odorized, total purity propane industry, and all NGLs are found in Table 11, Table 12, and Table 13.

#### 4.1.1 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

<sup>17</sup> 2021 Retail Propane Sales Report, the Propane Education & Research Council, 2022

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 Gases) coming from domestic crude at nearly \$5.9 billion, with odorized propane's share of LRGs in domestic crude at \$759 million.
- We estimate the value of NGLs produced from U.S. natural gas production at nearly \$25.7 billion, with odorized propane's share of NGLs in raw domestic gas at \$2.6 billion.

The total value of imported raw commodities and products is estimated at \$4.8 billion. This figure includes all LRGs in imported crude and natural gas, \$2.2 billion of which is contributed by Canadian crude. The value of imported raw commodities in the odorized propane segment is \$600 million, including \$281 million of Canadian crude.

- U.S. gas processors extracted NGLs valued at \$572 million from imported Canadian natural gas, including \$57 million in odorized propane.
- \$3.5 billion of imported natural gas liquids entered the U.S. in 2021, including \$2.7 billion of NGLs imported from Canada.
- Odorized propane's share of imported NGLs value stood at \$403 million in 2021, of which \$338 million was attributed to imports from Canada.

#### 4.1.2 Midstream

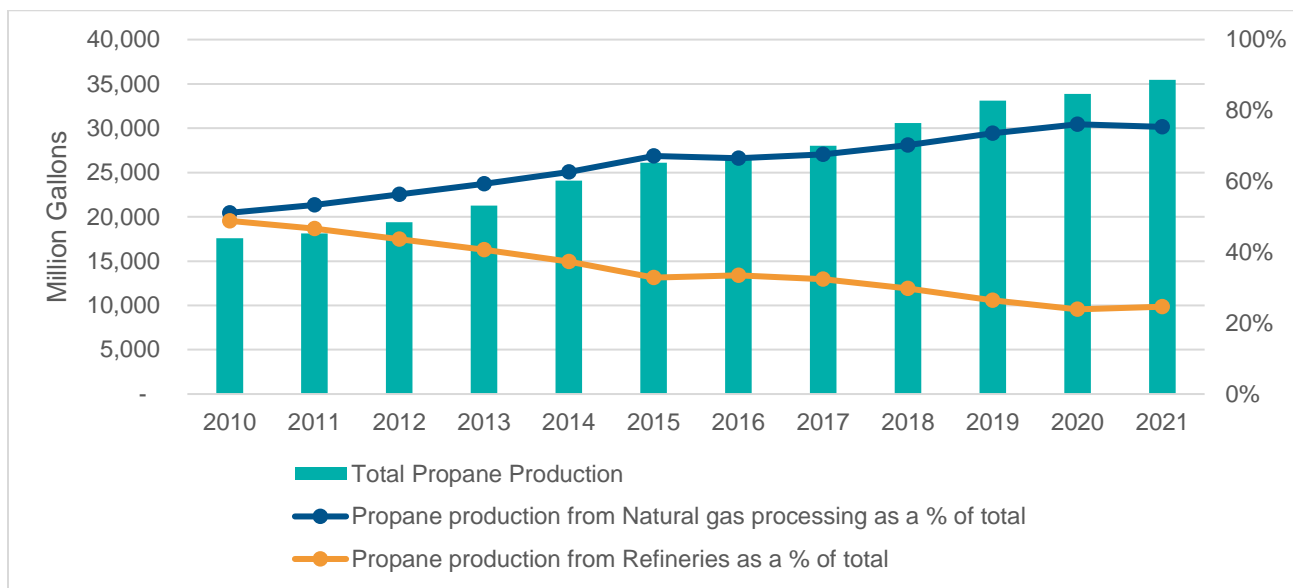
Accounting for value added generated by the midstream sector includes estimates for the economic contribution from the refining and gas processing sectors, fractionation sector, and pipeline and other transportation, storage, and wholesale market activities. As with upstream values, ICF's calculations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

According to EIA, propane production volumes from gas plant field production have been increasing while the propane production volumes from refineries have been staying flat over the past few years. In 2018, production of propane from gas processing accounted for 70 percent of the total supply while refineries accounted for 30 percent of the total supply. In 2021, production of propane from gas processing accounted for 75 percent of the total supply<sup>18</sup> while refineries accounted for the remaining 25 percent (refer to Figure 6). This increasing production trend from gas processing has contributed to higher value added from the gas processing sector as compared to the refining sector.

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<sup>18</sup> This propane production includes production from propylene.

Figure 6. Share of propane production from gas processing and refineries over the total production



Source: EIA

The share of refining revenues generated by natural gas liquids, and by propane, and odorized propane, specifically, has increased, resulting in increasing value added from the refining sector. During the period from 2019 to about 2020, global and US oil and natural gas prices first suffered a decline due to COVID-19 pandemic but rebounded by 2021. U.S. oil prices increased by 4 percent, from \$65.2 per barrel in 2018 to \$68.1 per barrel in 2021. Over this same period propane prices increased by 19 percent due to a tightening of the relative price between propane and global oil prices as well as increased exports, with Mont Belvieu propane prices averaging 104.6 cents/gallon in 2021. Propane’s share of total refinery output (measured in retail value) increased, from 1.4 percent in 2018 to 1.7 percent in 2021, and the share of production from refineries (the volume of propane/propylene over the crude oil and petroleum products), increased from 2.3 percent in 2018 to 2.5 percent in 2021.

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. Overall declines in the value of crude oil and related petroleum products relative to natural gas resulted in the value added from gas processing and fractionation generating 64.1 percent (refer to Table 18) of the value of NGLs produced from natural gas in 2021, down from 74.1 percent in 2018.

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 1.7 billion gallons in 2018 to 2.0 billion gallons in 2021, including those of propane/propylene, which increased from

1.6 billion gallons in 2018 to 1.8 billion gallons in 2021. The value of odorized propane imported from Canada, from both refineries and gas processing plants, was \$5.8 billion in 2021, up from \$4.9 billion in 2018.

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:

- \$2.8 billion for long-distance transportation of NGLs, including \$169 million for long-distance transport attributed to odorized propane.
- \$1.7 billion for intra-PAD transportation of NGLs, including \$165 million for intra-PAD transport attributed to odorized propane.
- \$8.9 billion for storage and wholesaling services of NGLs, including \$1.2 billion for wholesaling services attributed to odorized propane.
- \$1.3 billion for terminaling at NGL export and import terminals, a sharp increase from \$861 million in 2018. The terminaling of propane accounts for ~60 percent of the total value.

### 4.1.3 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 2021 Annual Retail Propane Sales Report published by PERC. For those states and customer types where PERC 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).<sup>19</sup> Pricing information for odorized propane is drawn from the Energy Information Administration’s database of retail prices by region<sup>20</sup> and industry, wholesale and rack prices reported on Bloomberg, state heating fuel pricing 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 a product at the wholesale level and the value of that product at the point of delivery to the ultimate consumer.

For 2021, value added by the retail sector totals just under \$8.9 billion – a 13 percent increase from 2018 value of \$7.9 billion. This increase in the added value attributable of the odorized propane sector was due to the combination of increased sales volumes from 2018 to 2021 and an increase in the retail margin of propane retailers. On a per-gallon basis, average retail markup across all consumer groups stayed above the 2018 value of 85 cents per gallon, reaching 93.8 cents per

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<sup>19</sup> 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.

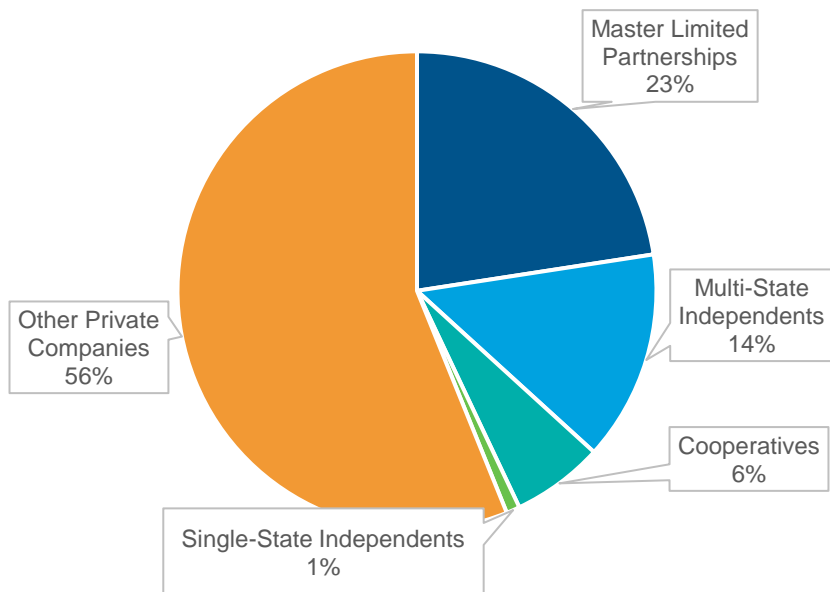
<sup>20</sup> The EIA suspended publishing retail propane prices (Residential, Commercial, etc.) by state in 2011. ICF has utilized historic relationships between sectors, Mont Belvieu wholesale propane prices, winter residential propane prices from EIA’s State Heating Oil and Propane Price (SHOPP) state and regional Rack propane prices to estimate retail propane prices by sector and state.

gallon in 2021. The contribution of the retail portion of the odorized propane segment to the total value add was 44.3 percent in 2021, close to 47.5 percent to 2018.

#### 4.1.4 Retailer Spending

There are approximately 3,100 propane retailers across the U.S. Most of these propane retailers are small private enterprises. In addition, there are several independent retailers that operate in either a single state or have regional operations, cooperatives, and larger national retailers that are structured as Master Limited Partnerships. The Figure 7 below shows data from LP Gas Magazine’s February 2022 issue, which provides details on the 50 largest public and private propane retailers across the county that choose to report their data to the Magazine.<sup>21</sup> Based on the total 2021 Annual Retail Propane Sales, the companies represented in the LP Gas Top 50 retailers accounted for 43 percent of sales that year. Master Limited Partnership category accounted for 23 percent of 2021 retail propane sales.<sup>22</sup> Companies that did not submit data to LP Gas Magazine or were smaller than the 50 companies included in the survey accounted for 56 percent of 2021 sales and are not categorized in the LP Gas Top 50 rankings.

Figure 7. Share of 2021 Retail Propane Sales by Company Type



Source: LP Gas Magazine – February 2022 Issue of Top 50 Retailers

#### Retailer Capital and Operating and Maintenance Spending

The retail propane sector is not a capital-intensive industry compared to the storage and distribution of other primary fuels to consumers. On an absolute and relative basis, the retail propane sector has a much smaller share of capital spending on infrastructure when compared to either the natural gas or power sectors. As such, the capital spending is less of a driver of economic activity for the retail propane sector when compared to the spending and economic contribution of other

<sup>21</sup> Not all companies choose to participate in the LP Gas Magazine survey.

<sup>22</sup> The Master Limited Partnership category includes AmeriGas Propane, Ferrellgas Partners LP, and Suburban Propane.

components, such as the manufacturing and installation of propane engines and appliances and operating and maintenance spending by propane retailers.

ICF estimates that propane retailers spent a total of \$9.2 billion in 2021, made up of \$712 million on capital investment and roughly \$8.5 billion on operations & maintenance activities. This estimate is based on analysis of the spending from the largest public propane retailers operating in the U.S.<sup>23</sup> and an estimate on the capital and O&M spending levels for non-public retailers.

### ***Explanation of Indirect and Induced Economic Impacts***

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 11 below.

The 2021 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. In 2021, the indirect and induced contribution to the U.S. GDP from the odorized propane sector is estimated at over \$43.5 billion, up from \$36.0 billion in 2018. Including direct value added, odorized propane's contribution to the U.S. GDP is estimated at \$63.7 billion in 2021, a 21.3 percent increase from the \$52.5 billion GDP contribution the U.S. economy in 2018. The increase from Total Value added to the U.S. GDP is largely due to increase in retail propane consumption, increased propane production, and an increase in the price of retail propane sales. The total market value of Odorized Propane of domestic origin sold in the United States is \$20.2 billion in 2021, an increase of 21 percent from the \$16.7 billion in 2018.

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<sup>23</sup> This analysis of 2021 spending includes AmeriGas Propane, Suburban Propane and Ferrellgas Partners.



Table 9: State Value Added, Employment, and Wages for Odorized Propane, 2021

State	Value Added (\$1,000)			Employment	Wages (\$1,000)
	Direct	Indirect & Induced	Total	Direct	Direct
Alabama	184,059	463,788	647,847	903	44,694
Alaska	79,699	129,193	208,892	313	26,339
Arizona	98,552	486,927	585,479	674	34,165
Arkansas	122,798	284,420	407,218	462	24,554
California	510,509	3,817,423	4,327,932	2,878	185,793
Colorado	881,956	1,310,063	2,192,020	1,376	121,075
Connecticut	231,491	535,164	766,655	1,125	88,148
Delaware	87,671	163,185	250,856	490	30,798
District of Columbia	1,425	111,068	112,493	24	936
Florida	366,807	1,426,373	1,793,180	1,915	109,196
Georgia	352,866	1,010,566	1,363,432	1,827	86,795
Hawaii	33,586	104,262	137,848	60	7,677
Idaho	67,481	161,533	229,014	245	12,822
Illinois	561,367	1,522,629	2,083,996	1,107	62,320
Indiana	155,450	690,355	845,805	1,209	65,518
Iowa	256,662	511,855	768,517	487	24,236
Kansas	197,960	409,633	607,593	465	31,342
Kentucky	91,676	357,200	448,876	537	28,172
Louisiana	368,613	664,104	1,032,717	629	46,716
Maine	263,855	352,557	616,412	1,115	59,157
Maryland	206,007	593,218	799,226	1,054	73,554
Massachusetts	250,200	846,410	1,096,610	1,023	74,128
Michigan	357,008	1,010,121	1,367,129	1,804	101,022
Minnesota	307,163	737,002	1,044,166	1,485	80,242
Mississippi	221,982	370,563	592,545	799	40,340
Missouri	170,688	528,750	699,437	1,156	71,126
Montana	110,962	166,966	277,928	281	17,641
Nebraska	95,248	242,531	337,779	249	14,897
Nevada	45,467	207,714	253,180	280	16,808
New Hampshire	294,563	405,467	700,030	1,052	72,575
New Jersey	145,748	774,932	920,679	780	52,399
New Mexico	677,593	806,063	1,483,656	1,471	137,005
New York	682,757	2,245,513	2,928,270	3,115	226,093
North Carolina	651,908	1,389,160	2,041,068	2,973	161,327
North Dakota	796,091	899,507	1,695,598	974	112,314
Ohio	380,167	1,195,757	1,575,923	1,617	90,872
Oklahoma	1,000,024	1,254,976	2,255,000	1,540	144,791
Oregon	81,432	360,299	441,731	331	17,625
Pennsylvania	873,742	1,753,540	2,627,281	2,888	179,380
Rhode Island	48,885	110,950	159,836	241	14,696
South Carolina	183,190	473,244	656,435	1,034	60,428
South Dakota	52,213	110,296	162,508	239	10,726
Tennessee	75,912	522,090	598,002	722	38,689
Texas	5,154,864	7,429,824	12,584,687	8,012	816,226
Utah	82,424	303,674	386,098	284	20,531
Vermont	197,226	243,232	440,458	618	38,165
Virginia	453,574	1,021,488	1,475,062	1,584	92,720
Washington	180,331	813,875	994,205	831	49,156
West Virginia	971,443	1,109,770	2,081,213	876	97,356
Wisconsin	308,423	736,173	1,044,596	1,360	65,893
Wyoming	249,922	301,118	551,040	413	39,082
<b>U.S. State Totals</b>	<b>20,221,638</b>	<b>43,476,522</b>	<b>63,698,161</b>	<b>58,928</b>	<b>4,118,261</b>
<b>Imports</b>	<b>1,075,167</b>		<b>1,075,167</b>		
<b>Total Including Imports</b>	<b>21,296,805</b>	<b>43,476,522</b>	<b>64,773,328</b>		

Table 10: State Production of Odorized Propane, 2021

State	Volume (1,000 Gal)			Percentage of National Total		
	Refinery	Gas Plant	Total	of Ref. Prod.	of Gas Plt. Production	of Total Production
Alabama	-	31,900	31,900	0.00%	0.41%	0.36%
Alaska	-	26,863	26,863	0.00%	0.35%	0.30%
Arizona	-	-	-	0.00%	0.00%	0.00%
Arkansas	2,328	518	2,846	0.19%	0.01%	0.03%
California	66,036	9,533	75,570	5.36%	0.12%	0.84%
Colorado	2,823	629,397	632,220	0.23%	8.13%	7.04%
Connecticut	-	-	-	0.00%	0.00%	0.00%
Delaware	16,834	-	16,834	1.37%	0.00%	0.19%
District of Columbia	-	-	-	0.00%	0.00%	0.00%
Florida	-	531	531	0.00%	0.01%	0.01%
Georgia	-	-	-	0.00%	0.00%	0.00%
Hawaii	-	-	-	0.00%	0.00%	0.00%
Idaho	-	59	59	0.00%	0.00%	0.00%
Illinois	59,813	30,181	89,994	4.85%	0.39%	1.00%
Indiana	34,213	-	34,213	2.78%	0.00%	0.38%
Iowa	-	-	-	0.00%	0.00%	0.00%
Kansas	19,414	65,869	85,283	1.58%	0.85%	0.95%
Kentucky	19,182	11,923	31,104	1.56%	0.15%	0.35%
Louisiana	313,865	175,794	489,659	25.47%	2.27%	5.46%
Maine	-	-	-	0.00%	0.00%	0.00%
Maryland	-	-	-	0.00%	0.00%	0.00%
Massachusetts	-	-	-	0.00%	0.00%	0.00%
Michigan	8,115	2,634	10,748	0.66%	0.03%	0.12%
Minnesota	23,586	-	23,586	1.91%	0.00%	0.26%
Mississippi	29,181	50,478	79,659	2.37%	0.65%	0.89%
Missouri	-	-	-	0.00%	0.00%	0.00%
Montana	6,273	3,199	9,472	0.51%	0.04%	0.11%
Nebraska	-	-	-	0.00%	0.00%	0.00%
Nevada	-	-	-	0.00%	0.00%	0.00%
New Hampshire	-	-	-	0.00%	0.00%	0.00%
New Jersey	29,768	-	29,768	2.42%	0.00%	0.33%
New Mexico	2,126	441,044	443,171	0.17%	5.70%	4.94%
New York	-	-	-	0.00%	0.00%	0.00%
North Carolina	-	-	-	0.00%	0.00%	0.00%
North Dakota	5,034	591,904	596,938	0.41%	7.64%	6.65%
Ohio	38,050	110,850	148,899	3.09%	1.43%	1.66%
Oklahoma	29,291	805,223	834,514	2.38%	10.40%	9.30%
Oregon	-	-	-	0.00%	0.00%	0.00%
Pennsylvania	12,627	251,099	263,726	1.02%	3.24%	2.94%
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	12,911	760	13,670	1.05%	0.01%	0.15%
Texas	472,107	3,557,217	4,029,324	38.32%	45.94%	44.90%
Utah	6,794	26,191	32,986	0.55%	0.34%	0.37%
Vermont	-	-	-	0.00%	0.00%	0.00%
Virginia	-	-	-	0.00%	0.00%	0.00%
Washington	15,918	-	15,918	1.29%	0.00%	0.18%
West Virginia	-	752,234	752,233	0.00%	9.72%	8.38%
Wisconsin	2,111	-	2,111	0.17%	0.00%	0.02%
Wyoming	3,764	167,377	171,142	0.31%	2.16%	1.91%
<b>U.S. Total</b>	<b>1,232,166</b>	<b>7,742,779</b>	<b>8,974,943</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2021

Table 11: State Level Value Summary for Odorized Propane, 2021

		Value Added (\$1,000)										
State	SUB	Transportation, Storage, and Wholesaling		Wholesale		Retail		Direct	Indirect & Induced			Total
		Supply	Markup	Value	Markup	Value	Markup	Value Added	In-State Contribution To GDP	Manufacturing Allocation Contribution	GDP Allocation Contribution to GDP	Contribution To GDP
Alabama	3	33,652	14,936	48,588	135,471	184,059		195,179	87,445	181,165	463,788	647,847
Alaska	5	67,575	2,329	69,904	9,795	79,699		84,514	3,793	40,886	129,193	208,892
Arizona	5	1	14,663	14,664	83,888	98,552		104,506	82,968	299,453	486,927	585,479
Arkansas	3	1,449	11,959	13,408	109,390	122,798		130,217	48,206	105,997	284,420	407,218
California	5	41,092	71,828	112,920	397,589	510,509		541,350	871,163	2,404,910	3,817,423	4,327,932
Colorado	4	698,645	43,632	742,276	139,680	881,956		935,238	63,729	311,097	1,310,063	2,192,020
Connecticut	1-A	0	16,284	16,284	215,207	231,491		245,476	76,951	212,737	535,164	766,655
Delaware	1-B	11,784	6,891	18,675	68,995	87,671		92,967	12,356	57,862	163,185	250,856
District of Columbia	1-B	0	145	145	1,280	1,425		1,511	0	109,557	111,068	112,493
Florida	1-C	924	28,612	29,536	337,271	366,807		388,967	142,272	895,134	1,426,373	1,793,180
Georgia	1-C	0	27,717	27,717	325,149	352,866		374,183	143,297	493,087	1,010,566	1,363,432
Hawaii	5	0	5,818	5,818	27,768	33,586		35,615	3,702	64,946	104,262	137,848
Idaho	4	71	9,843	9,913	57,568	67,481		71,558	21,331	68,644	161,533	229,014
Illinois	2	231,882	76,355	308,237	253,130	561,367		595,280	253,142	674,206	1,522,629	2,083,996
Indiana	2	332	38,964	39,296	116,153	155,450		164,841	231,089	294,425	690,355	845,805
Iowa	2	0	52,163	52,163	204,499	256,662		272,168	85,080	154,608	511,855	768,517
Kansas	2	91,676	41,491	133,167	64,793	197,960		209,919	63,271	136,443	409,633	607,593
Kentucky	2	14,026	15,751	29,777	61,899	91,676		97,214	90,890	169,096	357,200	448,876
Louisiana	3	281,784	20,940	302,725	65,888	368,613		390,882	88,877	184,345	664,104	1,032,717
Maine	1-A	0	19,637	19,637	244,218	263,855		279,796	17,178	55,583	352,557	616,412
Maryland	1-B	0	17,296	17,296	188,711	206,007		218,453	58,271	316,494	593,218	799,226
Massachusetts	1-A	0	17,921	17,921	232,279	250,200		265,315	123,865	457,230	846,410	1,096,610
Michigan	2	3,677	66,828	70,505	286,503	357,008		378,576	223,599	407,947	1,010,121	1,367,129
Minnesota	2	0	62,564	62,564	244,599	307,163		325,720	117,225	294,057	737,002	1,044,166
Mississippi	3	60,640	16,734	77,374	144,608	221,982		235,393	44,407	90,763	370,563	592,545
Missouri	2	13	36,424	36,437	134,250	170,688		180,999	92,111	255,639	528,750	699,437
Montana	4	7,827	15,059	22,885	88,077	110,962		117,665	7,451	41,849	166,966	237,928
Nebraska	2	372	38,375	38,747	56,501	95,248		101,002	37,237	104,292	242,531	337,779
Nevada	5	48	6,865	6,912	38,554	45,467		48,213	20,844	138,657	207,714	253,180
New Hampshire	1-A	0	21,012	21,012	273,551	294,563		312,359	22,047	71,061	405,467	700,030
New Jersey	1-B	20,838	11,557	32,396	113,352	145,748		154,553	133,481	486,898	774,932	920,679
New Mexico	3	552,014	18,528	570,542	107,051	677,593		718,528	9,410	78,126	806,063	1,483,656
New York	1-B	32	55,627	55,659	627,097	682,757		724,004	166,003	1,355,506	2,245,513	2,928,270
North Carolina	1-C	0	49,339	49,339	602,570	651,908		691,292	225,817	472,051	1,389,160	2,041,068
North Dakota	2	709,942	25,311	735,254	60,837	796,091		844,185	10,008	45,314	899,507	1,695,598
Ohio	2	139,707	64,272	203,979	176,187	380,167		403,134	253,203	539,421	1,195,757	1,575,923
Oklahoma	2	873,010	55,096	928,105	71,919	1,000,024		1,060,438	41,017	153,521	1,254,976	2,255,000
Oregon	5	0	12,496	12,496	68,937	81,432		86,352	79,892	194,055	360,299	441,731
Pennsylvania	1-B	300,793	55,890	356,684	517,058	873,742		926,527	224,940	602,073	1,753,540	2,627,281
Rhode Island	1-A	0	3,524	3,524	45,361	48,885		51,839	11,651	47,461	110,950	159,836
South Carolina	1-C	0	15,119	15,119	168,072	183,190		194,257	86,635	192,352	473,244	656,435
South Dakota	2	224	10,372	10,596	41,616	52,213		55,367	10,951	43,978	110,296	162,508
Tennessee	2	822	16,137	16,959	58,953	75,912		80,498	137,078	304,513	522,090	598,002
Texas	3	4,504,105	140,623	4,644,728	510,135	5,154,864		5,466,283	500,758	1,462,783	7,429,824	12,584,687
Utah	4	35,599	9,535	45,133	37,291	82,424		87,404	55,617	160,653	303,674	386,098
Vermont	1-A	0	13,914	13,914	183,312	197,226		209,141	7,639	26,453	243,232	440,458
Virginia	1-C	1	32,904	32,905	420,669	453,574		480,976	109,216	431,297	1,021,488	1,475,062
Washington	5	0	26,925	26,925	153,406	180,331		191,225	139,642	483,007	813,875	994,205
West Virginia	1-C	839,325	44,545	883,870	87,573	971,443		1,030,131	18,730	60,909	1,109,770	2,081,213
Wisconsin	2	0	57,584	57,584	250,838	308,423		327,055	146,322	262,797	736,173	1,044,596
Wyoming	4	197,000	11,143	208,144	41,779	249,922		265,021	6,503	29,594	301,118	551,040
<b>Total Allocated to states</b>		<b>9,720,885</b>	<b>1,549,475</b>	<b>11,270,359</b>	<b>8,951,279</b>	<b>20,221,638</b>		<b>21,443,282</b>	<b>5,508,310</b>	<b>16,524,931</b>	<b>43,476,522</b>	<b>63,698,161</b>
<b>Values Not Applied to States</b>												
Value of Imported NGL Product		127,168										
Value in Imported Crude		547,660										
Value in Foreign Natural Gas		57,052										
Storage Inventory Change		65,279										
Import Adjustments		278,008										
						<b>Value in Non-U.S. Consumption</b>						
						0						
<b>U.S. Total</b>		<b>10,796,052</b>	<b>1,549,475</b>	<b>12,345,526</b>	<b>8,951,279</b>	<b>21,296,805</b>		<b>21,296,805</b>	<b>5,801,182</b>	<b>17,403,547</b>	<b>44,501,534</b>	<b>65,798,339</b>

Impact of the U.S. Consumer Propane Industry on U.S. and State Economies in 2021

Table 12: State Level Value Summary for Propane (C<sub>3</sub>H<sub>8</sub>), 2021

State	SUB PAD	Value Added (\$1,000)									Total Contribution To GDP	
		Supply	Transportation, Storage, and Wholesaling Markup	Wholesale		Retail		Direct Value Added	Indirect & Induced			
				Value	Markup	Value	Markup		In-State Contribution To GDP	Manufacturing Allocation Contribution		GDP Allocation Contribution
Alabama	3	116,227	16,715	132,942	135,471	268,414	284,629	185,414	384,133	854,177	1,122,590	
Alaska	5	233,389	3,372	236,761	9,795	246,556	261,451	8,042	86,693	356,187	602,743	
Arizona	5	5	14,663	14,667	83,888	98,555	104,509	175,921	634,947	915,378	1,013,933	
Arkansas	3	5,006	13,676	18,682	109,390	128,072	135,809	102,215	224,751	462,774	590,846	
California	5	141,924	77,447	219,371	397,589	616,960	654,232	1,847,177	5,099,267	7,600,676	8,217,636	
Colorado	4	2,412,977	89,593	2,502,571	139,680	2,642,251	2,801,876	135,128	659,636	3,596,640	6,238,891	
Connecticut	1-A	0	16,284	16,284	215,207	231,491	245,476	163,164	451,078	859,718	1,091,209	
Delaware	1-B	40,701	8,229	48,930	68,995	117,925	125,050	26,200	122,688	273,937	391,863	
District of Columbia	1-B	0	145	145	1,280	1,425	1,511	0	232,300	233,811	235,237	
Florida	1-C	3,193	28,632	31,825	337,271	369,096	391,394	301,667	1,898,004	2,591,065	2,960,161	
Georgia	1-C	0	31,719	31,719	325,149	356,867	378,427	303,840	1,045,520	1,727,786	2,084,654	
Hawaii	5	0	5,818	5,818	27,768	33,586	35,615	7,849	137,708	181,172	214,758	
Idaho	4	244	9,845	10,089	57,568	67,657	71,744	45,230	145,549	262,524	330,181	
Illinois	2	800,874	90,865	891,739	253,130	1,144,869	1,214,033	536,752	1,429,558	3,180,344	4,325,212	
Indiana	2	1,147	62,192	63,339	116,153	179,492	190,336	489,992	624,287	1,304,614	1,484,106	
Iowa	2	0	37,635	37,635	204,499	242,134	256,762	180,400	327,823	764,985	1,007,118	
Kansas	2	316,632	104,921	421,553	64,793	486,346	515,727	134,156	289,307	939,191	1,425,536	
Kentucky	2	48,444	17,739	66,183	61,899	128,081	135,819	192,719	358,544	687,082	815,163	
Louisiana	3	973,226	68,792	1,042,018	65,888	1,107,906	1,174,837	188,452	390,877	1,754,166	2,862,072	
Maine	1-A	0	19,637	19,637	244,218	263,855	279,796	36,424	117,855	434,075	697,931	
Maryland	1-B	0	17,296	17,296	188,711	206,007	218,453	123,556	671,081	1,013,089	1,219,097	
Massachusetts	1-A	0	17,921	17,921	232,279	250,200	265,315	262,638	969,490	1,497,443	1,747,643	
Michigan	2	12,698	67,861	80,560	286,503	367,063	389,238	474,109	864,993	1,728,340	2,095,403	
Minnesota	2	0	64,725	64,725	244,599	309,324	328,011	248,559	623,507	1,200,077	1,509,401	
Mississippi	3	209,437	21,554	230,991	144,608	375,600	398,291	94,159	192,449	684,899	1,060,499	
Missouri	2	45	39,504	39,549	134,250	173,800	184,299	195,309	542,047	921,655	1,095,455	
Montana	4	27,032	15,681	42,713	88,077	130,790	138,691	15,799	88,736	243,225	374,015	
Nebraska	2	1,285	98,736	100,020	56,501	156,521	165,977	78,955	221,136	466,069	622,590	
Nevada	5	164	6,865	7,029	38,554	45,583	48,337	44,196	294,002	386,535	432,118	
New Hampshire	1-A	0	21,012	21,012	273,551	294,563	312,359	46,748	150,674	509,781	804,344	
New Jersey	1-B	71,972	13,923	85,895	113,352	199,247	211,284	283,028	1,032,397	1,526,709	1,725,956	
New Mexico	3	1,906,544	38,552	1,945,095	107,051	2,052,146	2,176,122	19,952	165,655	2,361,728	4,413,874	
New York	1-B	111	55,627	55,738	627,097	682,835	724,087	351,986	2,874,156	3,950,230	4,633,065	
North Carolina	1-C	0	53,105	53,105	602,570	655,675	695,286	478,813	1,000,916	2,175,015	2,830,690	
North Dakota	2	2,451,997	48,977	2,500,974	60,837	2,561,811	2,716,577	21,221	96,082	2,833,881	5,395,692	
Ohio	2	482,519	113,967	596,487	176,187	772,674	819,353	536,880	1,143,764	2,499,997	3,272,671	
Oklahoma	2	3,015,198	146,271	3,161,469	71,919	3,233,388	3,428,726	86,970	325,519	3,841,215	7,074,604	
Oregon	5	0	12,496	12,496	68,937	81,432	86,352	169,399	411,466	667,217	748,649	
Pennsylvania	1-B	1,038,879	76,545	1,115,424	517,058	1,632,482	1,731,104	476,954	1,276,609	3,484,667	5,117,149	
Rhode Island	1-A	0	3,524	3,524	45,361	48,885	51,839	24,704	100,634	177,177	226,062	
South Carolina	1-C	0	18,885	18,885	168,072	186,957	198,251	183,697	407,855	789,804	976,760	
South Dakota	2	774	10,372	11,146	41,616	52,762	55,950	23,220	93,248	172,419	225,181	
Tennessee	2	2,840	17,192	20,032	58,953	78,986	83,757	290,654	645,677	1,020,088	1,099,074	
Texas	3	15,556,266	412,452	15,968,718	510,135	16,478,853	17,474,385	1,061,786	3,101,622	21,637,792	38,116,646	
Utah	4	122,950	12,890	135,840	37,291	173,131	183,590	117,928	340,642	642,161	815,292	
Vermont	1-A	0	13,914	13,914	183,312	197,226	209,141	16,197	56,089	281,427	478,653	
Virginia	1-C	4	32,904	32,908	420,669	453,577	480,978	231,576	914,504	1,627,059	2,080,635	
Washington	5	0	28,190	28,190	153,406	181,596	192,567	296,091	1,024,148	1,512,806	1,694,402	
West Virginia	1-C	2,898,860	137,709	3,036,569	87,573	3,124,142	3,312,880	39,714	129,149	3,481,743	6,605,885	
Wisconsin	2	0	57,752	57,752	250,838	308,590	327,233	310,254	557,223	1,194,709	1,503,300	
Wyoming	4	680,400	19,739	700,138	41,779	741,917	786,738	13,790	62,750	863,278	1,605,195	
<b>Total Allocated to states</b>		<b>33,573,964</b>	<b>2,414,059</b>	<b>35,988,024</b>	<b>8,951,279</b>	<b>44,939,303</b>	<b>47,654,206</b>	<b>11,679,582</b>	<b>35,038,747</b>	<b>94,372,535</b>	<b>139,311,838</b>	
<b>Values Not Applied to States</b>												
Value of Imported NGL Product		439,213										
Value in Imported Crude		1,891,506										
Value in Foreign Natural Gas		197,046										
Storage Inventory Change		225,460										
Import Adjustments		960,184										
						<b>Value in Non-U.S. Consumption</b>						
<b>U.S. Total</b>		<b>37,287,372</b>	<b>2,414,059</b>	<b>39,701,432</b>	<b>8,951,279</b>	<b>25,643,751</b>	<b>25,643,751</b>	<b>6,664,730</b>	<b>19,994,189</b>	<b>52,302,670</b>	<b>77,946,422</b>	



## 4.2. Summary Results of the Propane Value Chain Analysis

The basic results of the ICF analysis are shown in a series of value-chain tables and volume-chain diagrams. The detailed results, including volumes, value, and prices for each step in the value chain are shown in Figure 8 through Figure 17.

### *Explanation of Value/Volume Chain Diagrams*

Each of the 10 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 consumers. 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 1<sup>st</sup> and December 31<sup>st</sup> of 2021, 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 8. Value Chain for Odorized Propane, 2021 (Million Dollars)

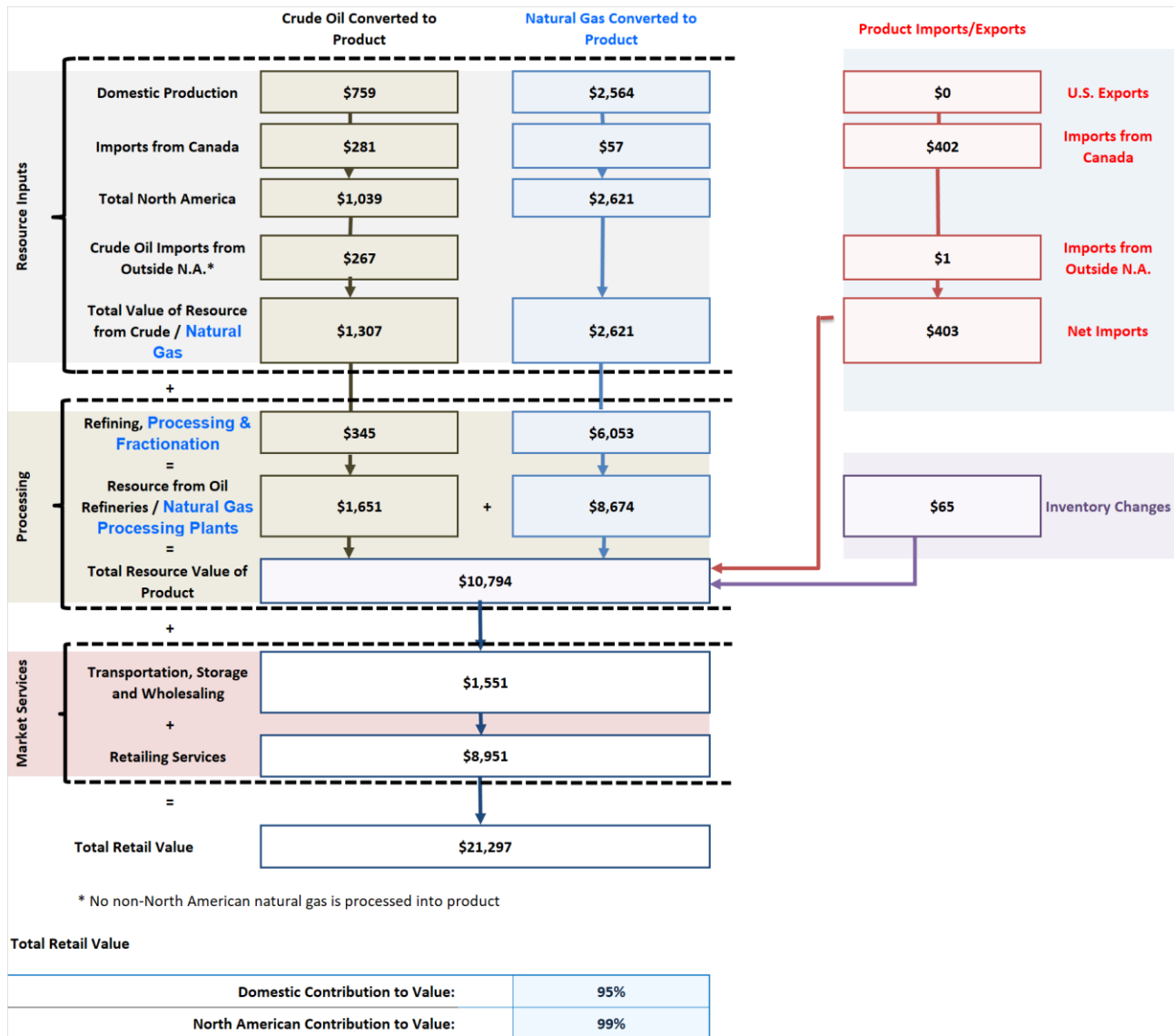


Figure 9. Volume Chain for Odorized Propane, 2021 (Thousand Gallons)

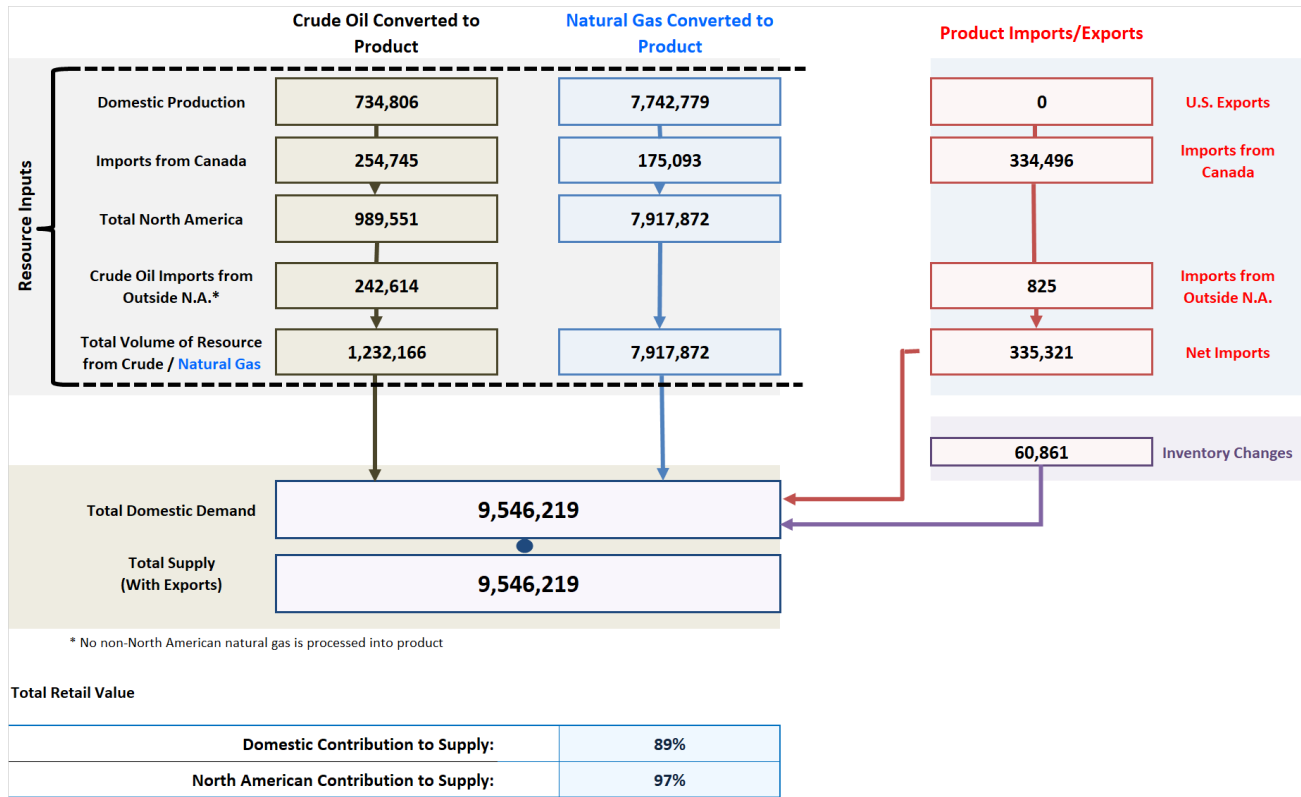




Figure 10. Value Chain for All Purity Propane (C<sub>3</sub>H<sub>8</sub>), 2021 (Million Dollars)

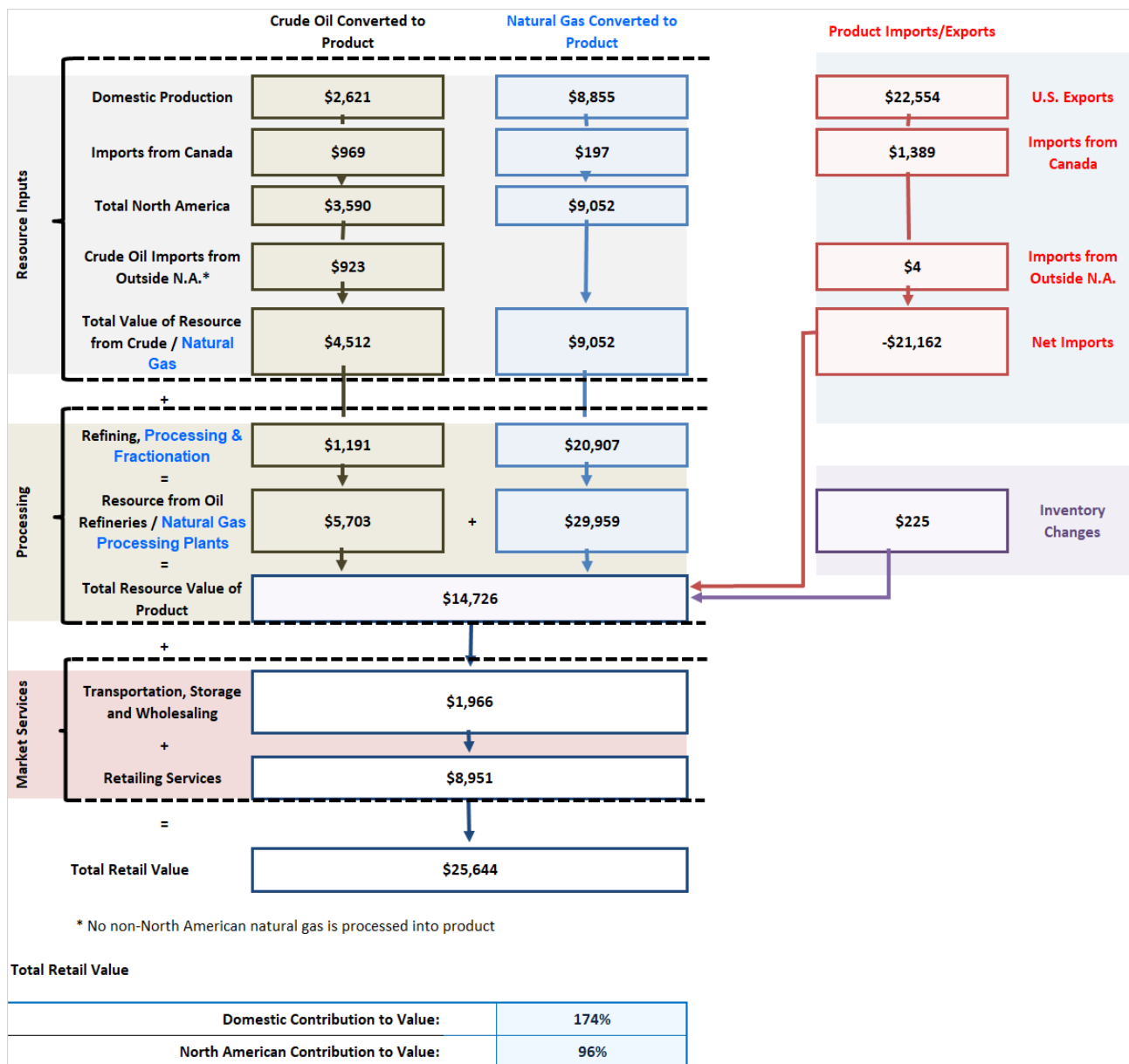
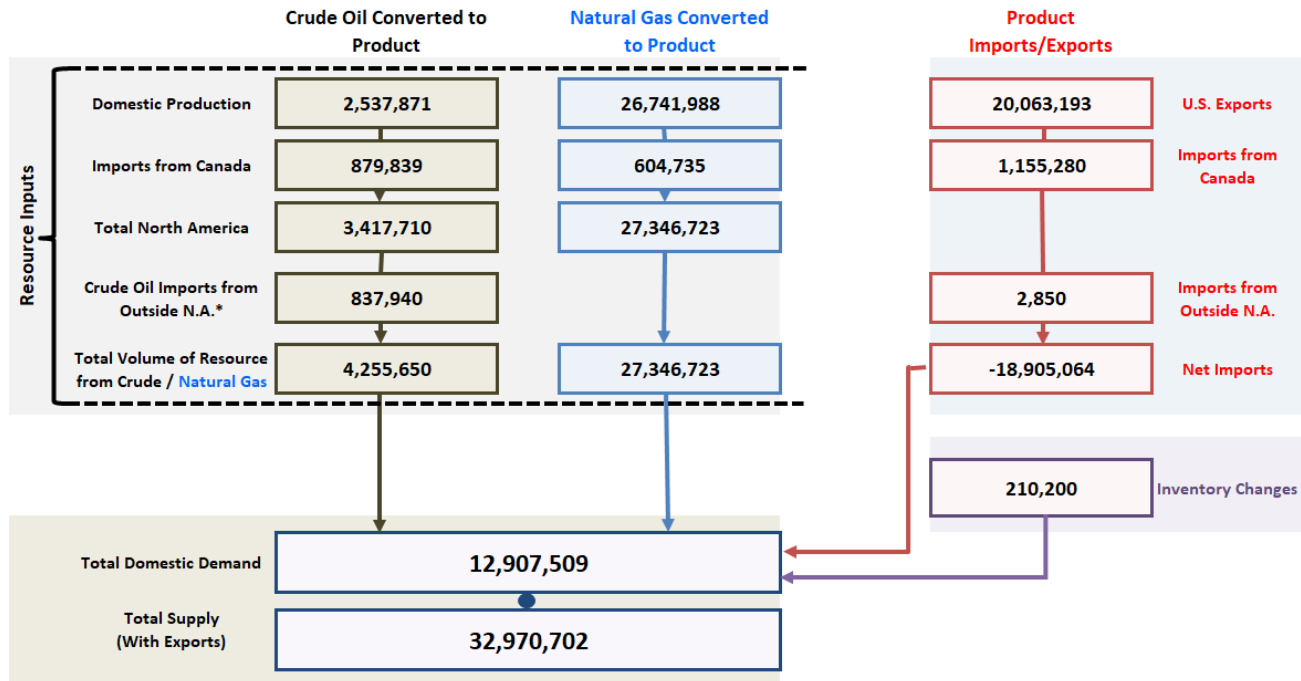


Figure 11. Volume Chain for All Purity Propane (C<sub>3</sub>H<sub>8</sub>), 2021 (Thousand Gallons)



\* No non-North American natural gas is processed into product

**Total Retail Value**

Domestic Contribution to Supply:	89%
North American Contribution to Supply:	97%

Figure 12. Value Chain for Butanes (C<sub>4</sub>H<sub>10</sub>), 2021 (Million Dollars)

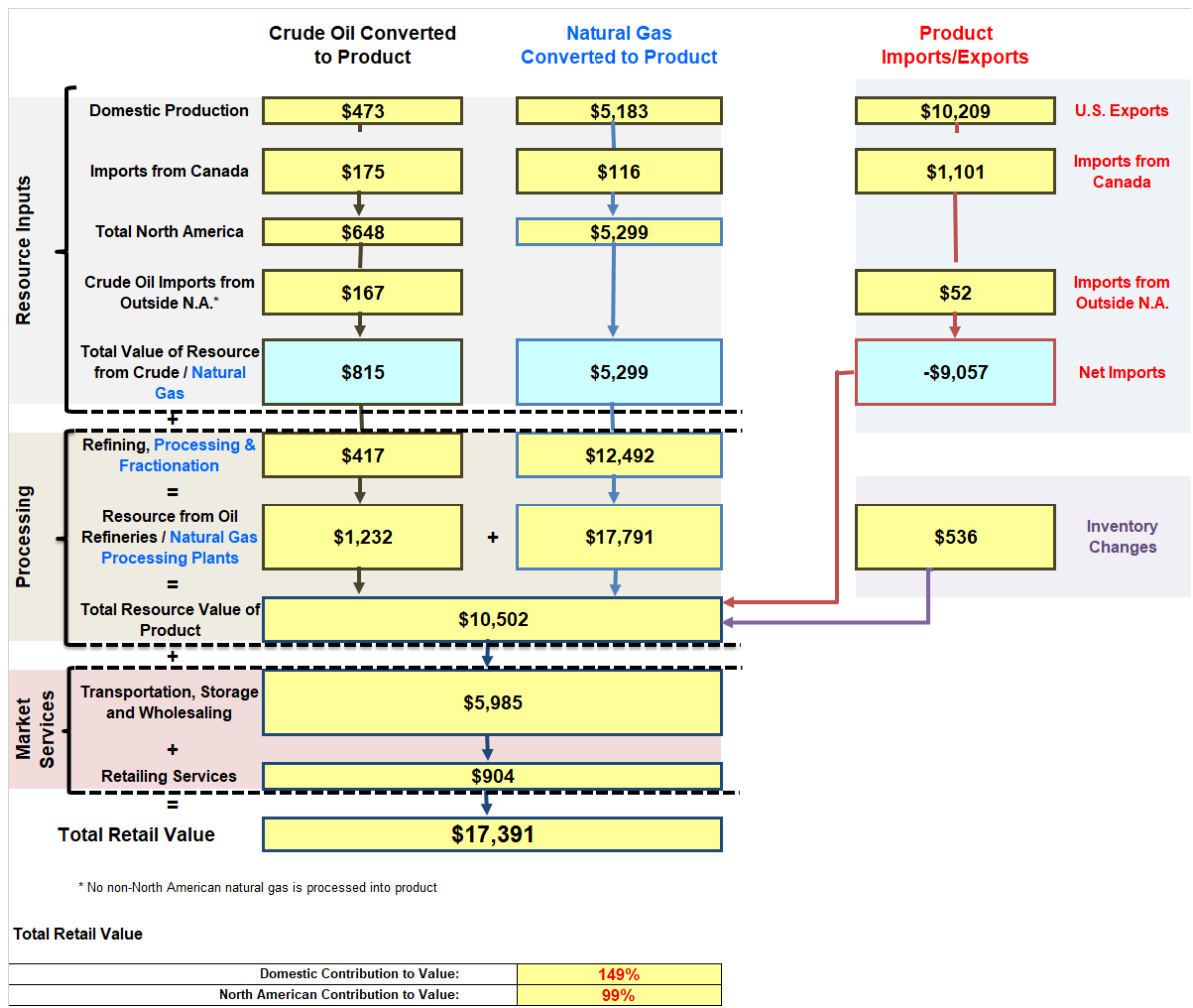


Figure 13. Volume Chain for Butanes (C<sub>4</sub>H<sub>10</sub>), 2021 (Thousand Gallons)

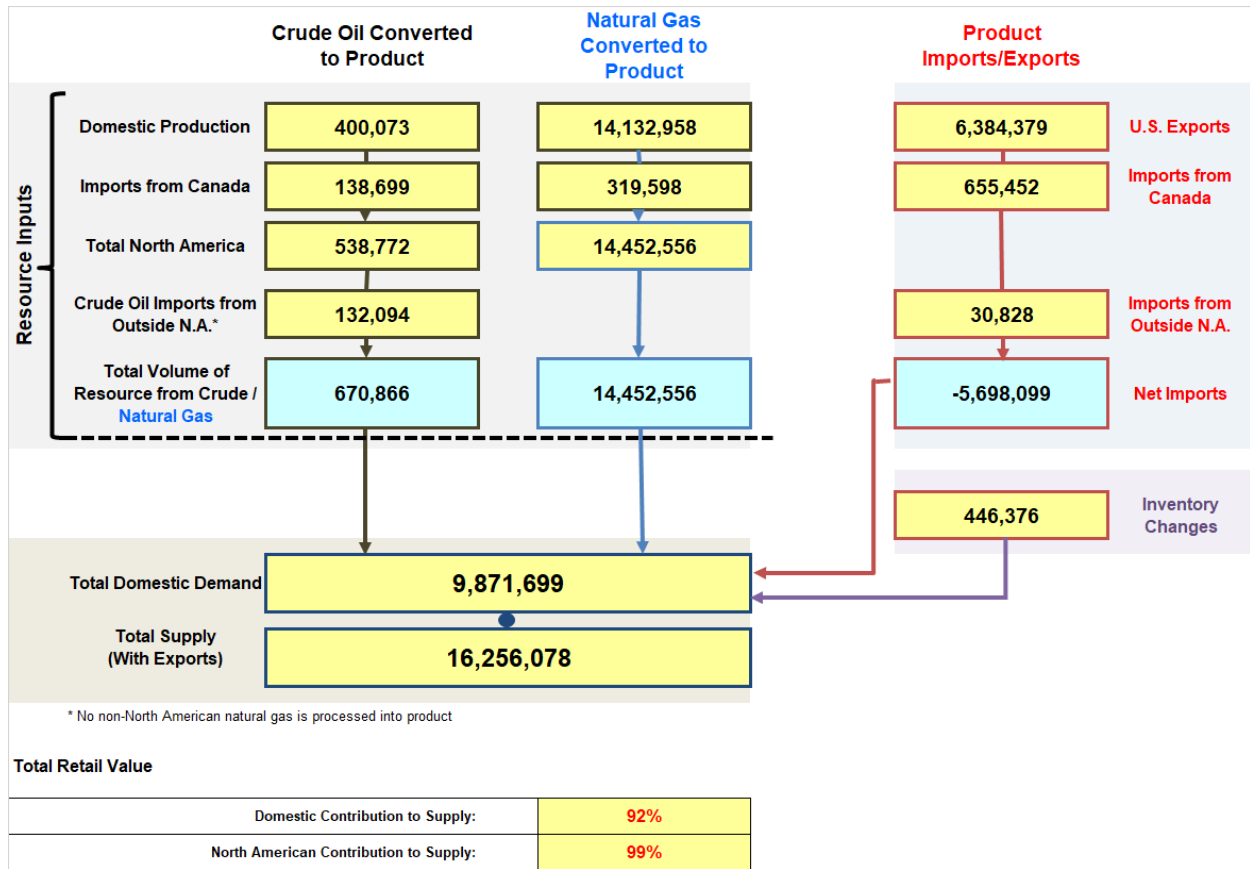
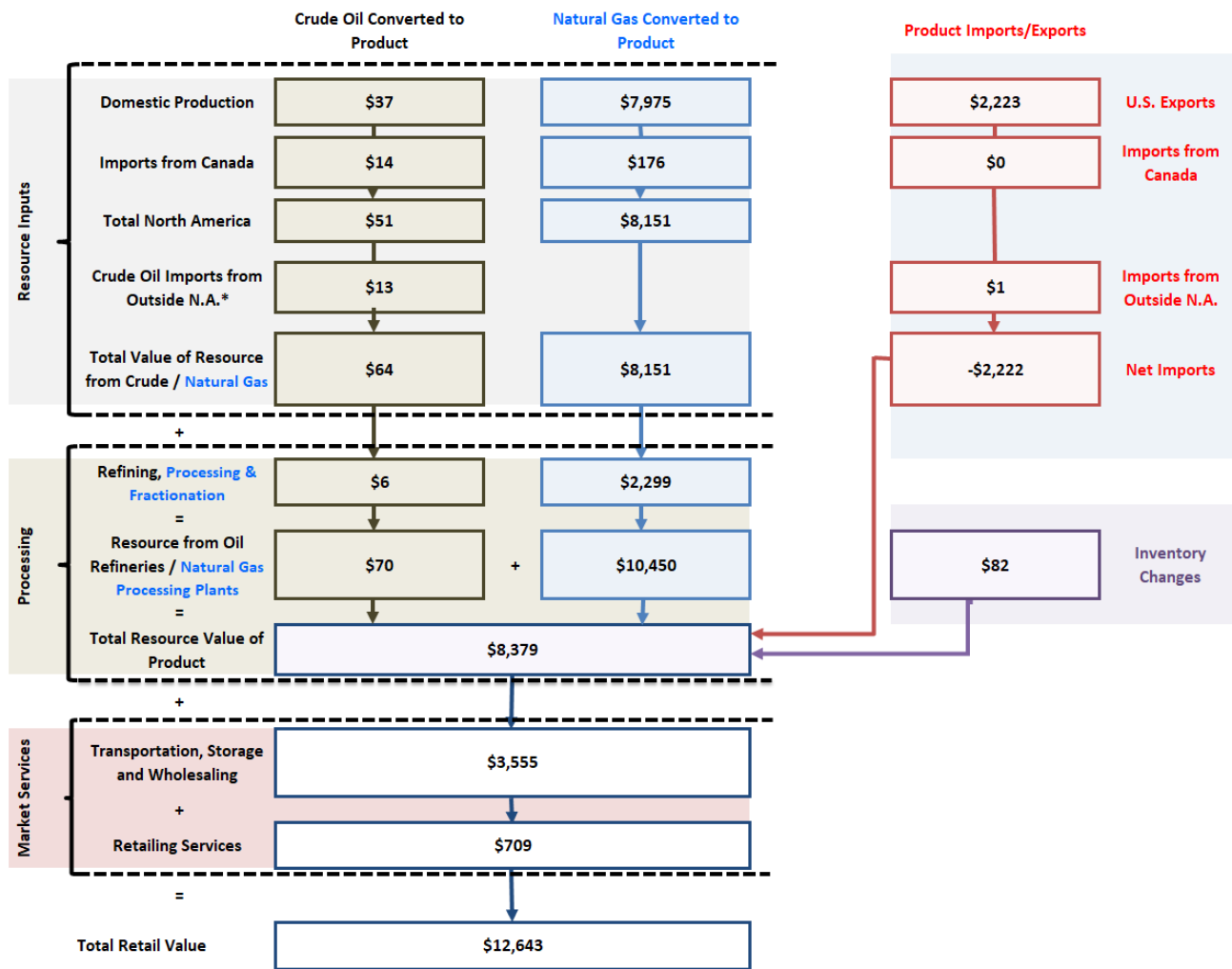


Figure 14. Value Chain for Ethane (C<sub>2</sub>H<sub>6</sub>), 2021 (Million Dollars)

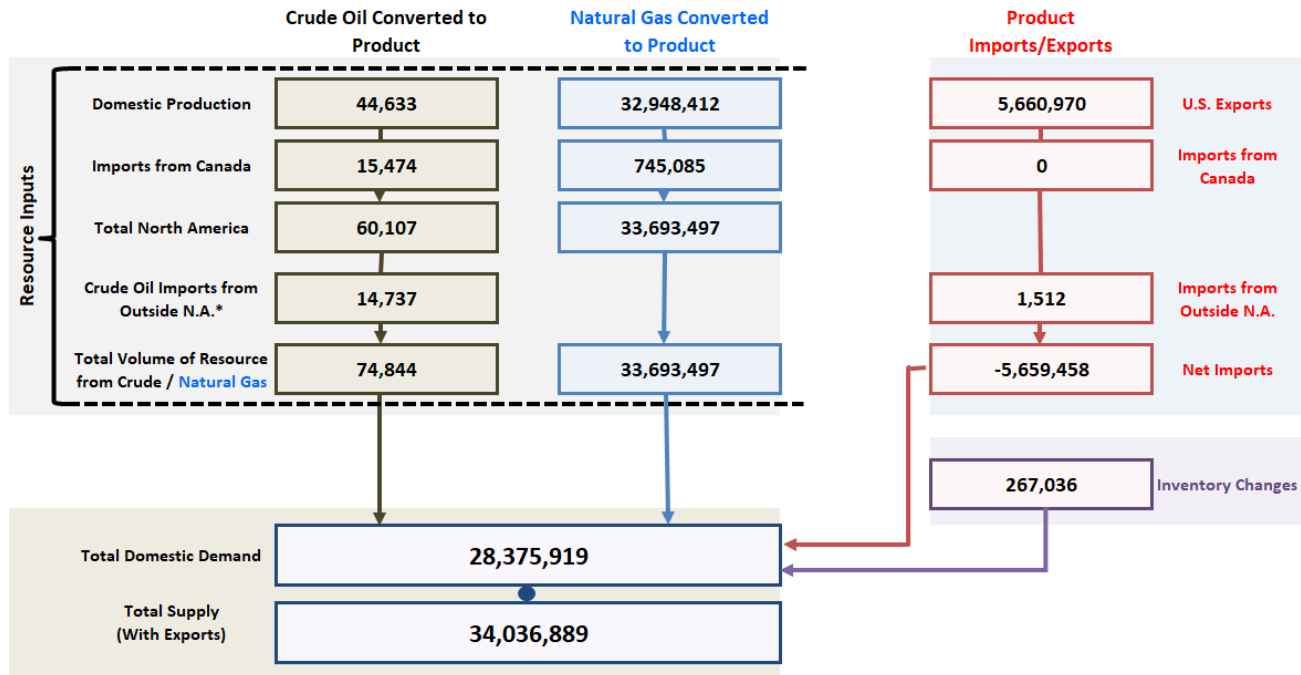


\* No non-North American natural gas is processed into product

Total Retail Value

Domestic Contribution to Value:	98%
North American Contribution to Value:	117%

Figure 15. Volume Chain for Ethane (C<sub>2</sub>H<sub>6</sub>), 2021 (Thousand Gallons)



\* No non-North American natural gas is processed into product

**Total Retail Value**

Domestic Contribution to Supply:	98%
North American Contribution to Supply:	100%

Figure 16. Value Chain for All NGLs and LRGs, 2021 (Million Dollars)

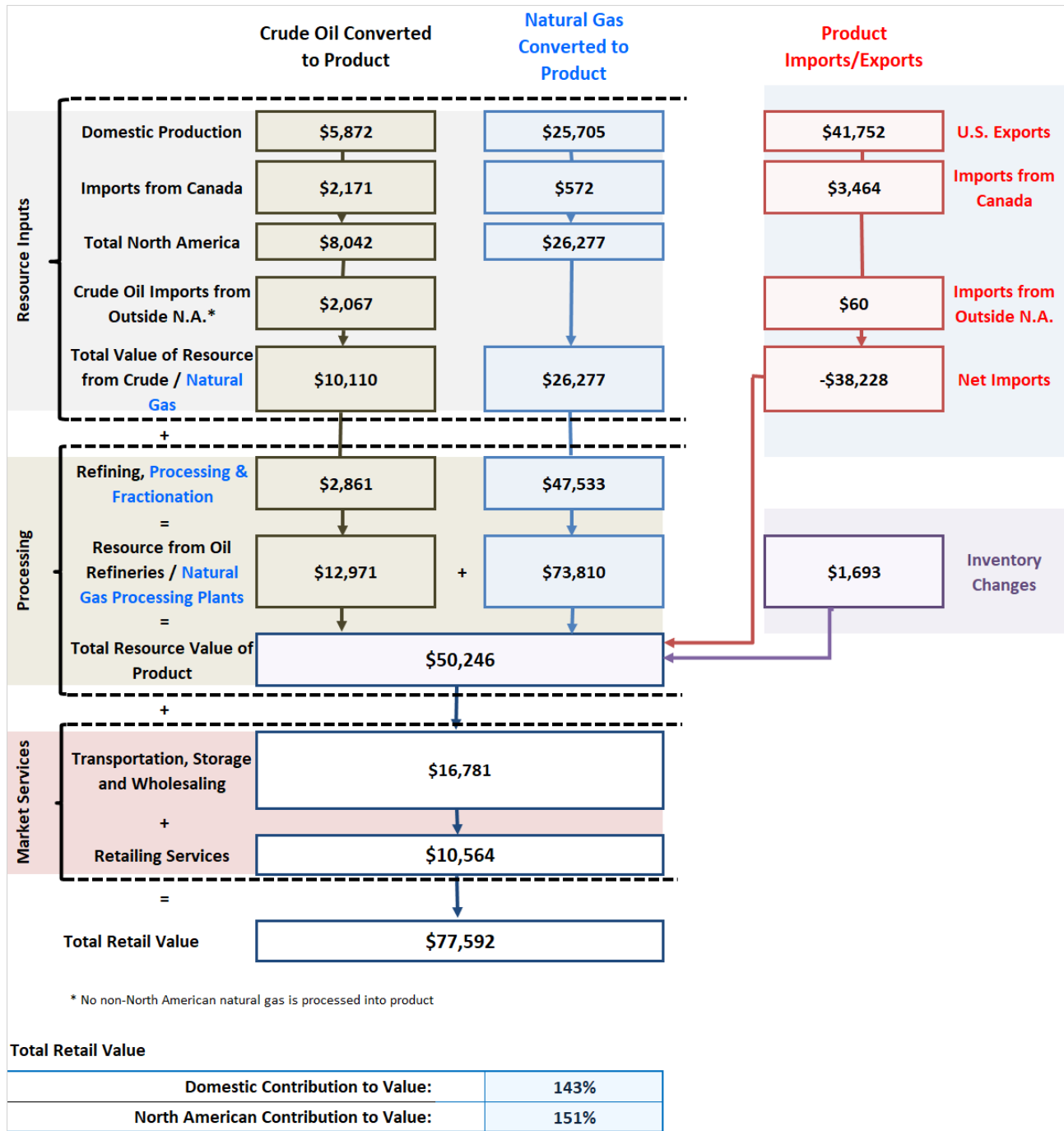


Figure 17. Volume Chain for All NGLs and LRGs, 2021 (Thousand Gallons)

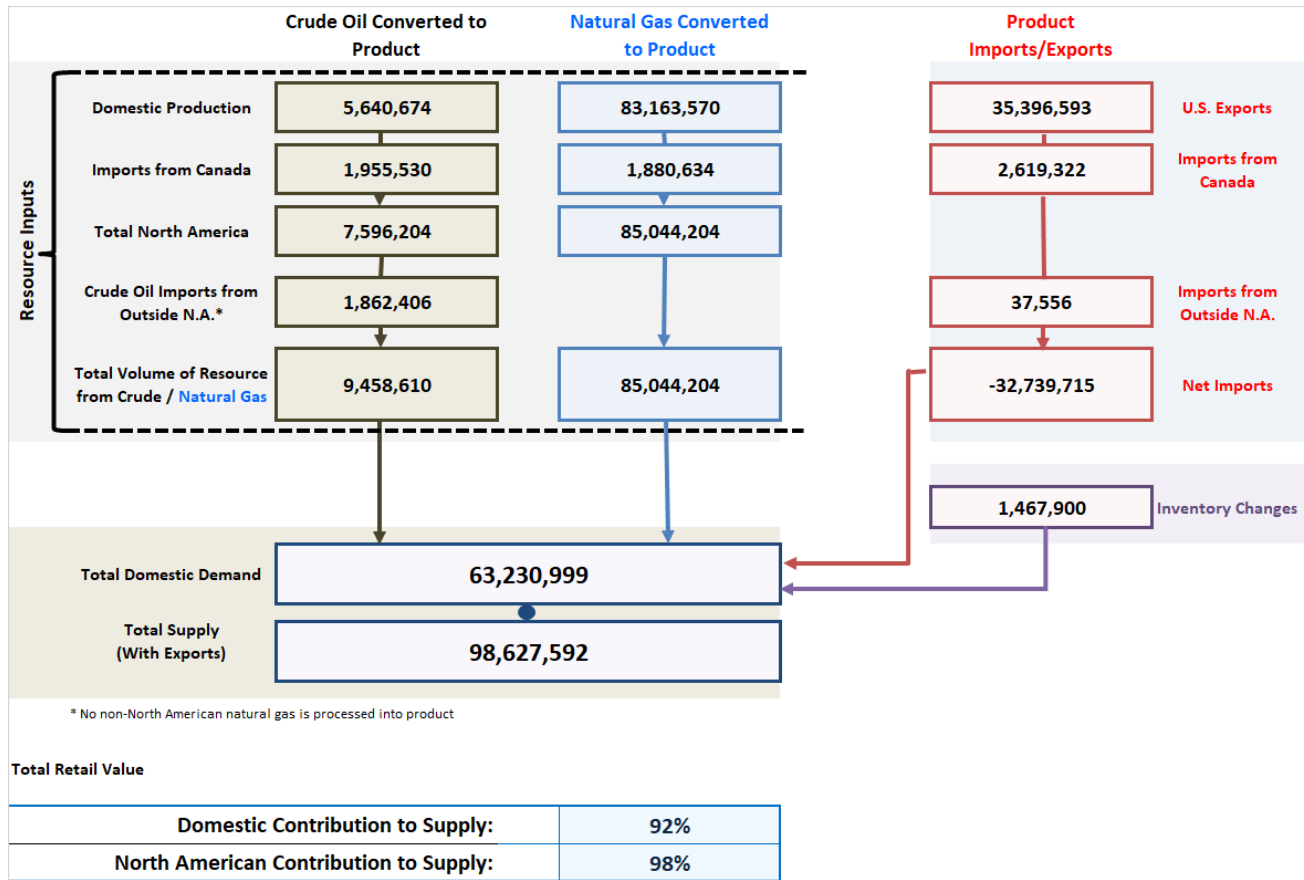




Table 14: National Value Summary for Odorized Propane, 2021

	Volume	Value	Price
	Gallons (1,000)	\$ Million	\$ per Gal.
<b>Refining</b>			
Value in Imported Crude (CIF)	497,360	547.7	1.101
in Canadian Crude	254,745	280.5	1.101
in Non-Canadian crude	242,614	267.2	1.101
Value in Domestic Crude	734,806	758.8	1.033
Value Added by Crude Refining	1,232,166	344.7	0.280
<b>Refinery Sales</b>	<b>1,232,166</b>	<b>1,651.2</b>	<b>1.340</b>
<b>Gas Processing</b>			
Value in Natural Gas	7,742,779	2,563.8	0.331
Value Added by Gas Processing	7,742,779	5,491.5	0.709
Fractionation	7,742,779	369.1	0.048
<b>Gas Plants (With Fractionation)</b>	<b>7,742,779</b>	<b>8,424.4</b>	<b>1.088</b>
<b>EIA Product Imports</b>			
Imported Product Value (CIF)	91,290	125.2	1.372
Canadian Imports	90,465	124.1	1.372
Non-Canadian Imports	825	1.1	1.372
Terminaling	91,290	1.9	0.021
<b>Imports (With Terminaling)</b>	<b>91,290</b>	<b>127.2</b>	<b>1.393</b>
Inventory Change	60,861	65.3	1.073
<b>Supply</b>	<b>9,127,095</b>	<b>10,268.1</b>	<b>1.125</b>
Import Adjust. (Imports Not Counted by EIA)	244,030	278.0	1.139
Aux Sable Value Added by Gas Processing and Frac.	175,093	192.9	1.101
Aux Sable Value of Canadian Gas	175,093	57.1	0.326
<b>Total Supply</b>	<b>9,546,219</b>	<b>10,796.1</b>	<b>1.131</b>
<b>Exports</b>			
Export Product Value	-	-	-
Terminaling	-	-	-
<b>Export Value (FOB)</b>	<b>-</b>	<b>-</b>	<b>-</b>
Domestic Demand	9,546,219	12,345.5	1.293
Balancing Item	-	-	1.293
<b>Total Domestic Demand (Wholesale Value)</b>	<b>9,546,219</b>	<b>12,345.5</b>	<b>1.293</b>
Supply Value	9,546,219	10,796.1	1.131
Wholesale Value	9,546,219	12,345.5	1.293
<b>Wholesale Market Services</b>	<b>9,546,219</b>	<b>1,549.5</b>	<b>0.162</b>
<i>Breakout of Wholesale Market Services</i>			
Long Distance P/L Transportation		168.7	
Intra PAD P/L Transportation		165.2	
Storage and Wholesale Markup		1,215.6	
Wholesale Value Balancing Item		-	
<b>Total Wholesale Market Services</b>	<b>9,546,219</b>	<b>1,549.5</b>	<b>0.162</b>
<i>Final Retail Values</i>			
Wholesale Value	9,546,219	12,345.5	1.293
Retail Markup on Total Volume	9,546,219	8,951.3	0.938
<b>Total Retail Value</b>	<b>9,546,219</b>	<b>21,296.8</b>	<b>2.231</b>

Table 15: National Value Summary for All Purity Propane (C<sub>3</sub>H<sub>8</sub>), 2021

	Volume	Value	Price
	Gallons (1,000)	\$ Million	\$ per Gal.
<b>Refining</b>			
Value in Imported Crude (CIF)	1,717,779	1,891.5	1.101
in Canadian Crude	879,839	968.8	1.101
in Non-Canadian crude	837,940	922.7	1.101
Value in Domestic Crude	2,537,871	2,620.9	1.033
Value Added by Crude Refining	4,255,650	1,190.7	0.280
<b>Refinery Sales</b>	<b>4,255,650</b>	<b>5,703.1</b>	<b>1.340</b>
<b>Gas Processing</b>			
Value in Natural Gas	26,741,988	8,855.0	0.331
Value Added by Gas Processing	26,741,988	18,966.4	0.709
Fractionation	26,741,988	1,274.9	0.048
<b>Gas Plants (With Fractionation)</b>	<b>26,741,988</b>	<b>29,096.3</b>	<b>1.088</b>
<b>EIA Product Imports</b>			
Imported Product Value (CIF)	315,298	432.5	1.372
Canadian Imports	312,448	428.6	1.372
Non-Canadian Imports	2,850	3.9	1.372
Terminaling	315,298	6.7	0.021
<b>Imports (With Terminaling)</b>	<b>315,298</b>	<b>439.2</b>	<b>1.393</b>
Inventory Change	210,200	225.5	1.073
<b>Supply</b>	<b>31,523,136</b>	<b>35,464.1</b>	<b>1.125</b>
Import Adjust. (Imports Not Counted by EIA)	842,832	960.2	1.139
Aux Sable Value Added by Gas Processing and Frac.	604,735	666.1	1.101
Aux Sable Value of Canadian Gas	604,735	197.0	0.326
<b>Total Supply</b>	<b>32,970,702</b>	<b>37,287.4</b>	<b>1.131</b>
<b>Exports</b>			
Export Product Value	20,063,193	22,554.2	1.124
Terminaling	20,063,193	736.9	0.037
<b>Export Value (FOB)</b>	<b>20,063,193</b>	<b>23,291.1</b>	<b>1.161</b>
Domestic Demand	11,570,941	14,964.0	1.293
Balancing Item	1,336,568	1,728.5	1.293
<b>Total Domestic Demand (Wholesale Value)</b>	<b>12,907,509</b>	<b>16,692.5</b>	<b>1.293</b>
Supply Value	12,907,509	14,597.4	1.131
Wholesale Value	12,907,509	16,692.5	1.293
<b>Wholesale Market Services</b>	<b>12,907,509</b>	<b>2,095.1</b>	<b>0.162</b>
<i>Breakout of Wholesale Market Services</i>			
Long Distance P/L Transportation		582.7	
Intra PAD P/L Transportation		570.5	
Storage and Wholesale Markup		941.8	
Wholesale Value Balancing Item		(872.6)	
<b>Total Wholesale Market Services</b>	<b>12,907,509</b>	<b>1,222.5</b>	<b>0.095</b>
<i>Final Retail Values</i>			
Wholesale Value	12,907,509	16,692.5	1.293
Retail Markup on Total Volume	12,907,509	8,951.3	0.693
<b>Total Retail Value</b>	<b>12,907,509</b>	<b>25,643.8</b>	<b>1.987</b>

Table 16: National Value Summary for Butanes (C<sub>4</sub>H<sub>10</sub>), 2021

	Volume	Value	Price
	Gallons (1,000)	\$ Million	\$ per Gal.
<b>Refining</b>			
Value in Imported Crude (CIF)	325,840	404.3	1.241
in Canadian Crude	166,894	207.1	1.241
in Non-Canadian crude	158,946	197.2	1.241
Value in Domestic Crude	481,400	560.2	1.164
Value Added by Crude Refining	807,240	397.3	0.492
<b>Refinery Sales</b>	<b>807,240</b>	<b>1,361.8</b>	<b>1.687</b>
<b>Gas Processing</b>			
Value in Natural Gas	7,764,666	2,867.9	0.369
Value Added by Gas Processing	7,764,666	6,223.9	0.802
Fractionation	7,764,666	388.0	0.050
<b>Gas Plants (With Fractionation)</b>	<b>7,764,666</b>	<b>9,479.9</b>	<b>1.221</b>
<b>EIA Product Imports</b>			
Imported Product Value (CIF)	587,244	986.5	1.680
Canadian Imports	556,416	934.7	1.680
Non-Canadian Imports	30,828	51.8	1.680
Terminaling	587,244	13.6	0.023
<b>Imports (With Terminaling)</b>	<b>587,244</b>	<b>1,000.1</b>	<b>1.703</b>
Inventory Change	335,832	402.7	1.199
<b>Supply</b>	<b>9,494,982</b>	<b>12,244.6</b>	<b>1.290</b>
Import Adjust. (Imports Not Counted by EIA)	-	-	
Aux. Sable Value Added by Gas Processing and Frac.	175,588	220.8	1.258
Aux. Sable Value of Canadian Gas	175,588	64.8	0.369
<b>Total Supply</b>	<b>9,670,570</b>	<b>12,530.2</b>	<b>1.296</b>
<b>Exports</b>			
Export Product Value	6,338,941	10,209.3	1.611
Terminaling	6,338,941	221.7	0.035
<b>Export Value (FOB)</b>	<b>6,338,941</b>	<b>10,431.0</b>	<b>1.646</b>
Domestic Demand	7,761,180	12,734.5	1.641
Balancing Item	(4,429,552)	(7,268.0)	1.641
<b>Total Domestic Demand (Wholesale Value)</b>	<b>3,331,628</b>	<b>5,466.5</b>	<b>1.641</b>
Supply Value	3,331,628	4,316.8	1.296
Wholesale Value	3,331,628	5,466.5	1.641
<b>Wholesale Market Services</b>	<b>3,331,628</b>	<b>1,149.7</b>	<b>0.345</b>
<i>Breakout of Wholesale Market Services</i>			
Long Distance P/L Transportation		491.9	
Intra PAD P/L Transportation		158.3	
Storage and Wholesale Markup		499.5	
Wholesale Value Balancing Item		1,774.2	
<b>Total Wholesale Market Services</b>	<b>3,331,628</b>	<b>2,923.9</b>	<b>0.345</b>
<i>Final Retail Values</i>			
Wholesale Value	3,331,628	5,466.5	1.641
Retail Markup on Total Volume	3,331,628	496.6	0.149
<b>Total Retail Value</b>	<b>3,331,628</b>	<b>5,963.1</b>	<b>1.790</b>

Table 17: National Value Summary for Ethane (C<sub>2</sub>H<sub>6</sub>), 2021

	Volume	Value	Price
	Gallons (1,000)	\$ Million	\$ per Gal.
<b>Refining</b>			
Value in Imported Crude (CIF)	30,211	26.7	0.884
in Canadian Crude	15,474	13.7	0.884
in Non-Canadian Crude	14,737	13.0	0.884
Value in Domestic Crude	44,633	37.0	0.829
Value Added by Crude Refining	74,844	6.4	0.086
<b>Refinery Sales</b>	<b>74,844</b>	<b>70.1</b>	<b>0.937</b>
<b>Gas Processing</b>			
Value in Natural Gas	32,948,412	7,975.0	0.242
Value Added by Gas Processing	32,948,412	568.2	0.017
Fractionation	32,948,412	1,593.0	0.048
<b>Gas Plants (With Fractionation)</b>	<b>32,948,412</b>	<b>10,136.3</b>	<b>0.308</b>
<b>EIA Product Imports</b>			
Imported Product Value (CIF)	1,512	0.6	0.410
Canadian Imports	-	-	0.410
Non-Canadian Imports	1,512	0.6	0.410
Terminaling	1,512	0.016	0.010
<b>Imports (With Terminaling)</b>	<b>1,512</b>	<b>0.6</b>	<b>0.421</b>
Inventory Change	267,036	82.2	0.308
<b>Supply</b>	<b>33,291,804</b>	<b>10,289.2</b>	<b>0.309</b>
Import Adjust. (Imports Not Counted by EIA)	-	-	
Aux Sable Value Added by Gas Processing and Frac.	745,085	137.5	0.184
Aux Sable Value of Canadian Gas	745,085	175.9	0.236
<b>Total Supply</b>	<b>34,036,889</b>	<b>10,602.5</b>	<b>0.312</b>
<b>Exports</b>			
Export Product Value	5,660,970	2,223.0	0.393
Terminaling	5,660,970	157.8	0.028
<b>Export Value (FOB)</b>	<b>5,660,970</b>	<b>2,380.8</b>	<b>0.421</b>
Domestic Demand	32,948,412	13,857.1	0.421
Balancing Item	(4,572,493)	(1,923.1)	0.421
<b>Total Domestic Demand (Wholesale Value)</b>	<b>28,375,919</b>	<b>11,934.1</b>	<b>0.421</b>
Supply Value	28,375,919	8,839.1	0.312
Wholesale Value	28,375,919	11,934.1	0.421
<b>Wholesale Market Services</b>	<b>28,375,919</b>	<b>3,094.9</b>	<b>0.109</b>
<i>Breakout of Wholesale Market Services</i>			
Long Distance P/L Transportation		597.6	
Intra PAD P/L Transportation		611.0	
Storage and Wholesale Markup		1,886.4	
Wholesale Value Balancing Item		301.9	
<b>Total Wholesale Market Services</b>	<b>28,375,919</b>	<b>3,396.8</b>	<b>0.109</b>
<i>Retail Margin</i>			
Non-Chemical Retail Value	664,887	988.7	1.487
Non-Chemical Wholesale Value	664,887	279.6	0.421
<b>Difference = Retail Markup on Non-Chem.</b>	<b>664,887</b>	<b>709.1</b>	<b>1.066</b>
<i>Final Retail Values</i>			
Wholesale Value	28,375,919	11,934.1	0.421
Retail Markup on Total Volume	28,375,919	709.1	0.025
<b>Total Retail Value</b>	<b>28,375,919</b>	<b>12,643.1</b>	<b>0.446</b>

Table 18: National Value Summary for Total NGL and LRG, 2021

	Volume	Value	Price
	Gallons (1,000)	\$ Million	\$ per Gal.
<b>Refining</b>			
Value in Imported Crude (CIF)	3,817,936	4,237.8	1.110
in Canadian Crude	1,955,530	2,170.6	1.110
in Non-Canadian crude	1,862,406	2,067.2	1.110
Value in Domestic Crude	5,640,674	5,871.9	1.041
Value Added by Crude Refining	9,458,610	2,861.0	0.302
<b>Refinery Sales</b>	<b>9,458,610</b>	<b>12,970.7</b>	<b>1.371</b>
<b>Gas Processing</b>			
Value in Natural Gas	83,163,570	25,704.9	0.309
Value Added by Gas Processing	83,163,570	41,921.9	0.504
Fractionation	83,163,570	4,019.6	0.048
<b>Gas Plants (With Fractionation)</b>	<b>83,163,570</b>	<b>71,646.4</b>	<b>0.862</b>
<b>EIA Product Imports</b>			
Imported Product Value (CIF)	1,225,949	1,893.6	1.545
Canadian Imports	1,188,393	1,833.7	1.543
Non-Canadian Imports	37,556	59.9	1.594
Terminaling	1,225,949	26.9	0.022
<b>Imports (With Terminaling)</b>	<b>1,225,949</b>	<b>1,920.5</b>	<b>1.567</b>
Inventory Change	1,467,900	1,693.0	1.153
<b>Supply</b>	<b>95,316,029</b>	<b>88,230.7</b>	<b>0.926</b>
Import Adjust. (Imports Not Counted by EIA)	1,430,929	1,630.2	1.139
Aux Sable Value Added by Gas Processing and Frac.	1,880,634	1,591.8	0.846
Aux Sable Value of Canadian Gas	1,880,634	572.0	0.304
<b>Total Supply</b>	<b>98,627,592</b>	<b>92,024.6</b>	<b>0.933</b>
<b>Exports</b>			
Export Product Value	35,396,593	41,751.8	1.180
Terminaling	35,396,593	1,230.5	0.035
<b>Export Value (FOB)</b>	<b>35,396,593</b>	<b>42,982.3</b>	<b>1.214</b>
Domestic Demand	70,329,315	75,742.0	1.077
Balancing Item	(7,098,316)	(8,714.9)	1.228
<b>Total Domestic Demand (Wholesale Value)</b>	<b>63,230,999</b>	<b>67,027.1</b>	<b>1.060</b>
Supply Value	63,230,999	53,547.3	0.847
Wholesale Value	63,230,999	67,027.1	1.060
<b>Wholesale Market Services</b>	<b>63,230,999</b>	<b>13,479.8</b>	<b>0.213</b>
<i>Breakout of Wholesale Market Services</i>			
Long Distance P/L Transportation		2,847.2	
Intra PAD P/L Transportation		1,709.9	
Storage and Wholesale Markup		8,922.7	
Wholesale Value Balancing Item		2,043.9	
<b>Total Wholesale Market Services</b>	<b>63,230,999</b>	<b>15,523.7</b>	<b>0.246</b>
<b>Final Retail Values</b>			
Wholesale Value	63,230,999	67,027.1	1.060
Retail Markup on Total Volume	63,230,999	10,564.4	0.167
<b>Total Retail Value</b>	<b>63,230,999</b>	<b>77,591.5</b>	<b>1.227</b>

### 4.3. Economic Impact from the Manufacture of Propane Appliances and Engines

The economic impact in the U.S. from the manufacturing, distribution, and installation of propane engines, appliances, and other propane end use equipment that was installed or purchased in 2021 is estimated to be \$11.7 billion, consisting of \$4.0 billion of direct propane consumers spending and \$7.7 billion from indirect/induced economic benefits. The Table 19 below shows the capital outlays from consumers and total economic impacts from that spending by sector and type of propane equipment.

Table 19: Economic Impact from Manufacturing Activities (Million Dollars)

Manufacturing Category	Consumer Spending (Direct)	Indirect	Induced	Total
<b>Residential Sector</b>	<b>3,164</b>	<b>2,825</b>	<b>3,225</b>	<b>9,214</b>
New Construction	189	168	192	549
Conversions / Upgrades	222	198	226	646
Appliance Replacements	1,139	1,016	1,160	3,316
Propane BBQ Grills	1,615	1,442	1,646	4,703
<b>Commercial Sector<sup>24</sup></b>	<b>433</b>	<b>387</b>	<b>442</b>	<b>1,262</b>
New Construction	65	58	66	189
Appliance Replacements	368	329	375	1,073
<b>Internal Combustion Engines</b>	<b>376</b>	<b>336</b>	<b>384</b>	<b>1,096</b>
Forklifts	241	215	246	703
School Buses	40	36	41	117
LDV/MDVs	70	63	72	204
Irrigation / Mowers	25	22	25	72
<b>Agricultural Products</b>	<b>17</b>	<b>15</b>	<b>18</b>	<b>50</b>
<b>Industrial / Other</b>	<b>21</b>	<b>18</b>	<b>21</b>	<b>60</b>
<b>Total Impact</b>	<b>4,012</b>	<b>3,581</b>	<b>4,089</b>	<b>11,682</b>

Source: ICF

#### 4.3.1 Residential Sector Propane Equipment Usage

##### Residential Propane Consumption

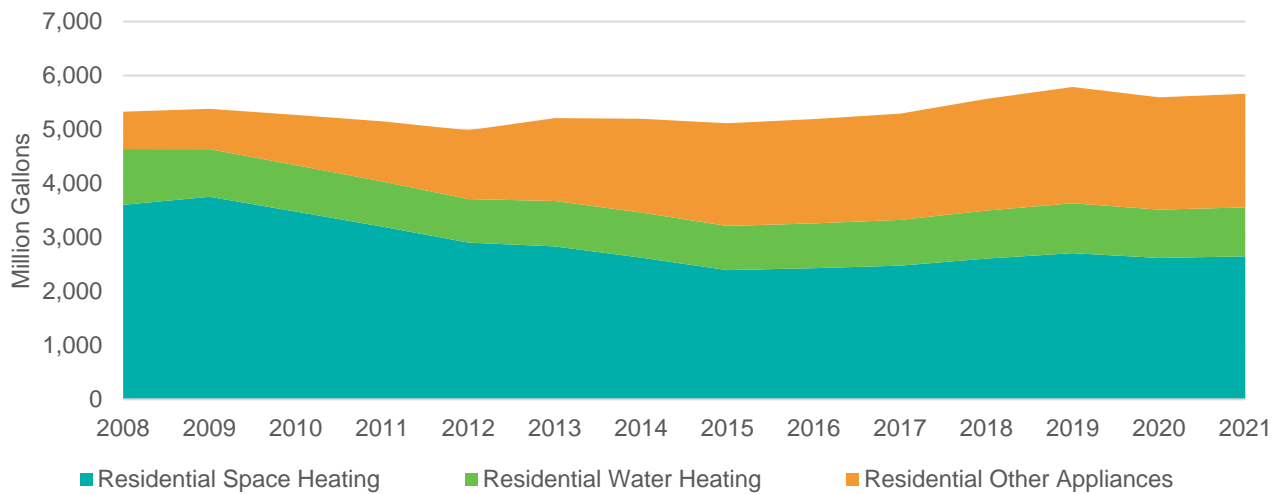
The Residential sector accounts for the largest share of the domestic retail propane industry, with odorized propane sales totaling 4.9 billion gallons in 2021, or roughly 51.6 percent of the 2021 total retail propane sales.

The average residential customer of a propane retailer consumed 408 gallons per account, however, there are wide variations based on the region and local weather conditions and the share of local accounts that use propane for space heating. In Nebraska a residential consumer account averaged over 1,169 gallons, while in Florida the average usage per residential customer was 132 gallons.

<sup>24</sup> Replacement of commercial appliances has been estimated in this study.

On a national basis, space heating accounts for over two thirds of the propane usage in the residential sector. The Figure 18 below shows the total residential propane demand by end-use. Water heating accounted for 16 percent residential propane fuel usage in 2021.

Figure 18. Residential Odorized Propane Consumption by End-Use



Source: ICF, PERC, EIA Residential Energy Consumption Survey

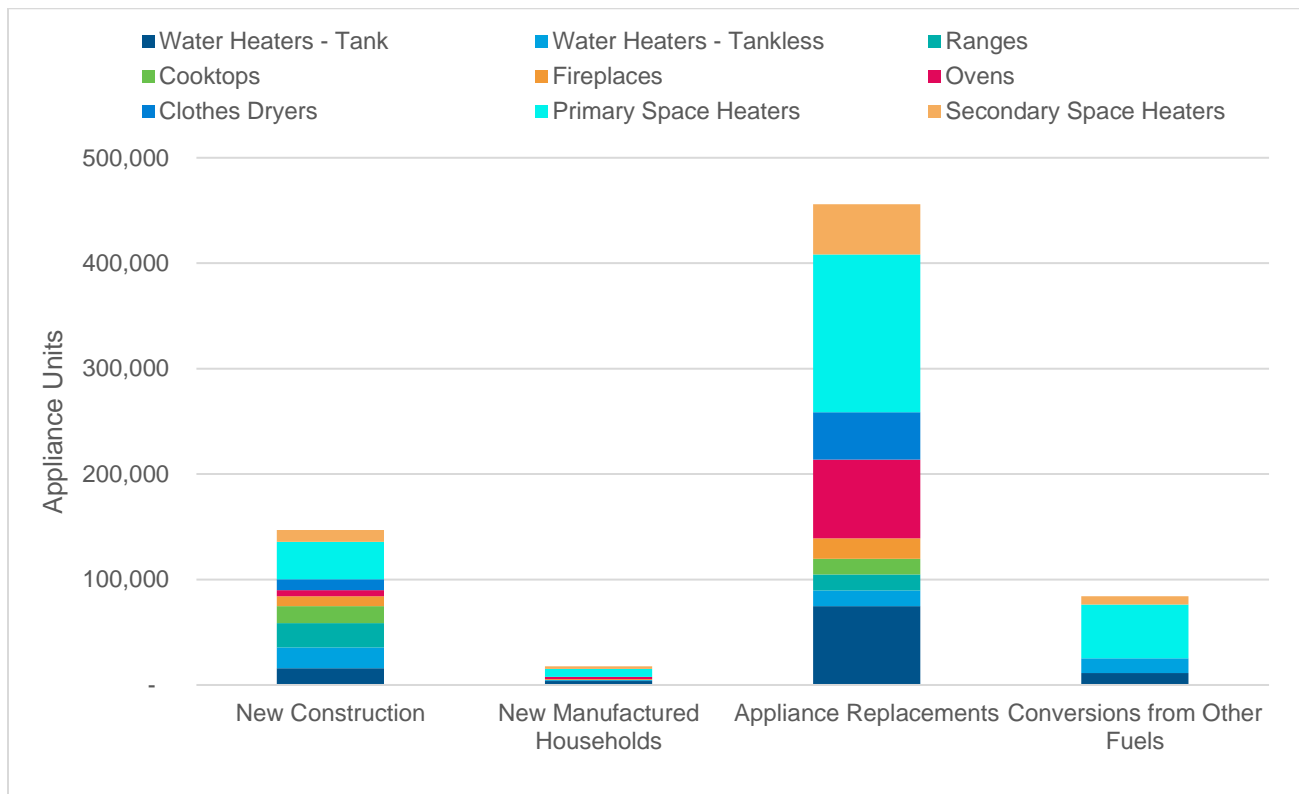
### Propane Appliance Installations by Market Installation Category

This analysis considered the major appliance purchases in the residential sector for space and water heating equipment, cooking ranges, and indoor fireplaces. To estimate the number of propane appliances purchased and installed each year, ICF looked at four separate residential housing market segments for new appliances.

The Figure 19 below shows the number of new appliance installations by the type of appliance and four different types of market installation.

In 2021, ICF estimates that there were nearly 704,900 propane appliance installations consisting of 147,000 appliances installed in newly built households; 455,800 replacement appliances in existing households; 17,800 appliances installed in new manufactured households; and 84,300 appliances in households that converted from another fuel to propane.

Figure 19. Residential Appliance Installations by Type and Construction Status



Source: ICF

These four market installations and the approach to estimate the appliance installations are provided below:

**New Household Construction:**

ICF used estimates of new construction by the primary space-heating fuel from the U.S. Census’ Survey of Construction (SOC).<sup>25</sup> This survey provides a detailed estimate of the physical characteristics of newly built households at the census division level for the country, including the types of major appliances installed and primary space-heating fuel choice. ICF then used state-level new residential construction permit data to estimate the number of newly built households within each state.

According to the Survey of Construction data, there were a total of 968,869 newly constructed households in 2021. Of these, 35,492 households used propane as the primary space-heating fuel.

The majority of these propane households were built in the Northeast and Midwest, totaling 13,284 and 11,620 respectively. There were 6,927 new propane-fueled households built in the Western U.S. and 3,661 built in the Southern U.S., where propane has the lowest share of primary space heating fuels used in new construction.

<sup>25</sup> <https://www.census.gov/construction/nrc/index.html>



### **New Manufactured Household Construction:**

In 2021, there were a total of 105,800 shipments of new manufactured households, a 12 percent increase from the prior year's totals.<sup>26</sup> Compared to site-built households, manufactured households have a significantly different suite of appliances included within the building as well as the sizing of these appliances.

ICF estimates that propane would be used as a primary space heating fuel in 7 percent of newly shipped manufactured households, or roughly twice the market share of propane used in site-built households. This estimate was based on the large share of shipments of manufactured households to rural areas with more limited access to natural gas distribution lines. Based on this assumption, ICF assumes that there were roughly 7,750 manufactured households that installed a propane primary space-heating system; 4,650 propane water heater systems; and 5,400 other propane appliances to total 17,800 total propane appliances installed (refer Figure 19).

### **Conversions from other Fuels to Propane:**

Propane serves as a primary space-heating fuel in largely rural areas that have more limited access to natural gas and where low-cost electric space heating is not readily available. In these areas, there are traditionally large numbers of households that have used fuel oil for primary space-heating purposes, as well as a more limited number of households that have used wood or other non-traditional fuels.

The conversion away from fuel oil-heated households to propane is the most common form of household fuel conversion. In 2021 there were a total of 5.4 million households that had used fuel oil for primary space heating, a decline of over 600,000 households over the last five years.

ICF estimates that in 2021, there were nearly 51,000 new propane-heated households that ICF estimates were added in 2021. These conversions occur in areas where there is a large residential fuel oil usage, such as the Northeast and Midwest.

### **Replacements of Propane Appliances in Existing Households:**

In 2021, there were roughly 5.9 million households that used propane as a primary space-heating fuel and another 5.4 million households that use propane for water heating or as a back-up space-heating fuel. ICF estimates that nearly 393,400 households have a propane appliance, which includes 299,250 propane appliance replacements. This figure indicates that roughly 5.02 percent of existing residential propane customers replaced an appliance in 2021.

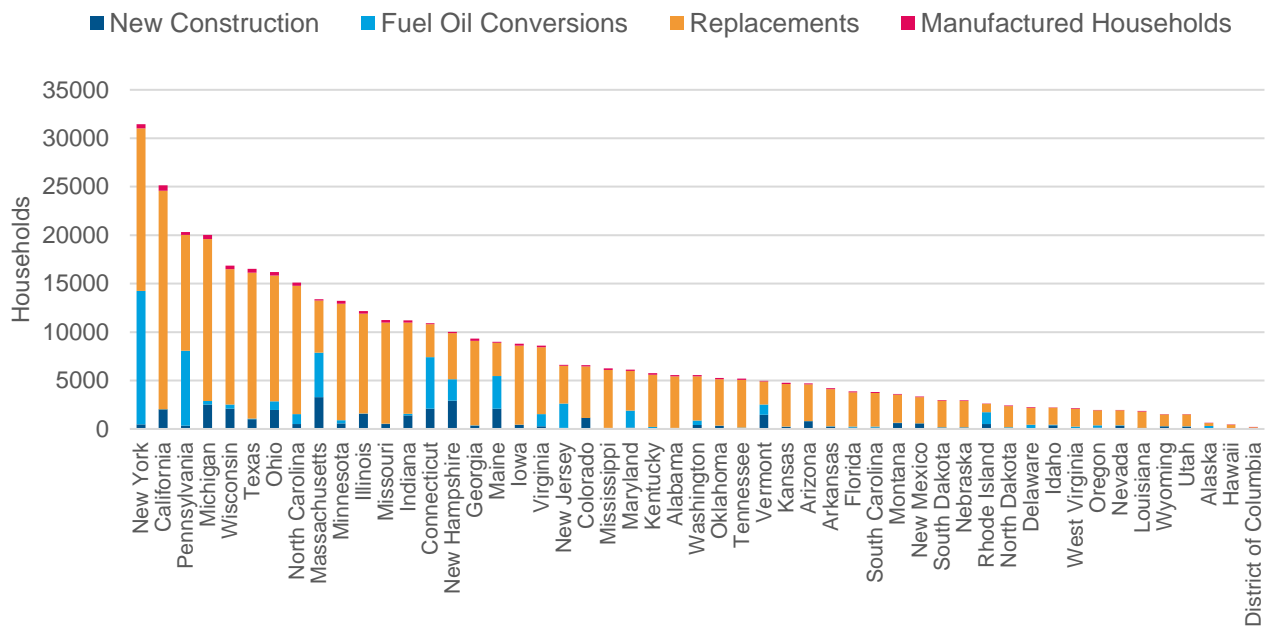
### **State-Level Households Appliance Installations**

In 2021, ICF estimates that a total of 393,400 new and existing households replaced nearly 704,900 propane appliances. The Figure 20 below shows the number of households in each of the four market installation categories by state. This figure does not include propane-fired BBQ grills.

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<sup>26</sup> <https://www.census.gov/data/tables/time-series/econ/mhs/shipments.html>

Figure 20. Number of Households with New Propane Appliances by State



Source: ICF

### Propane-Fired Home Barbeques

According to the EIA’s Residential Energy Consumption Survey from 2020, there are over 42 million homes that use propane for outdoor grilling activities. BBQ grills that use gaseous fuels<sup>27</sup> represented 75 percent of all outdoor grills used in the U.S., according to the Hearth, Patio & Barbeque Association<sup>28</sup>, which provides information on total ownership of BBQ grills and annual manufacturer shipments.

Based on estimated BBQ grill shipment data, ICF estimates that in 2021 there were nearly 8.1 million new propane-fired BBQ grills purchased by consumers. The cost of BBQ grills can range significantly, from small portable grills to custom-built outdoor installations. ICF has used an average cost of a propane BBQ grill from a standard two-burner BBQ grill available at home improvement stores to calculate the amount that consumers spent on propane BBQ grills, which totaled nearly \$1.61 billion.

## 4.3.2 Commercial Sector Propane Equipment Installations

### Commercial Propane Consumption

Odorized propane sales to the commercial sector accounted for 25 percent of the 2021 total retail propane sales, or roughly 2.3 billion gallons. In 2021, propane retailers sold these volumes to nearly 1.1 million commercial propane accounts across the country with an average sale of 2,161 gallons per account.

<sup>27</sup> Gaseous fuels include propane, butane, and natural gas.

<sup>28</sup> As per the Hearth, Patio & Barbecue Association data from April 1, 2021.

As per the 2018 commercial buildings energy consumption (CBECS) survey conducted by EIA, the commercial sector accounts for the second-largest number of buildings in 2018, behind residential, with a 96.4 million square feet of commercial floor space, an increase from the 87.1 million square feet in 2012.<sup>29</sup>

### Commercial Appliance Installations by Market Installation Category

ICF estimates that a total of 41,800 major propane appliances were installed in commercial buildings in 2021 either as a new installation or as a replacement, including 16,400 space heaters, 16,200 commercial water heaters, and over 9,200 propane-fired food preparation or cooking systems. These installations represent over \$433.3 million in direct consumer spending for propane applications in commercial buildings.

ICF's estimate on the number of commercial appliance installations is based on analysis of commercial building types, energy consumption, and appliance information from the EIA Commercial Building Energy Survey for 2018, which is the most recent data available from the survey results of September 2022. This survey is conducted periodically and includes detailed information and estimates for the entire commercial sectors, including new commercial construction, major appliance replacements, and key trends in energy and fuel usage.<sup>30</sup>

According to the CBECS data in 2018, there were approximately 5.9 million existing commercial buildings, representing roughly 96 billion square feet of floor space. Similar to the residential sector, propane usage in the commercial sector is significantly more limited than electricity and natural gas use. There are 676,000 existing buildings using propane as an energy source accounting for 11 percent of the total floor space. However, when looking at propane businesses that use propane for space heating, the share of commercial businesses decreased by 4.4 percent between 2012 and 2018. There were 45,000 propane buildings constructed between 2010-2018.

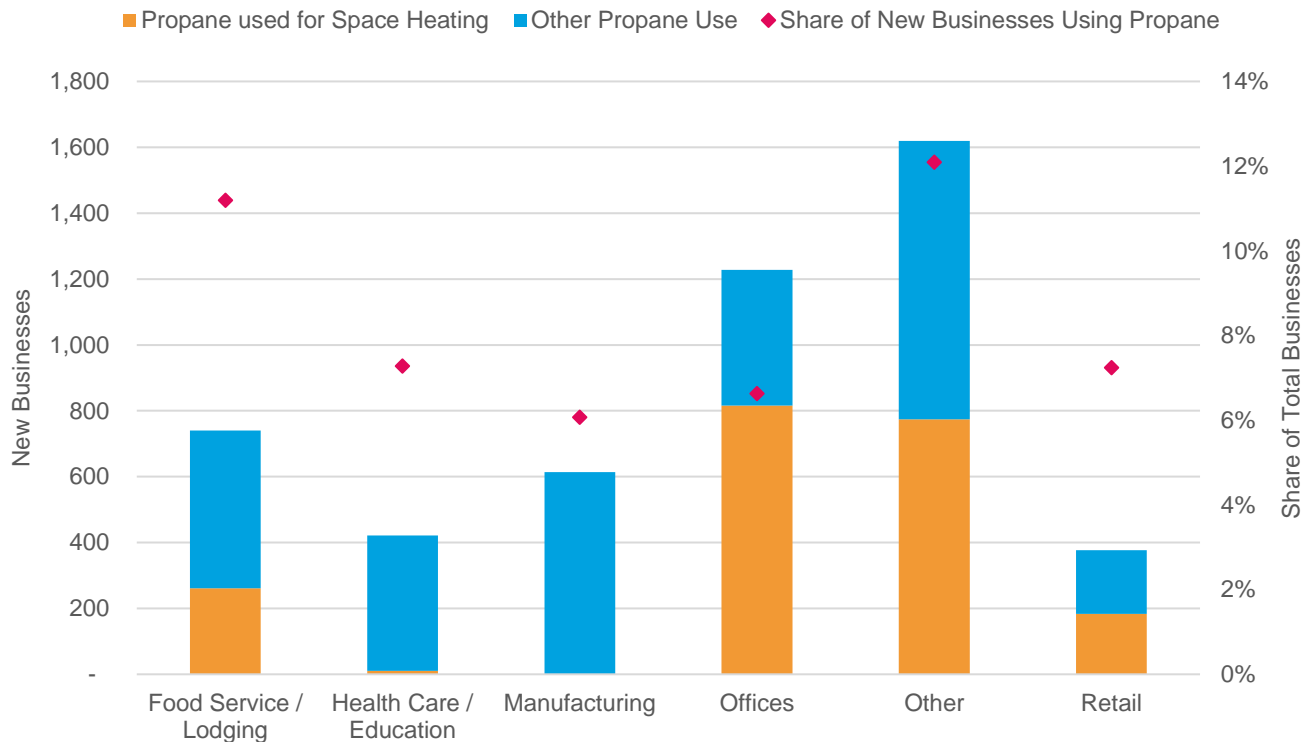
Figure 21 shows the new businesses that reported using propane in 2018. There are two types of propane use. One category for businesses that use propane for space heating and other end uses. The other category includes businesses that use propane for any other end use except space heating. These breakouts are shown by the major industry type to provide estimates on the different types of major appliances required as part of the business.

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<sup>29</sup> <https://www.eia.gov/consumption/commercial/>

<sup>30</sup> <https://www.eia.gov/consumption/commercial/> - Information from the surveys conducted in 2018 and 2012 has been used in this analysis. The 2018 survey data was released in September 2022.

Figure 21. New Commercial Businesses that Use Propane by Industry Type (2018)



Source: ICF, EIA CBECS 2018

### 4.3.3 Propane Internal Combustion Engines

The economic impact of new propane engines is estimated to be \$1.2 billion, including \$393 million in direct engine purchases by consumers. Included in this economic impact are forklift engines, irrigation engines, commercial lawn mower engines, and vehicle engines for Light Duty Vehicles (LDV), Medium Duty Vehicles (MDV), and school buses.

In 2021, the World LPG Association estimated that there were nearly 28.3 million propane-fueled vehicles globally and that propane was the third-most widely used transportation fuel.<sup>31</sup> In the U.S., nearly 60,000 vehicles used propane as fuel in 2021 as per the Propane Education and Research Council (PERC).<sup>32</sup>

To support this fleet of propane autogas vehicles, there is a large network of public and private propane fueling stations. The U.S. Department of Energy’s Alternative Fuels Data Center (AFDC) provides a listing of the public alternative fueling locations.<sup>33</sup> However, a large number of propane autogas vehicles are part of private fleet operations that are not reported in this public directory. ICF

<sup>31</sup> [Autogas Incentive Policies 2022 \(fliphtml5.com\)](https://online.fliphtml5.com/addge/osco/#p=138) ; <https://online.fliphtml5.com/addge/osco/#p=138>

<sup>32</sup> This estimate includes light duty vehicles using propane, or LPG, fuels, school buses, and other medium duty vehicles used in various fleet operations. This estimate does not include forklifts or other off-road propane-fueled vehicles.

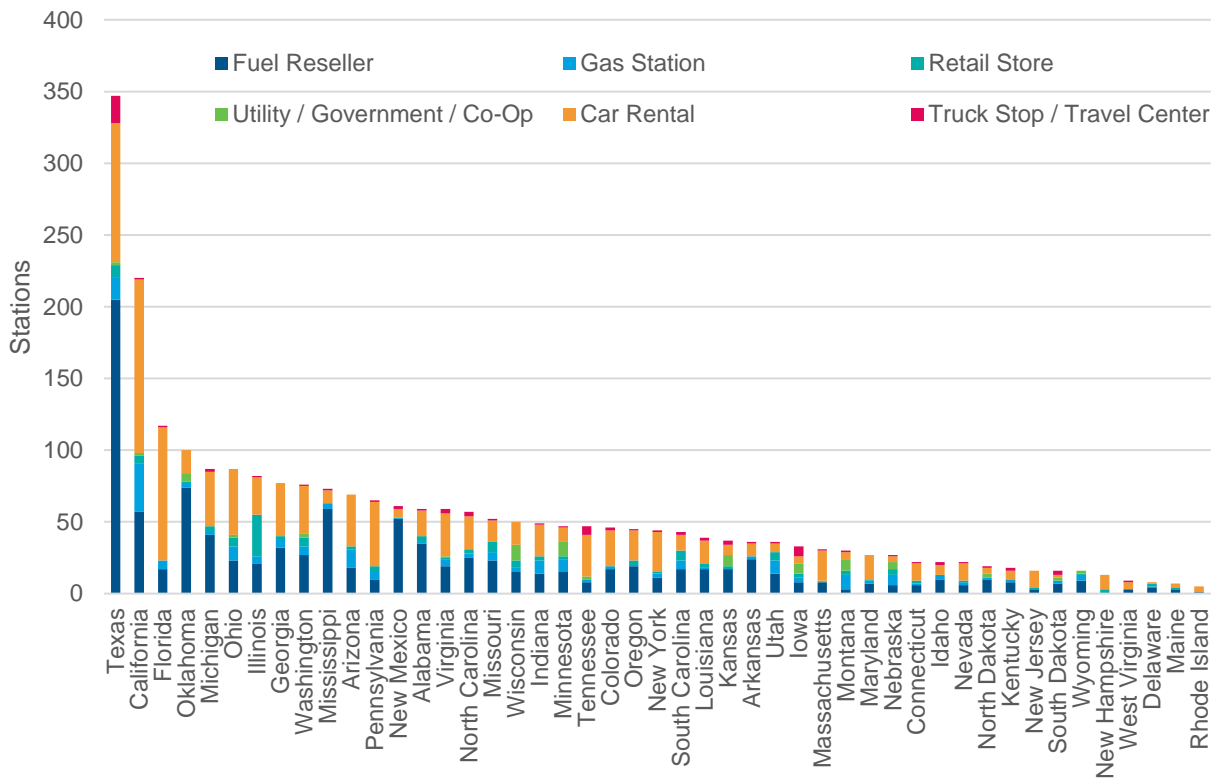
<sup>33</sup> The AFDC provides statistics and information on alternative fuel use across the U.S., including biodiesel, electricity, natural gas, hydrogen, ethanol, and propane - <https://afdc.energy.gov/>

estimates that private propane fueling facilities account for 50 percent of the total number of propane fueling stations.

Based on an analysis of the number of new public propane fueling stations that began operation, ICF estimates that there were no new propane fueling stations added in 2021 as the spread of the pandemic curbed travel and limited growth in existing infrastructure. Costs of new propane fueling stations will depend on a variety of factors, such as location, size of facility, if the facility is stand-alone or shared infrastructure, and type of fleet that is being serviced. Compared to a traditional gasoline fueling station, propane fueling stations require significantly less upfront capital. PERC estimates a range for new propane fueling stations between \$15,000 and \$225,000.<sup>34</sup>

The addition of these facilities brought the total number of propane fueling stations online in the U.S. to 2,553. Texas and California have the most stations, with 347 and 220, representing 22 percent of the nation’s propane fueling stations. The number of stations and type of facility are shown by state in the Figure 22 below.

Figure 22. Number of Public Propane Fueling Stations by State



Source: U.S. Department of Energy, Alternative Fuels Data Center

<sup>34</sup> [https://propane.com/for-my-business/fleet-vehicles/propane-autogas-refueling-options/#/find/nearest?fuel=LPG&lpg\\_secondary=true&country=US](https://propane.com/for-my-business/fleet-vehicles/propane-autogas-refueling-options/#/find/nearest?fuel=LPG&lpg_secondary=true&country=US)

## Propane-Fueled School Buses

School buses are a key part of the fabric of daily life for millions of school children across the U.S. In 2021, there were an estimated 490,000 school buses across the country that transported over 21 million students to school daily.<sup>35</sup> PERC estimates around 19,470 propane-fueled school buses which transport close to 1 million students to school daily.

Traditionally, these vehicles have been powered by diesel or gasoline. However, in recent years alternative-fueled vehicle options have become more common, led in large part by an increase in the number of new propane-fueled school buses.

There are two major manufacturers of propane-fueled buses : Blue Bird and IC Bus

- **Blue Bird** is the largest manufacturer of propane-fueled school buses, with over 18,000 buses built.<sup>36</sup> Blue Bird is headquartered in Georgia where the company manufactured nearly 15,500 school buses in 2020 and 2021. The company has over 50 dedicated dealers across the country, selling propane-fueled school buses as well as other engine configurations.
- **IC Bus** is a subsidiary of Navistar International and manufactures school and commercial buses in North American. The company's operations are centered in Oklahoma and Arkansas, and it has over 700 distribution locations across North American through its parent company. The company began manufacturing propane-fueled school buses in 2015 and is one of several types of alternative fueled vehicles on offer.

In 2021, there were a total of 26,653 school buses sold in the U.S., down 33 percent compared to 2018. ICF estimates that there were roughly 4,000 new propane-fueled vehicles built and sold during 2021, bringing the total number of active propane school buses to roughly 19,500. Industry outlook indicated new school bus sales going down for the year of 2021 compared to 2020 as the schools remained shut amid increasing Covid cases in 2020. As several states adopt alternative fuels to reduce their carbon footprint, there is an increase in the purchases of propane vehicles between 2018 and 2021.

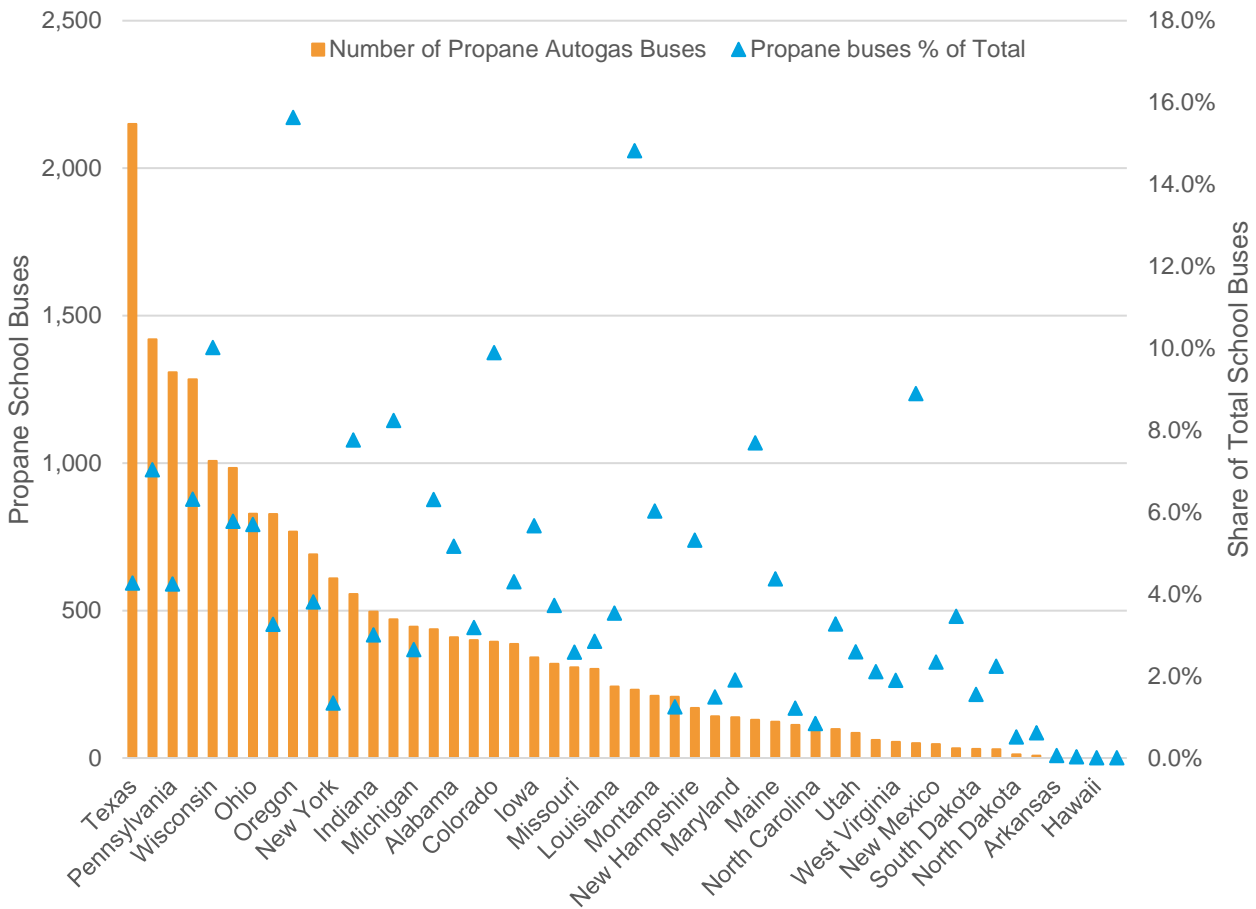
Figure 23 shows the estimated number of operating propane-fueled school buses and the share that those vehicles represent of the state's total school bus fleet. Texas has over 2,100 propane-fueled school buses that account for roughly 4.3 percent of the state's total school bus fleet. Georgia, Pennsylvania, California, Wisconsin, and Minnesota are the states with next largest propane-fueled fleets in the U.S. These top five states have a total of more than 7,100 propane vehicles and 37 percent of the total propane school buses in the U.S.

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<sup>35</sup> SCHOOL TRANSPORTATION: 2021-22 SCHOOL YEAR;  
<https://www.schoolbusfleet.com/download?id=10188282&dl=1>

<sup>36</sup> <https://www.blue-bird.com/alternative-fuels>

Figure 23. Number of Propane-fueled School Buses and Share of Total School Bus Fleet by State



Source: Propane Education & Research Council, School Bus Fleet, ICF

### Propane-Fueled Forklifts

Forklifts are used in a variety of commercial and industrial settings, both indoors and outdoors, to transport heavy materials. It is estimated that there are over 850,000 forklifts active across the country. ICF estimates that there were roughly 500,000 propane-fueled forklifts operating in the U.S. which consumed nearly 480 million gallons of odorized propane in 2021.

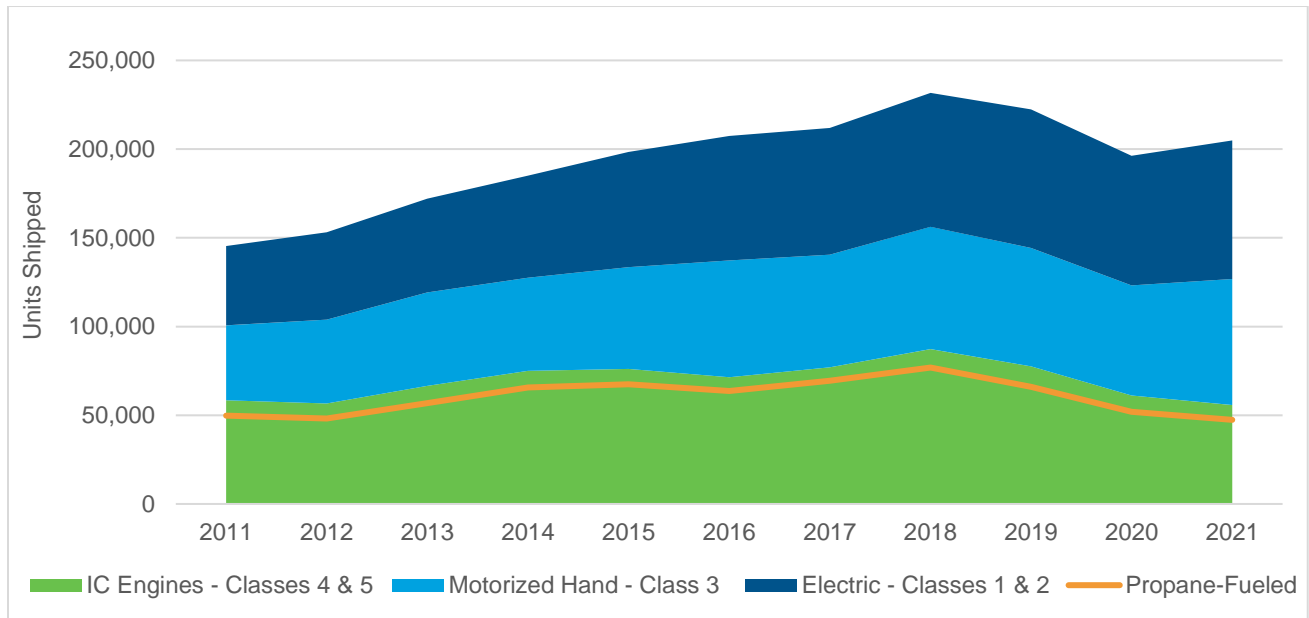
Propane-fueled forklifts are a key leading support of warehousing activity and are separated into five separate classes. Class 1 & Class 2 forklifts are powered by electric engines and are a key competitor to propane-powered engines. Class 4 & Class 5 forklifts are categorized as using an internal combustion engine. Within this class of forklifts propane has a market share above 85 percent, followed by diesel-powered units, and a minimal number of forklifts using gasoline.

In 2021, there were approximately 205,000 total forklifts shipped as per the Industrial Truck association data.<sup>37</sup> Electric Class 1 & 2 engines accounted for roughly 38 percent of these

<sup>37</sup> [Market Intelligence - Industrial Truck Association - Industrial Truck Association \(indtrk.org\)](https://www.indtrk.org/)

shipments, Motorized Hand - Class 3 accounted for 35 percent of the shipments and IC Engines - Classes 4 & 5 formed 27 percent of the total forklift shipments. ICF estimates that shipments of propane-powered forklifts are roughly 85 percent of the internal combustion engines or 23 percent of total shipments, or roughly 48,000 new propane-fueled forklifts shipped. Figure 24 shows the number of new forklift shipments over the last decade by the type of forklift class and the estimated number of propane-powered forklifts.

Figure 24. New U.S. Forklift Shipments by Class

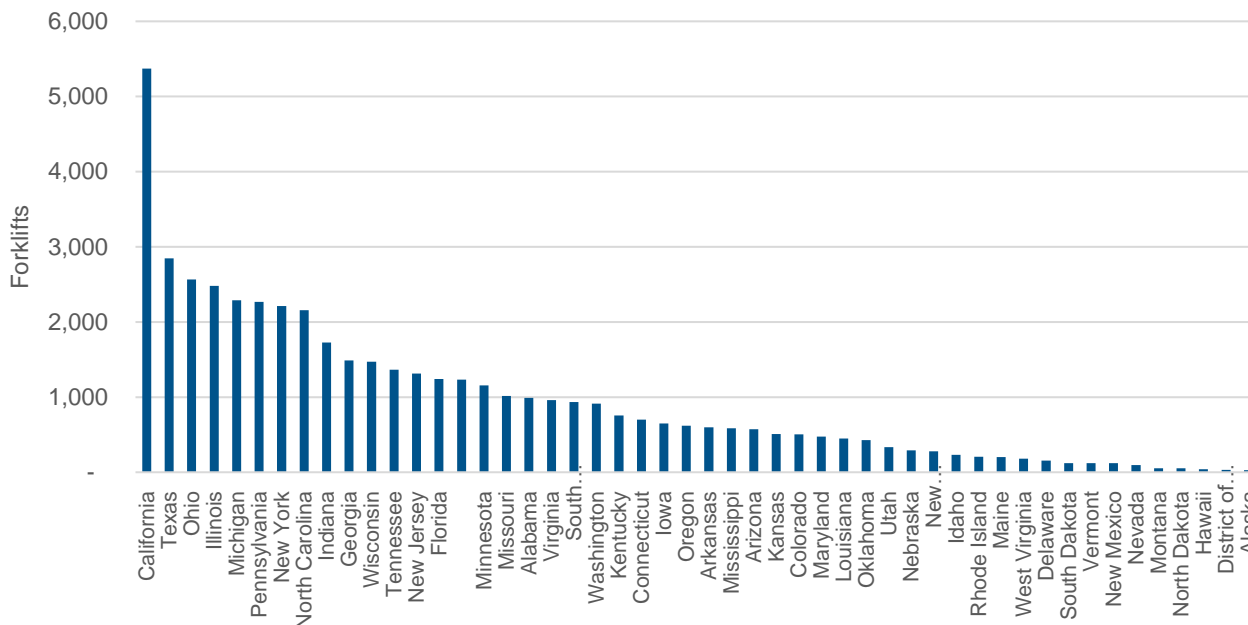


Source: ICF, Industrial Truck Association

The Figure 25 below shows the state-level shipments of propane forklifts. These state-level estimates show where the propane forklifts were delivered and do not represent the location where the propane engines, or full forklifts, are manufactured, assembled, and sold.



Figure 25. Number of 2021 Propane Forklift Shipments by State



Source: ICF, Industrial Truck Association

### Agricultural Irrigation Engines

According to the U.S. Department of Agriculture’s 2018 Irrigation and Water Management Survey, there were 600,500 irrigation pumps on more than 160,000 farms.<sup>38</sup> The primary purpose of these pumps is to bring water from wells to the surrounding land. A majority of these irrigation pumps run on electricity, particularly when there is ready access to electric lines. Natural gas and diesel are also used as fuel sources for irrigation pumps.

The 2018 survey indicates that there were 443,694 pumps powered by electricity; 102,865 pumps powered by diesel; 29,041 pumps powered by natural gas; 11,176 propane-powered irrigation pumps; and a smaller number of pumps powered by gasoline, solar, or other fuels.<sup>39</sup>

In recent years propane has made significant in-roads as a portable fuel that can be used to power agricultural engines that support farmers in providing irrigation water for their crops. These engines have been displacing traditional diesel-powered units due to competitive costs, stricter local emissions, and the relative ease in fueling given little to no infrastructure is required to support these engines.

### Commercial Mowers Engines

Propane has a distinct advantage as a portable fuel for commercial mowing due to a cleaner particulate emissions profile than diesel and gasoline fuels, and reliability and range compared to

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[https://www.nass.usda.gov/Publications/AgCensus/2017/Online\\_Resources/Farm\\_and\\_Ranch\\_Irrigation\\_Survey/fris.pdf](https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/Farm_and_Ranch_Irrigation_Survey/fris.pdf)

<sup>39</sup> The USDA’s 2013 Farm and Ranch Irrigation Survey reported there were 13,444 irrigation pumps were powered by propane, up slightly from the 12,203 propane powered pumps in 2008.

electric engines. In recent years, PERC has developed multiple programs to support increased penetration of propane engine use in this sub-sector.<sup>40</sup>

Based on available market data, large commercial mowers can cost the equivalent of a small car, the cost of a propane engine typically ranges between \$2,000 and \$3,000.

#### **4.3.4 Other Agricultural Products**

Odorized propane sales to the agricultural sector accounted for 10 percent of the 2021 total retail propane sales, or roughly 942 million gallons.

Most of the propane used in the agricultural sector is used by farmers to dry grain harvests. However, there are a wide variety of other uses of propane across America's agricultural sector, including radiant heating systems for hog and chicken farms, heating of the greenhouses and propane-fueled torches used for weed control. Propane use for irrigation engines is detailed in a prior section.

There are limited public sources of information for the purchase of propane equipment and appliances in the agricultural sector. ICF's estimate for the economic impact for manufacturing of new equipment is based on estimates from PERC on the penetration of newly developed propane appliances.

The economic impact of new propane-fueled agricultural equipment, excluding irrigation engines, is estimated to be \$50.4 million, including \$17.3 million in direct equipment purchases by consumers.

#### **4.3.5 Industrial Sector**

Odorized propane sales to the Industrial (non-Forklift) sector accounted for 2.7 percent of the 2021 total retail propane sales, or roughly 257 million gallons. The average size of an industrial customer account was 2,000 gallons in 2021, five times the size of a residential account for propane retailers.

There is a lack of available public information on the industrial sector's fuel consumption at a detailed enough level to estimate the number of new appliances or engine installations. The use of propane in the industrial sector can vary dramatically depending on the type of industry and availability of competing fuels or feed stocks.

Given this heterogeneous nature of propane use in industrial applications, ICF is not able to conduct an assessment of all new propane engines and appliances purchased or installed in 2021.

The economic impact of new propane-fueled industrial equipment is limited to on-site generators that can be used to produce electricity which in turn enables heating systems to run when the electric grid fails. They act as a portable power source. ICF estimates that there were a roughly 1,100 new industrial generators purchased domestically in 2021, representing a total economic contribution of \$60.3 million for the year.

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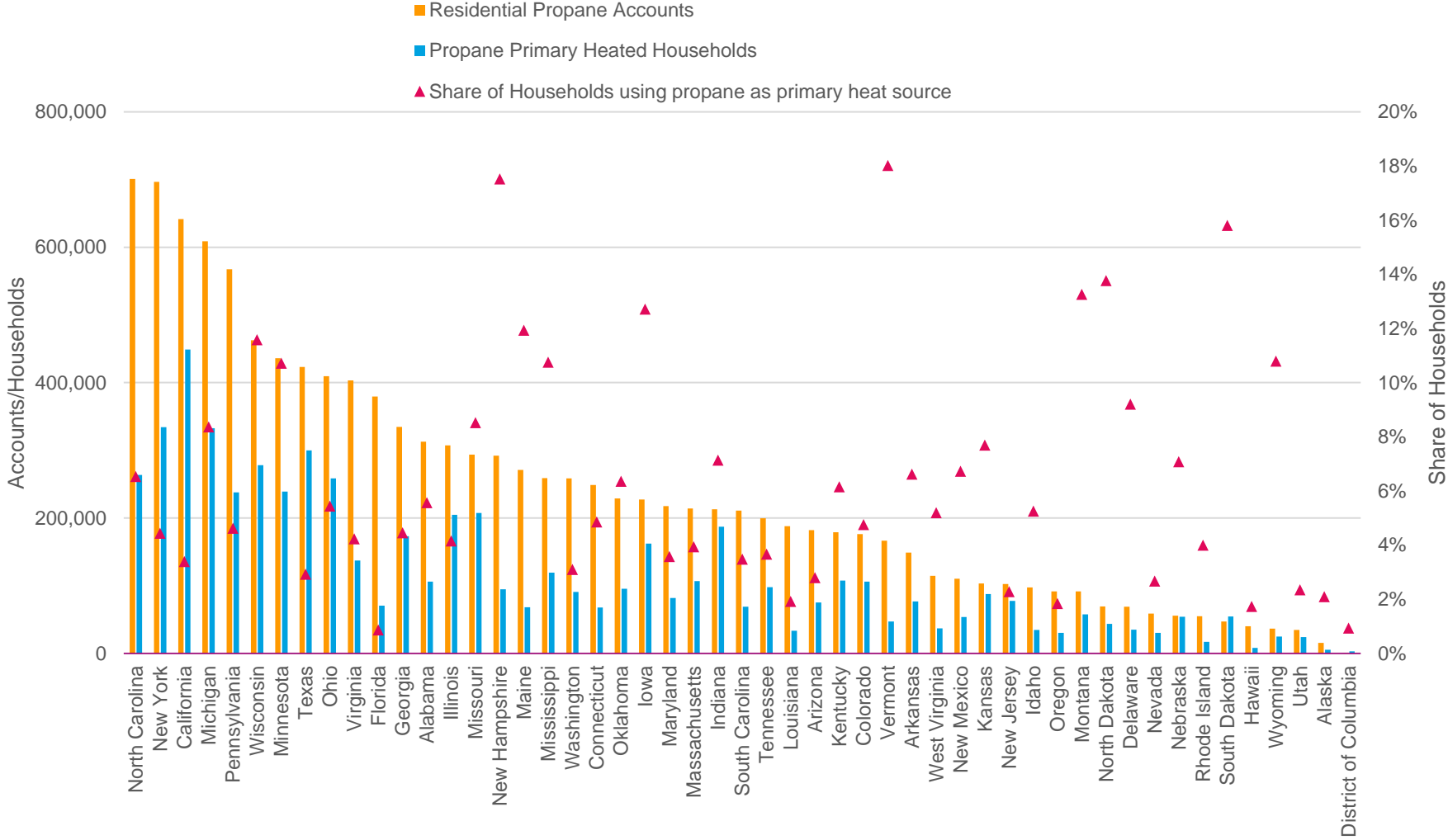
<sup>40</sup> <https://propane.com/propane-products/commercial-mowers/>

## 5. National Overview by State

The graphs on the following pages present a ranking of each state for each of the metrics outlined. These graphs represent key indicators of the economic and employment impacts from the propane, retail propane, and entire NGL value chain. The title of each map refers to the information being presented and includes the propane-heated households, employment, wage, and the economic impacts.

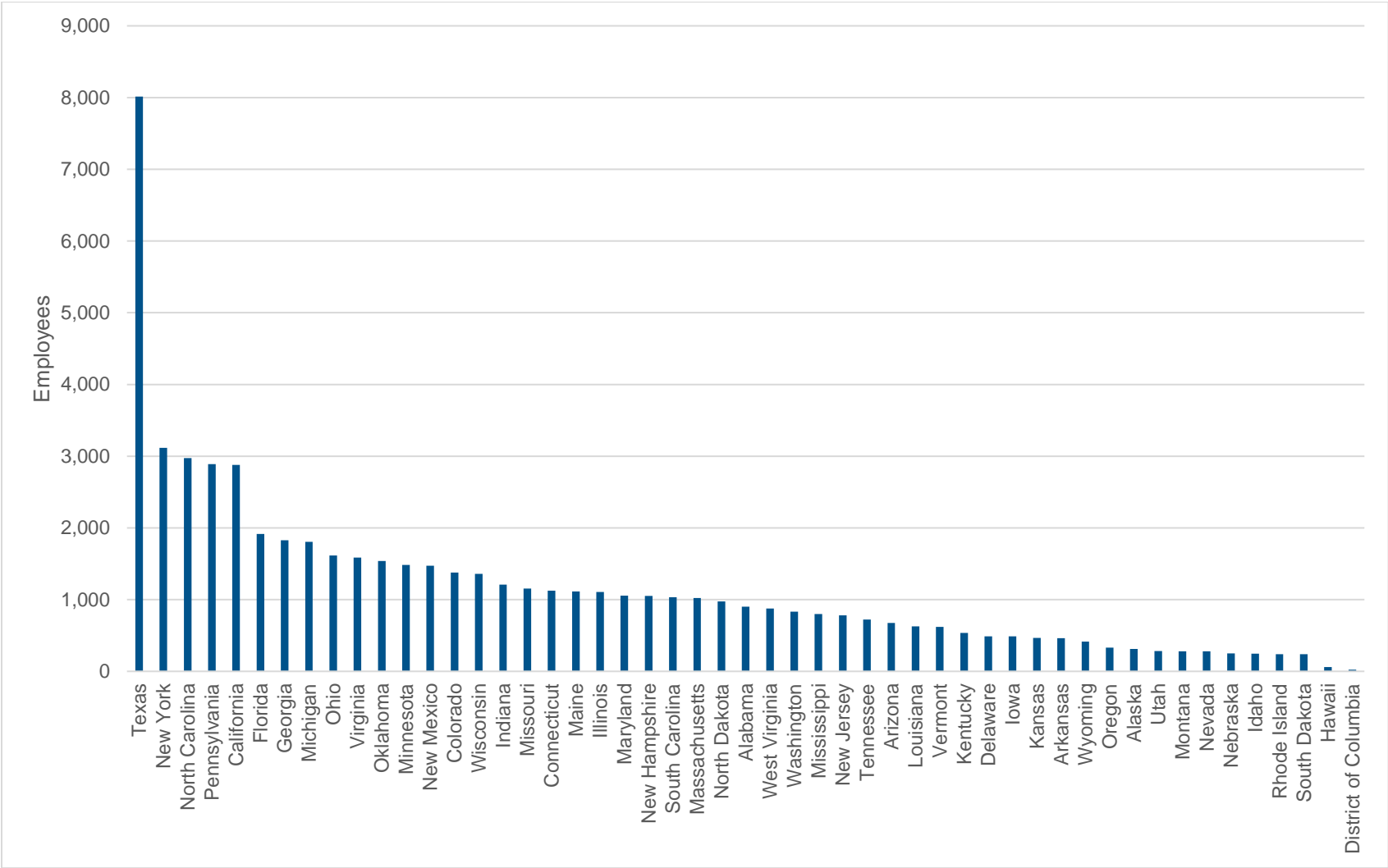
### 5.1. Residential Propane Accounts and Primary Heated Households by State

Figure 26. Residential Propane Accounts and Primary Heated Households by State and Share of households using propane as primary heat source



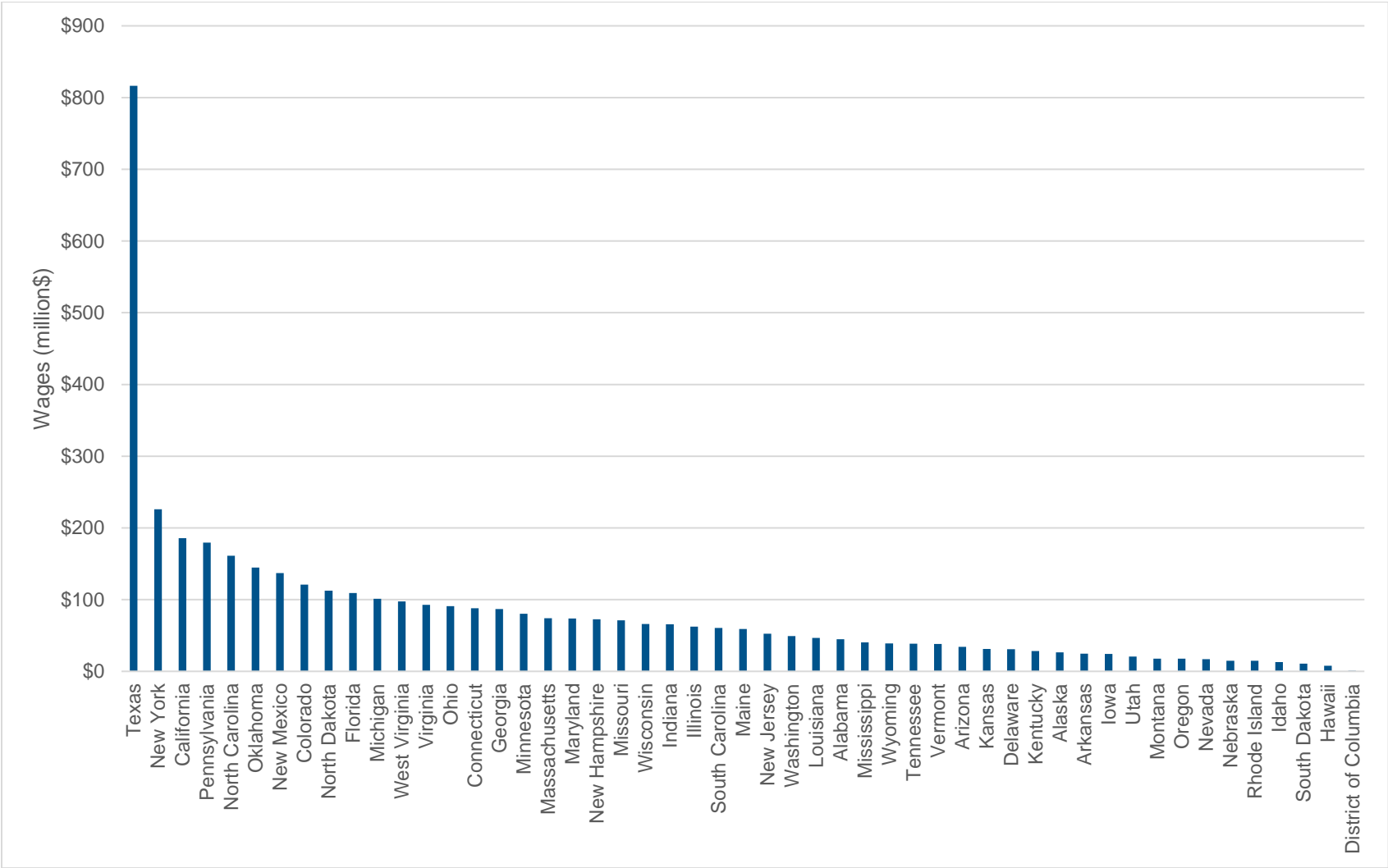
## 5.2. Retail Propane Employment by State

Figure 27. Retail Propane Employment by State (Section 3)



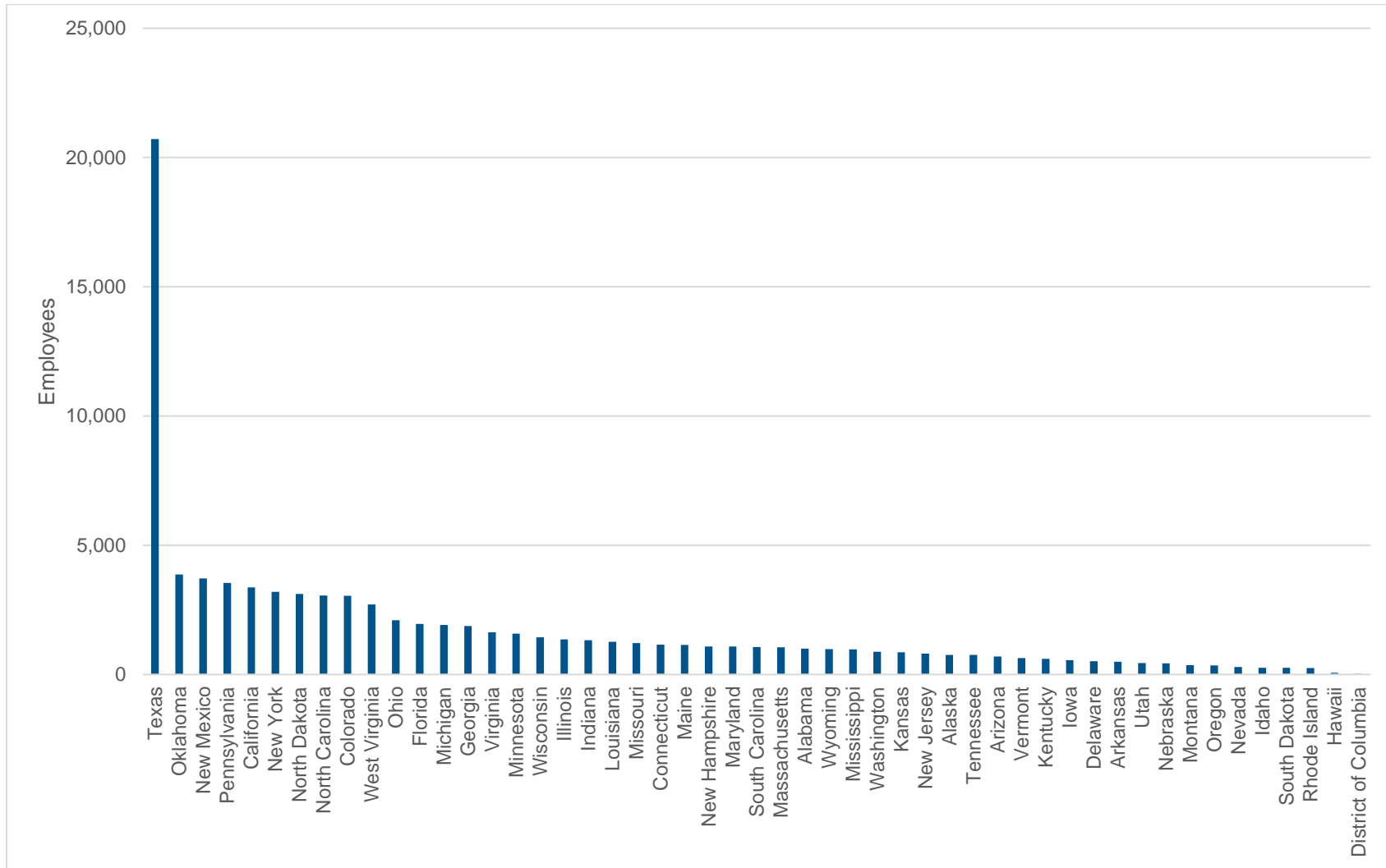
### 5.3. Retail Propane Wages (Million Dollars) by State

Figure 28. Retail Propane Wages (Million dollars) by State (Section 3)



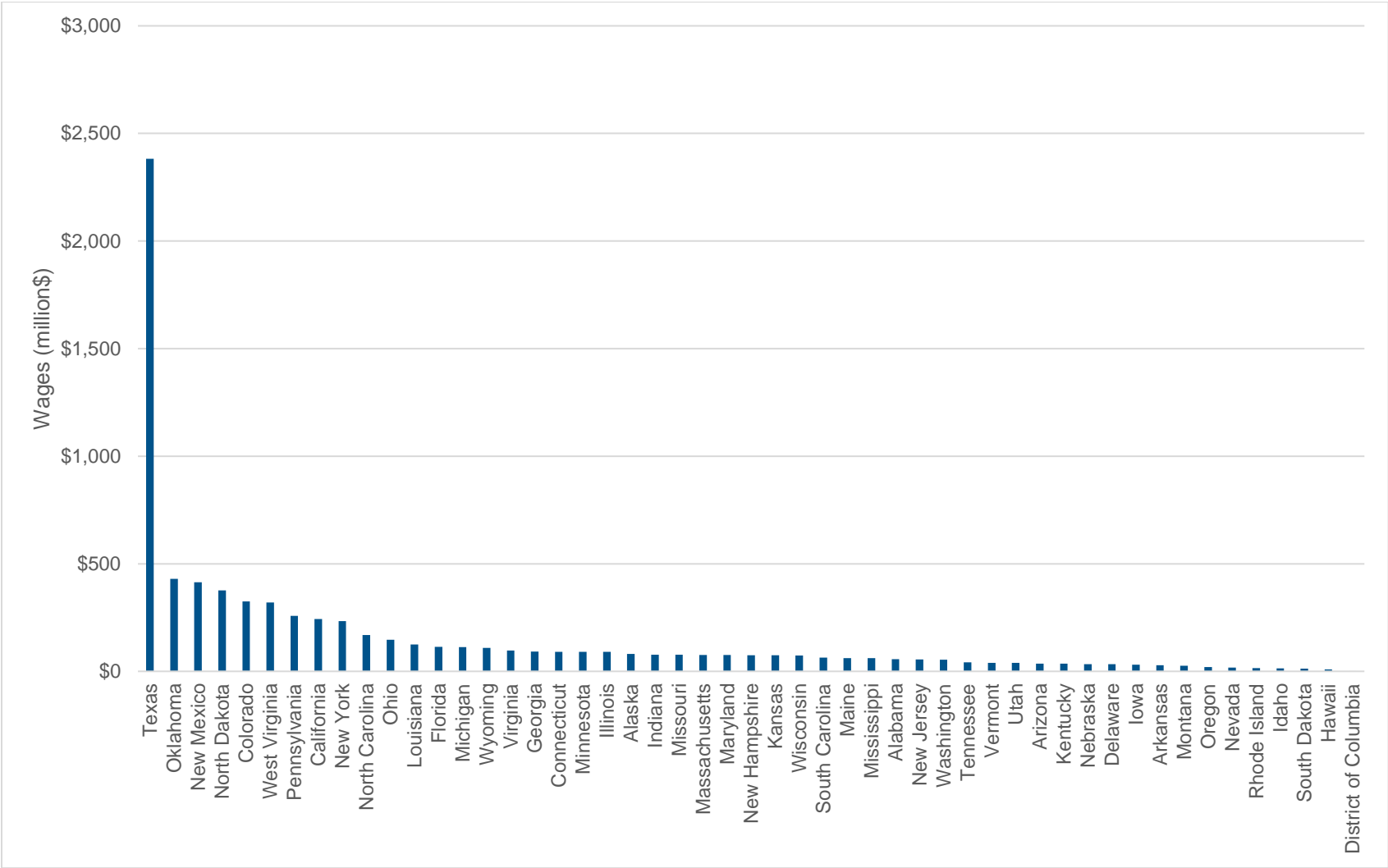
## 5.4. Total Propane Employment by State

Figure 29. Total Propane Employment by State (Section 3)



### 5.5. Total Propane Wages (Million dollars) by State

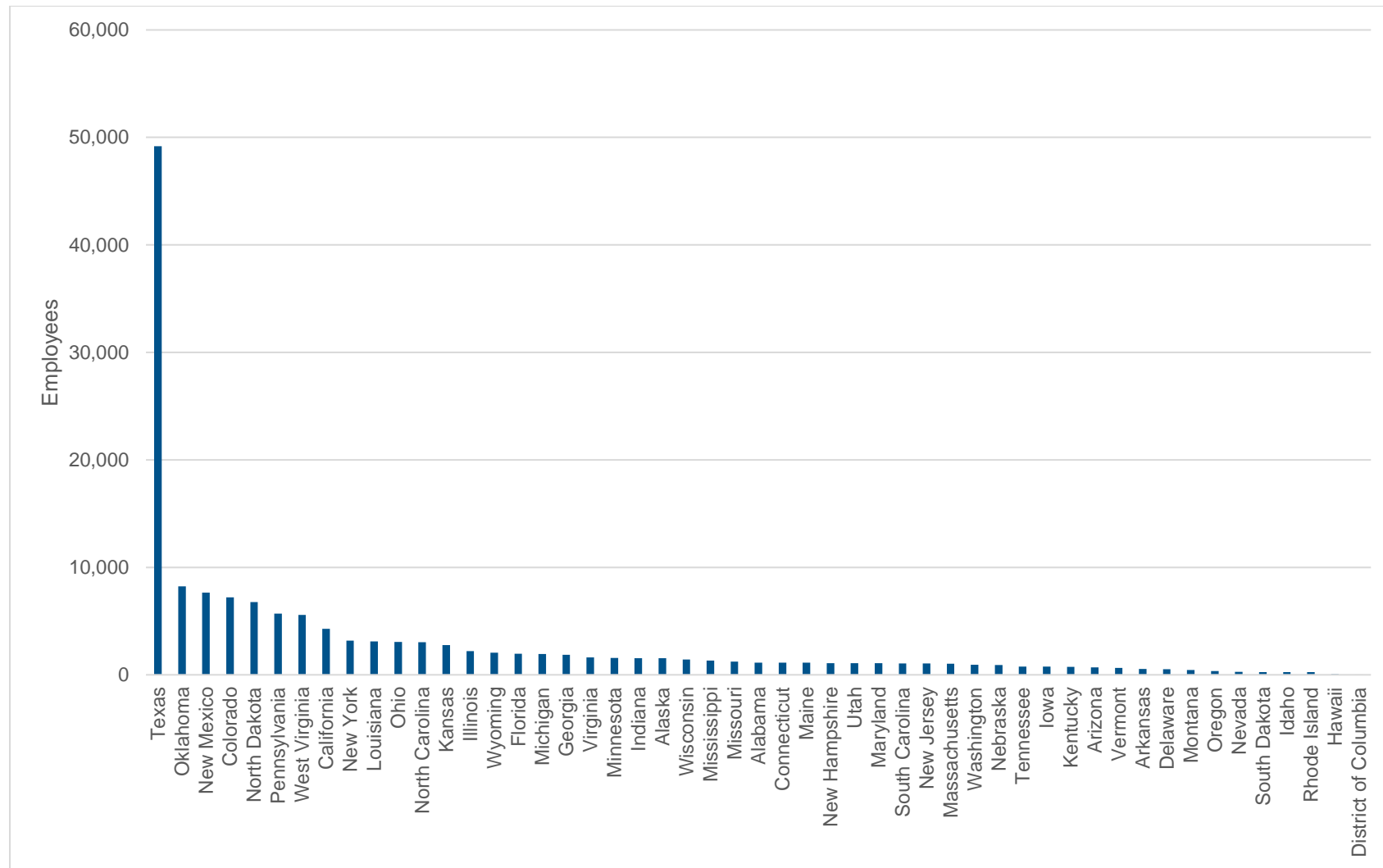
Figure 30. Total Propane Wages (Million dollars) by State (Section 3)





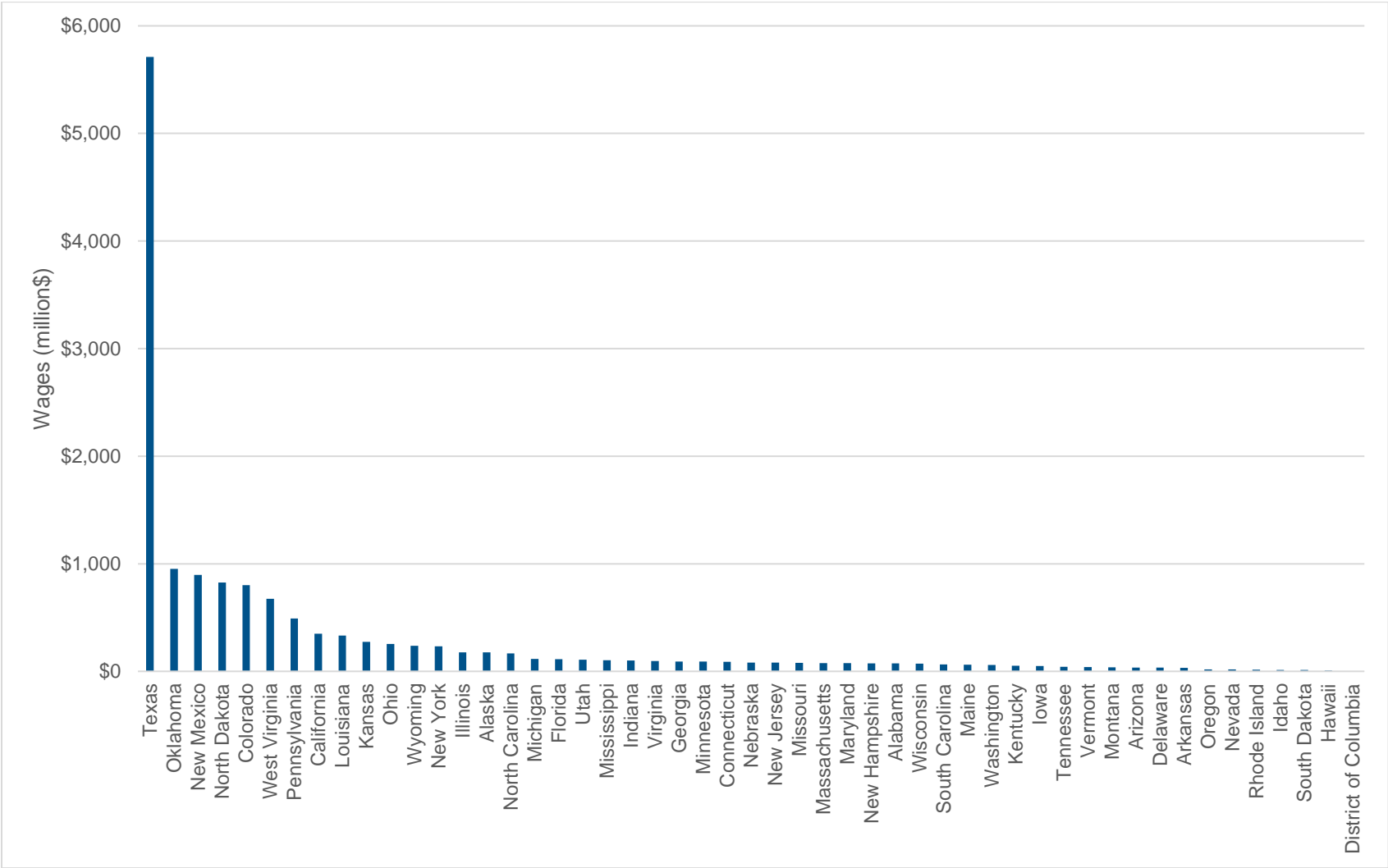
## 5.6. Total Employment from Natural Gas Liquids and Propane by State

Figure 31. Total Employment from Natural Gas Liquids and Propane by State (Section 3)



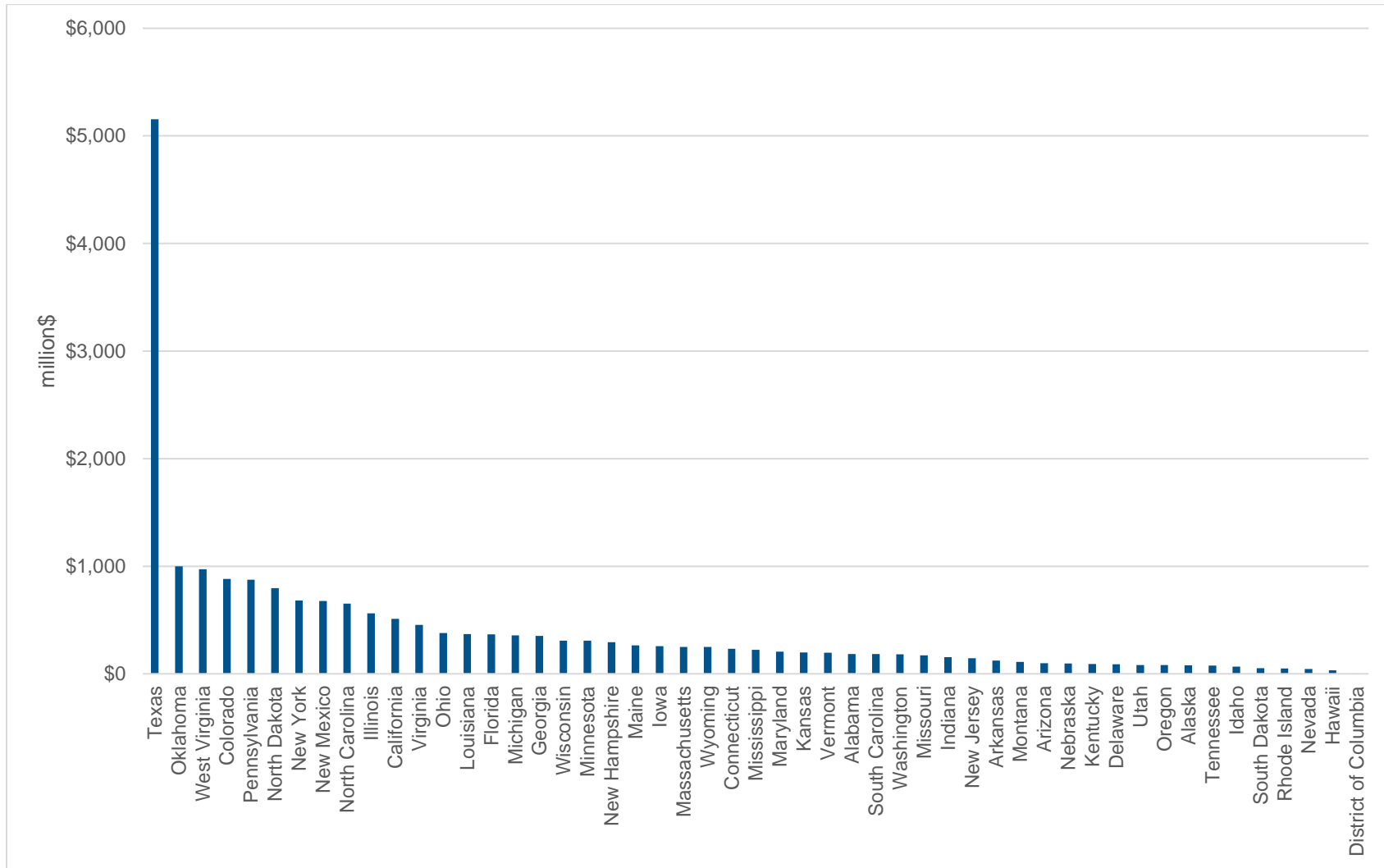
### 5.7. Total Wages (Million Dollars) from Natural Gas Liquids and Propane by State

Figure 32. Total Wages (Million Dollars) from Natural Gas Liquids and Propane by State (Section 3)



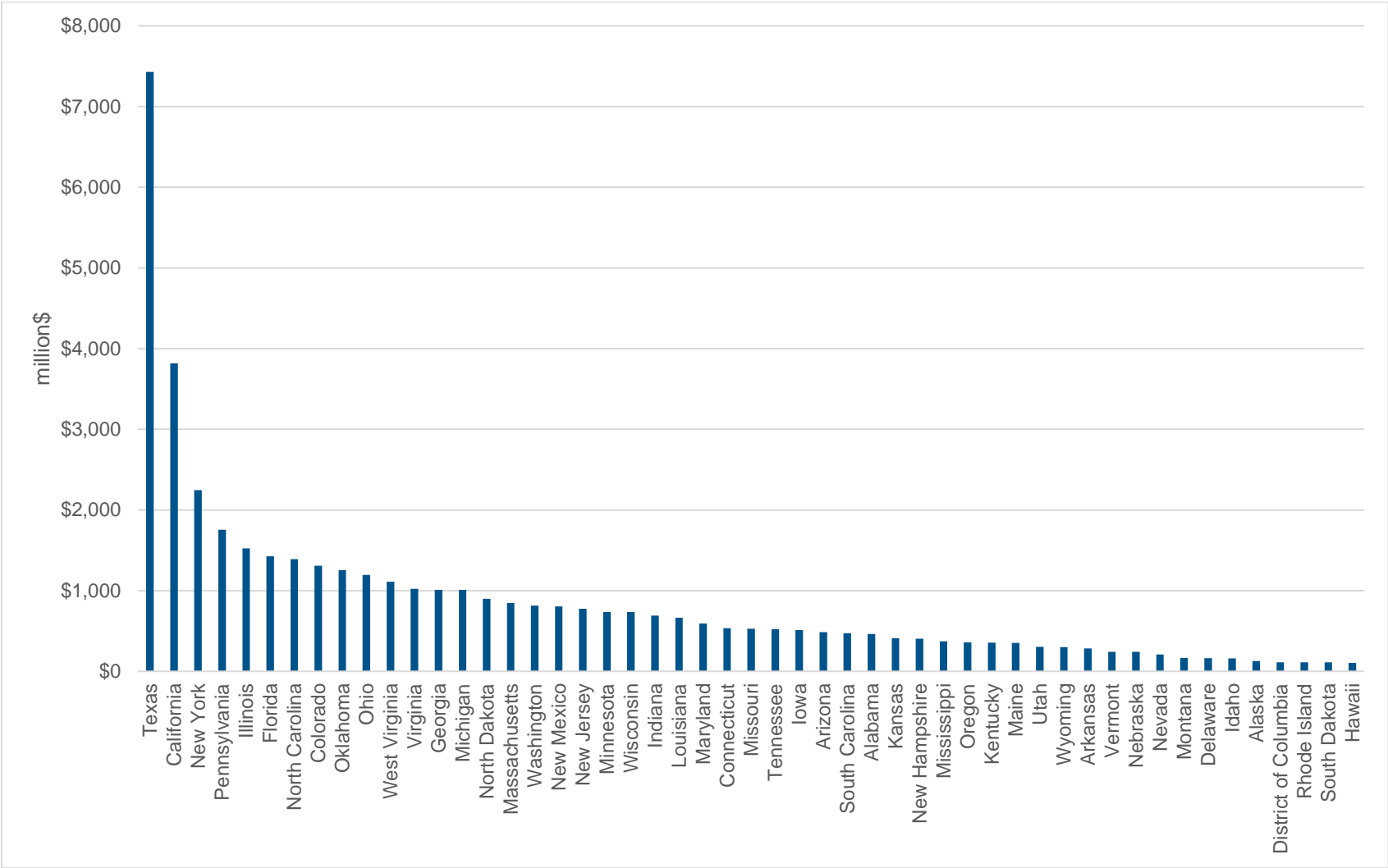
## 5.8. Direct Added Value from Odorized (Retail) Propane by State

Figure 33. Direct Added Value from Odorized (Retail) Propane by State (Section 4)



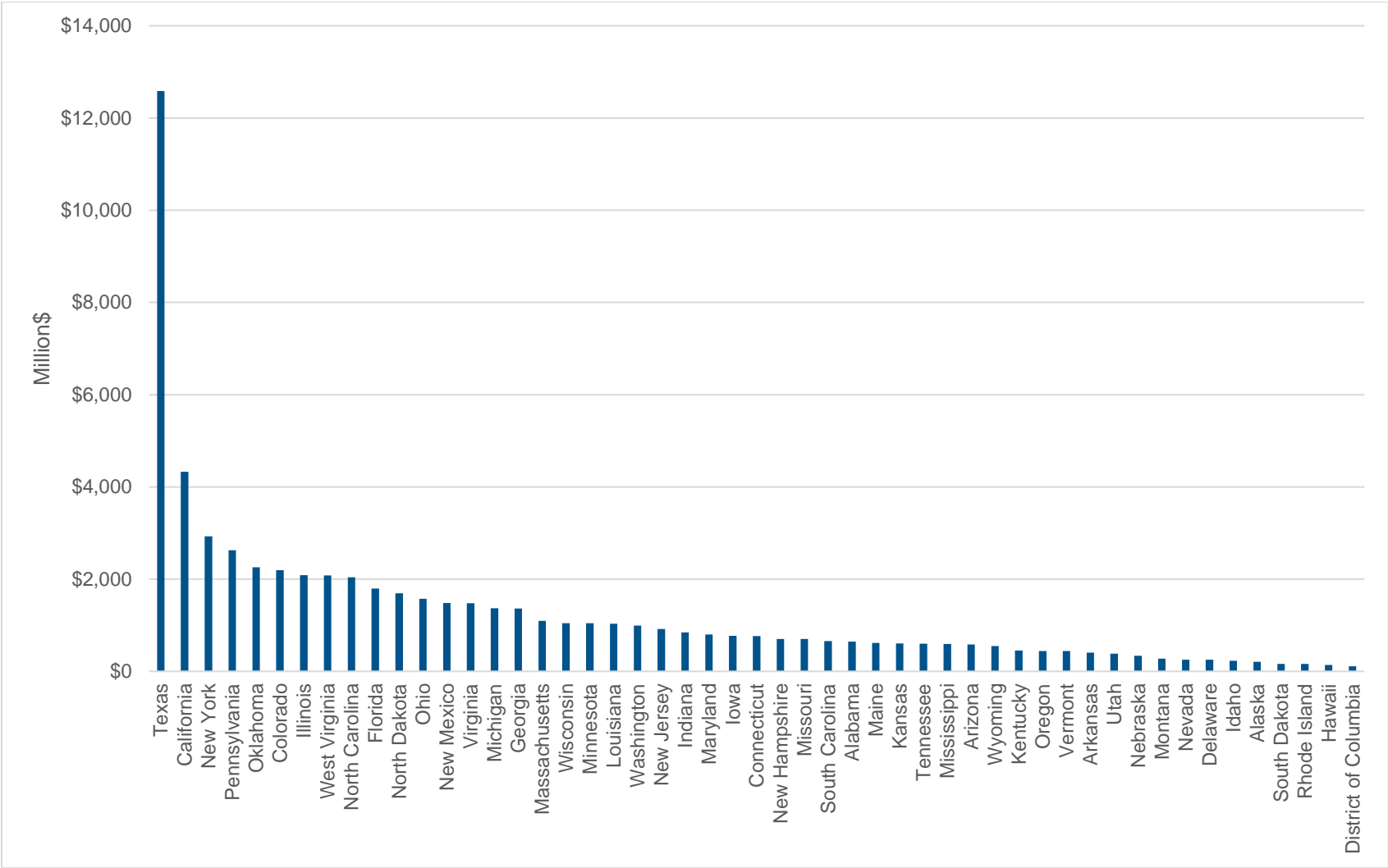
### 5.9. Indirect and Induced Added Value (Million Dollars) from Retail Propane by State

Figure 34. Indirect and Induced Added Value (Million Dollars) from Retail Propane by State (Section 4)



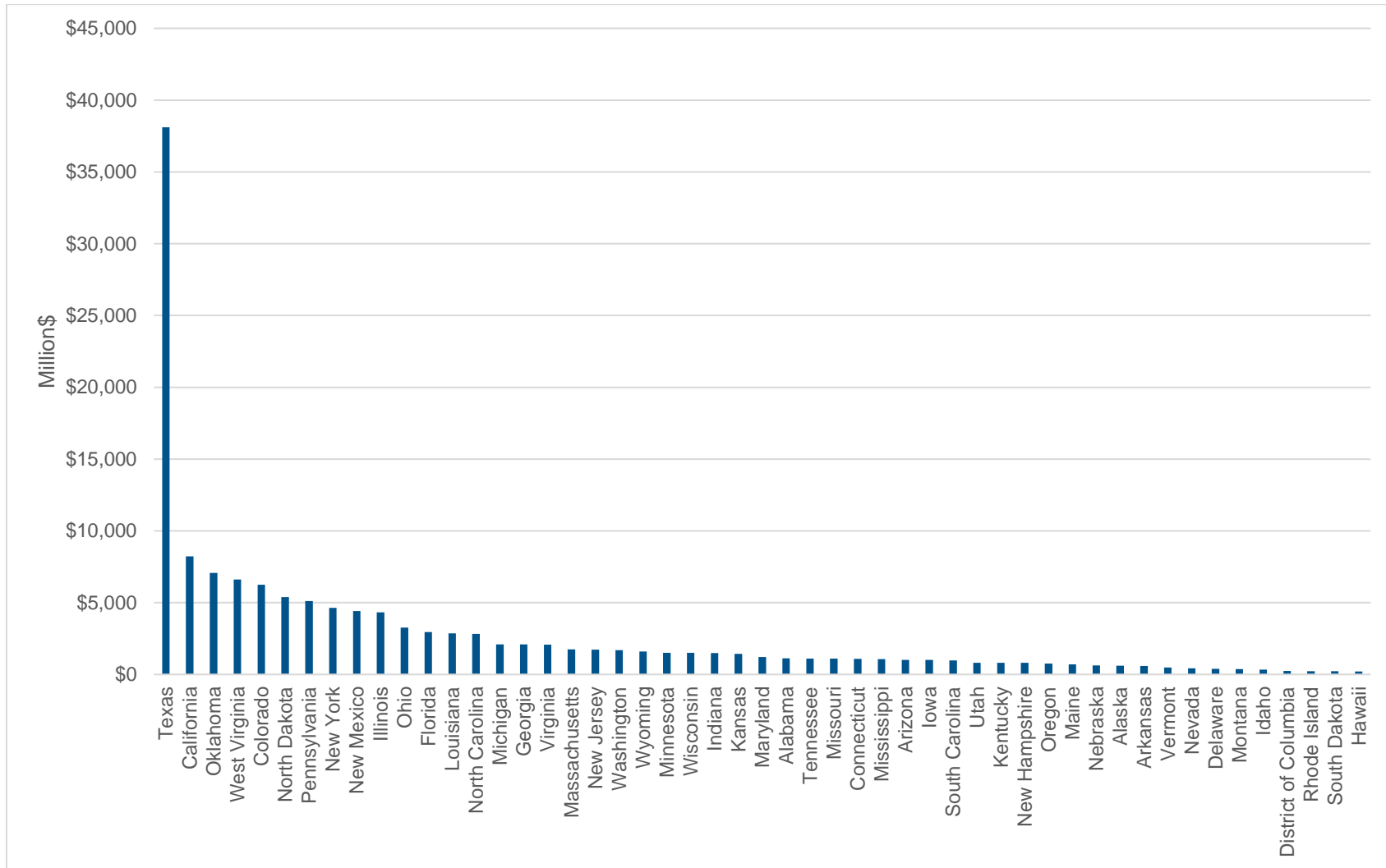
### 5.10. Total Added Value (Million Dollars) from Retail Propane by State

Figure 35. Total Added Value (Million Dollars) from Retail Propane by State (Section 4)



## 5.11. Total Added Value (Million Dollars) from Propane by State

Figure 36. Total Added Value (Million Dollars) from Propane by State (Section 4)



## A. Appendix: 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 are 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 domestic energy resource. Close to 90 percent of the product used in the retail propane segment is sourced domestically, with roughly 8 percent imported from Canada, and the remaining 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 a large percent of its domestic consumption.

## ***End-Use Categories, as defined by the Annual Retail Propane Sales Report***

### **Residential Sector:**

Residential propane sales include odorized propane delivered to and used by residential consumers at their place of residence for fixed applications. Uses include space heating, water heating, cooking, spa/pool use, and other household uses. Residential sector sales include delivery and replacement of 100-pound cylinders attached at fixed locations. Residential sales do not include household use of propane from 20-pound (or similar) cylinders used for portable appliances and applications.

### **Commercial Sector:**

Commercial sector propane sales include odorized propane delivered to and used by commercial entities, such as schools, hospitals, retail outlets, office buildings, and other types of non-industrial outlets. Commercial sales do not include propane used forklifts or engine use. Commercial sales include propane used in on-site standby or backup electric generation at the facility.

### **Industrial (Non-Forklift) Sector:**

Industrial (non-forklift) sector propane sales include odorized propane delivered to and used by industrial or manufacturing facilities for process heating, large scale combined heat and power systems, distributed generation, or as a fuel for furnaces. Propane used by industrial customers in forklifts or other internal combustion engines is reported as Internal Combustion and is not included in industrial (non-forklift) sector.

### **Agricultural Sector:**

Agricultural sector propane sales include odorized propane delivered to and used by agricultural entities that are primarily engaged in growing crops, raising animals, or other agricultural products. Agricultural sector sales include propane used for grain drying, agricultural harvesting activities, weed control, radiant heating systems, crop irrigation engines, and other related agricultural applications. Propane used by agricultural customers in other internal combustion engine applications is reported in the Internal Combustion category.

### **Cylinder Markets:**

Cylinder market sales include Consumer Bottle Refill & Exchange and Rental Yards / RV Refill Stations / Other categories. Propane that is delivered and used in a 20-pound (or similar) cylinder. The definition of propane cylinder markets does not include wholesale or bulk propane sales to other propane retailers, fixed 100-pound (or similar) cylinders attached at fixed residential locations, or cylinders used by forklifts, commercial mowers, or other internal combustion engines.

### **Internal Combustion:**

The Internal Combustion sector includes odorized propane sales for use in internal combustion engines (other than agricultural irrigation engines) in the Propane Autogas, Material Handling (Forklift), and non-Road categories.



## A.1 Odorized Propane's Impact on Total U.S. Economy

2021 Odorized Propane Sales Breakout		
	(1,000 Gal.)	(% of Total)
Residential	4,923,946	51.6%
Commercial	2,372,506	24.9%
Cylinder	369,856	3.9%
Internal Combustion	680,193	7.1%
Industrial	257,555	2.7%
Agricultural	942,173	9.9%
<b>Total United States Odorized Propane Demand</b>	<b>9,546,228</b>	<b>100.0%</b>
<b>Total Propane-Heated Households</b>	<b>5,961,040</b>	
Propane Share of United States		4.81%

2021 Employment	
Production	9,686
Transportation, Storage, and Retail	47,187
<b>Direct United States Employment Related to</b>	<b>58,929</b>
Indirect and Induced Labor	37,475
<b>Total United States Employment Related to</b>	<b>96,404</b>

2021 Contribution to the U.S. Economy	
	(\$1,000)
<b>Total Market Value of Odorized Propane Sold in the United States</b>	<b>\$21,852,109</b>
Value in Imported Product and Feedstock	-\$1,075,167
<b>Total Market Value of Odorized Propane of Domestic Origin Sold in the United States</b>	<b>\$20,776,942</b>
Supply	\$9,720,885
Transportation, Storage, and Wholesale	\$1,549,475
Retail	\$8,951,279
<b>Total Direct Value Added in United States</b>	<b>\$20,221,638</b>
Indirect and Induced Value Added	43,476,522
<b>Total Odorized Propane Industry Contribution to United States GDP</b>	<b>\$63,698,161</b>

2021 Labor Income	
	(\$1,000)
Production	\$1,202,848
Transportation, Storage, and Wholesale	\$221,114
Retail	\$2,694,299
<b>Direct Labor Income in United States Odorized Propane Industry</b>	<b>\$4,118,261</b>
Indirect and Induced Labor	\$2,969,807
<b>Total Labor Income in the United States Related to Odorized Propane</b>	<b>\$7,088,068</b>

2021 Odorized Propane Supply						
	(1,000 Gal.)			Total	Share of Supply (%)	
	Domestic	Canadian	From Outside N. America		From U.S.	From N. America
Odorized Propane from Crude	734,806	254,745	242,614	1,232,166	7.70%	10.37%
Odorized Propane from Natural Gas	7,742,779	175,093	-	7,917,873	81.11%	82.94%
<b>Total Odorized Propane Produced in the United States</b>	<b>8,477,585</b>	<b>429,838</b>	<b>242,614</b>	<b>9,150,038</b>	<b>88.81%</b>	<b>93.31%</b>
Odorized Propane Imports		334,496	825	335,321	0.00%	3.50%
Inventory Changes	60,861			60,861	0.64%	0.64%
<b>Total Supply of Odorized Propane in the United States</b>	<b>8,538,446</b>	<b>764,334</b>	<b>243,439</b>	<b>9,546,219</b>	<b>89.44%</b>	<b>97.45%</b>

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

## A.2 Odorized Propane's Impact on Total U.S. Economy

State	In-State Production		In-State Consumption		Economic Impact		Propane Heated Households	
	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	31,900	0.36%	111,603	1.17%	903	647,847	105,989	5.57%
Alaska	26,863	0.30%	14,953	0.16%	313	208,892	5,457	2.09%
Arizona	-	0.00%	115,150	1.21%	674	585,479	75,205	2.80%
Arkansas	2,846	0.03%	88,423	0.93%	462	407,218	76,706	6.62%
California	75,570	0.84%	546,104	5.72%	2,878	4,327,932	449,072	3.40%
Colorado	632,220	7.04%	195,553	2.05%	1,376	2,192,020	106,077	4.76%
Connecticut	-	0.00%	127,885	1.34%	1,125	766,655	67,902	4.86%
Delaware	16,834	0.19%	49,833	0.52%	490	250,856	35,082	9.21%
District of Columbia	-	0.00%	1,140	0.01%	24	112,493	2,916	0.94%
Florida	531	0.01%	224,632	2.35%	1,915	1,793,180	70,529	0.86%
Georgia	-	0.00%	204,862	2.15%	1,827	1,363,432	173,296	4.46%
Hawaii	-	0.00%	45,694	0.48%	60	137,848	8,301	1.74%
Idaho	59	0.00%	77,290	0.81%	245	229,014	34,513	5.25%
Illinois	89,994	1.00%	491,788	5.15%	1,107	2,083,996	204,950	4.16%
Indiana	34,213	0.38%	231,660	2.43%	1,209	845,805	187,276	7.14%
Iowa	-	0.00%	408,739	4.28%	487	768,517	162,294	12.72%
Kansas	85,283	0.95%	122,833	1.29%	465	607,593	87,714	7.70%
Kentucky	31,104	0.35%	117,338	1.23%	537	448,876	107,533	6.15%
Louisiana	489,659	5.46%	56,193	0.59%	629	1,032,717	33,582	1.92%
Maine	-	0.00%	154,216	1.62%	1,115	616,412	68,174	11.94%
Maryland	-	0.00%	135,831	1.42%	1,054	799,226	82,080	3.58%
Massachusetts	-	0.00%	140,743	1.47%	1,023	1,096,610	106,984	3.94%
Michigan	10,748	0.12%	521,520	5.46%	1,804	1,367,129	332,764	8.37%
Minnesota	23,586	0.26%	484,423	5.07%	1,485	1,044,166	238,928	10.72%
Mississippi	79,659	0.89%	115,991	1.22%	799	592,545	119,232	10.75%
Missouri	-	0.00%	276,195	2.89%	1,156	699,437	207,496	8.53%
Montana	9,472	0.11%	116,268	1.22%	281	277,928	57,866	13.26%
Nebraska	-	0.00%	108,192	1.13%	249	337,779	54,321	7.08%
Nevada	-	0.00%	53,911	0.56%	280	253,180	30,489	2.67%
New Hampshire	-	0.00%	165,017	1.73%	1,052	700,030	94,735	17.53%
New Jersey	29,768	0.33%	83,189	0.87%	780	920,679	77,429	2.28%
New Mexico	443,171	4.94%	81,422	0.85%	1,471	1,483,656	53,645	6.73%
New York	-	0.00%	436,861	4.58%	3,115	2,928,270	334,341	4.44%
North Carolina	-	0.00%	375,420	3.93%	2,973	2,041,068	263,683	6.54%
North Dakota	596,938	6.65%	123,035	1.29%	974	1,695,598	43,586	13.77%
Ohio	148,899	1.66%	345,707	3.62%	1,617	1,575,923	258,587	5.44%
Oklahoma	834,514	9.30%	140,879	1.48%	1,540	2,255,000	95,641	6.36%
Oregon	-	0.00%	98,132	1.03%	331	441,731	30,549	1.84%
Pennsylvania	263,726	2.94%	372,822	3.91%	2,888	2,627,281	237,882	4.62%
Rhode Island	-	0.00%	27,676	0.29%	241	159,836	17,055	4.00%
South Carolina	-	0.00%	106,678	1.12%	1,034	656,435	68,881	3.49%
South Dakota	-	0.00%	81,454	0.85%	239	162,508	54,643	15.80%
Tennessee	13,670	0.15%	123,347	1.29%	722	598,002	97,786	3.67%
Texas	4,029,324	44.90%	443,051	4.64%	8,012	12,584,687	299,884	2.93%
Utah	32,986	0.37%	64,142	0.67%	284	386,098	24,266	2.35%
Vermont	-	0.00%	109,268	1.14%	618	440,458	47,294	18.02%
Virginia	-	0.00%	258,407	2.71%	1,584	1,475,062	137,353	4.23%
Washington	15,918	0.18%	207,403	2.17%	831	994,205	91,012	3.10%
West Virginia	752,233	8.38%	51,653	0.54%	876	2,081,213	36,994	5.20%
Wisconsin	2,111	0.02%	451,692	4.73%	1,360	1,044,596	278,175	11.58%
Wyoming	171,142	1.91%	60,001	0.63%	413	551,040	24,891	10.79%
<b>U.S. Total</b>	<b>8,974,943</b>	<b>100.00%</b>	<b>9,546,219</b>	<b>100.00%</b>	<b>58,928</b>	<b>63,698,161</b>	<b>5,961,040</b>	<b>4.81%</b>

## A.3 Odorized Propane's Impact on Alabama Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	44,665,921	40.0%
Commercial	30,057,789	26.9%
Cylinder	4,656,443	4.2%
Internal Combustion	12,779,000	11.5%
Industrial	3,256,000	2.9%
Agricultural	16,187,000	14.5%
<b>Total Alabama Odorized Propane Demand</b>	<b>111,602,153</b>	<b>100.0%</b>
<b>Total Propane-Heated Households</b>	<b>105,989</b>	
Propane Share of Alabama Home Heating		5.57%

2021 Contribution to State Economy	
	(\$1,000)
<b>Total Market Value of Odorized Propane Sold in Alabama (\$1,000)</b>	<b>\$259,524</b>
Supply	\$33,652
Transportation, Storage, and Wholesale	\$14,936
Retail	\$135,471
<b>Total Direct Value Added in Alabama</b>	<b>\$184,059</b>
Indirect and Induced	\$463,788
<b>Total Odorized Propane Industry Contribution to Alabama GDP</b>	<b>\$647,847</b>

2021 Employment	
Production	29
Transportation, Storage, and Wholesale	12
Retail	862
<b>Direct Alabama Employment Related to Odorized Propane</b>	<b>903</b>

2021 Labor Income	
	(\$1,000)
Production	\$3,561
Transportation, Storage, and Wholesale	\$1,216
Retail	\$39,917
<b>Direct Labor Income in Alabama Odorized Propane Industry</b>	<b>\$44,694</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	31,900,000	0.41%
<b>Total Alabama Odorized Propane Production</b>	<b>31,900,000</b>	<b>0.36%</b>

## A.4 Odorized Propane's Impact on Alaska Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	3,624,695	24.2%	<b>Total Market Value of Odorized Propane Sold in Alaska (\$1,000)</b>	<b>\$32,728</b>
Commercial	8,918,927	59.6%	Supply	\$67,575
Cylinder	958,788	6.4%	Transportation, Storage, and Wholesale	\$2,329
Internal Combustion	426,000	2.8%	Retail	\$9,795
Industrial	1,013,000	6.8%		
Agricultural	11,000	0.1%		
<b>Total Alaska Odorized Propane Demand</b>	<b>14,952,409</b>	<b>100.0%</b>	<b>Total Direct Value Added in Alaska</b>	<b>\$79,699</b>
			Indirect and Induced	\$129,193
<b>Total Propane-Heated Households</b>	<b>5,457</b>		<b>Total Odorized Propane Industry Contribution to Alaska GDP</b>	<b>\$208,892</b>
Propane Share of Alaska Home Heating		2.09%		

2021 Employment		2021 Labor Income	
			(\$1,000)
Production	175	Production	\$21,506
Transportation, Storage, and Wholesale	4	Transportation, Storage, and Wholesale	\$514
Retail	134	Retail	\$4,319
<b>Direct Alaska Employment Related to Odorized Propane</b>	<b>313</b>	<b>Direct Labor Income in Alaska Odorized Propane Industry</b>	<b>\$26,339</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	26,863,000	0.35%
<b>Total Alaska Odorized Propane Production</b>	<b>26,863,000</b>	<b>0.30%</b>

## A.5 Odorized Propane's Impact on Arizona Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	48,430,658	42.1%	<b>Total Market Value of Odorized Propane Sold in Arizona (\$1,000)</b>	<b>\$260,447</b>
Commercial	39,521,660	34.3%	Supply	\$1
Cylinder	7,349,620	6.4%	Transportation, Storage, and Wholesale	\$14,663
Internal Combustion	14,448,000	12.5%	Retail	\$83,888
Industrial	3,780,000	3.3%	<b>Total Direct Value Added in Arizona</b>	<b>\$98,552</b>
Agricultural	1,622,000	1.4%	Indirect and Induced	\$486,927
<b>Total Arizona Odorized Propane Demand</b>	<b>115,151,938</b>	<b>100.0%</b>	<b>Total Odorized Propane Industry Contribution to Arizona GDP</b>	<b>\$585,479</b>
<b>Total Propane-Heated Households</b>	<b>75,205</b>			
Propane Share of Arizona Home Heating		2.80%		
2021 Employment			2021 Labor Income	
				(\$1,000)
Production		0	Production	\$1
Transportation, Storage, and Wholesale		8	Transportation, Storage, and Wholesale	\$811
Retail		666	Retail	\$33,353
<b>Direct Arizona Employment Related to Odorized Propane</b>		<b>674</b>	<b>Direct Labor Income in Arizona Odorized Propane Industry</b>	<b>\$34,165</b>
2021 Odorized Propane Production				
	(Gallons)	(% of U.S. Total)		
Refineries	-	0.00%		
Gas Processing Plants	-	0.00%		
<b>Total Arizona Odorized Propane Production</b>	<b>-</b>	<b>0.00%</b>		

## A.6 Odorized Propane's Impact on Arkansas Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	40,257,778	45.5%
Commercial	18,704,974	21.2%
Cylinder	3,295,187	3.7%
Internal Combustion	7,411,000	8.4%
Industrial	1,811,000	2.0%
Agricultural	16,943,000	19.2%

<b>Total Arkansas Odorized Propane Demand</b>	<b>88,422,939</b>	<b>100.0%</b>
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<b>Total Propane-Heated Households</b>	<b>76,706</b>
Propane Share of Arkansas Home Heating	6.62%

2021 Employment	
Production	5
Transportation, Storage, and Wholesale	8
Retail	449

<b>Direct Arkansas Employment Related to Odorized Propane</b>	<b>462</b>
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2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	2,328,000	0.19%
Gas Processing Plants	518,000	0.01%

<b>Total Arkansas Odorized Propane Production</b>	<b>2,846,000</b>	<b>0.03%</b>
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2021 Contribution to State Economy	
	(\$1,000)
<b>Total Market Value of Odorized Propane Sold in Arkansas (\$1,000)</b>	<b>\$207,663</b>
Supply	\$1,449
Transportation, Storage, and Wholesale	\$11,959
Retail	\$109,390
<b>Total Direct Value Added in Arkansas</b>	<b>\$122,798</b>
Indirect and Induced	\$284,420
<b>Total Odorized Propane Industry Contribution to Arkansas GDP</b>	<b>\$407,218</b>

2021 Labor Income	
	(\$1,000)
Production	\$600
Transportation, Storage, and Wholesale	\$812
Retail	\$23,142

<b>Direct Labor Income in Arkansas Odorized Propane Industry</b>	<b>\$24,554</b>
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## A.7 Odorized Propane's Impact on California Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	228,655,419	41.9%	<b>Total Market Value of Odorized Propane Sold in California (\$1,000)</b>	<b>\$1,234,917</b>
Commercial	154,613,398	28.3%	Supply	\$41,092
Cylinder	36,463,139	6.7%	Transportation, Storage, and Wholesale	\$71,828
Internal Combustion	61,954,000	11.3%	Retail	\$397,589
Industrial	15,610,000	2.9%	<b>Total Direct Value Added in California</b>	<b>\$510,509</b>
Agricultural	48,808,000	8.9%	Indirect and Induced	\$3,817,423
<b>Total California Odorized Propane Demand</b>	<b>546,103,957</b>	<b>100.0%</b>	<b>Total Odorized Propane Industry Contribution to California GDP</b>	<b>\$4,327,932</b>
<b>Total Propane-Heated Households</b>	<b>449,072</b>			
Propane Share of California Home Heating		3.40%		
2021 Employment			2021 Labor Income	
				(\$1,000)
Production		151	Production	\$18,849
Transportation, Storage, and Wholesale		47	Transportation, Storage, and Wholesale	\$4,628
Retail		2,680	Retail	\$162,316
<b>Direct California Employment Related to Odorized Propane</b>		<b>2,878</b>	<b>Direct Labor Income in California Odorized Propane Industry</b>	<b>\$185,793</b>
2021 Odorized Propane Production				
	(Gallons)	(% of U.S. Total)		
Refineries	66,036,000	5.36%		
Gas Processing Plants	9,533,000	0.12%		
<b>Total California Odorized Propane Production</b>	<b>75,569,000</b>	<b>0.84%</b>		

## A.8 Odorized Propane's Impact on Colorado Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	117,115,899	59.9%
Commercial	38,652,618	19.8%
Cylinder	11,959,748	6.1%
Internal Combustion	13,224,000	6.8%
Industrial	5,471,000	2.8%
Agricultural	9,130,000	4.7%
<b>Total Colorado Odorized Propane Demand</b>	<b>195,553,265</b>	<b>100.0%</b>
<b>Total Propane-Heated Households</b>	<b>106,077</b>	
Propane Share of Colorado Home Heating		4.76%

2021 Employment	
Production	585
Transportation, Storage, and Wholesale	94
Retail	698
<b>Direct Colorado Employment Related to Odorized Propane</b>	<b>1,376</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	2,823,000	0.23%
Gas Processing Plants	629,397,000	8.13%
<b>Total Colorado Odorized Propane Production</b>	<b>632,220,000</b>	<b>7.04%</b>

2021 Contribution to State Economy	
	(\$1,000)
<b>Total Market Value of Odorized Propane Sold in Colorado (\$1,000)</b>	<b>\$393,833</b>
Supply	\$698,645
Transportation, Storage, and Wholesale	\$43,632
Retail	\$139,680
<b>Total Direct Value Added in Colorado</b>	<b>\$881,956</b>
Indirect and Induced	\$1,310,063
<b>Total Odorized Propane Industry Contribution to Colorado GDP</b>	<b>\$2,192,020</b>

2021 Labor Income	
	(\$1,000)
Production	\$72,570
Transportation, Storage, and Wholesale	\$10,558
Retail	\$37,947
<b>Direct Labor Income in Colorado Odorized Propane Industry</b>	<b>\$121,075</b>



## A.9 Odorized Propane's Impact on Connecticut Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	83,587,924	65.4%
Commercial	35,882,896	28.1%
Cylinder	1,984,413	1.6%
Internal Combustion	4,047,000	3.2%
Industrial	814,000	0.6%
Agricultural	1,569,000	1.2%
<b>Total Connecticut Odorized Propane Demand</b>	<b>127,885,232</b>	<b>100.0%</b>
<b>Total Propane-Heated Households</b>	<b>67,902</b>	
Propane Share of Connecticut Home Heating		4.86%

2021 Employment	
Production	-
Transportation, Storage, and Wholesale	9
Retail	1,115
<b>Direct Connecticut Employment Related to Odorized Propane</b>	<b>1,125</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
<b>Total Connecticut Odorized Propane Production</b>	<b>-</b>	<b>0.00%</b>

2021 Contribution to State Economy	
	(\$1,000)
<b>Total Market Value of Odorized Propane Sold in Connecticut (\$1,000)</b>	<b>\$390,776</b>
Supply	\$0
Transportation, Storage, and Wholesale	\$16,284
Retail	\$215,207
<b>Total Direct Value Added in Connecticut</b>	<b>\$231,491</b>
Indirect and Induced	\$535,164
<b>Total Odorized Propane Industry Contribution to Connecticut GDP</b>	<b>\$766,655</b>

2021 Labor Income	
	(\$1,000)
Production	\$0
Transportation, Storage, and Wholesale	\$901
Retail	\$87,247
<b>Direct Labor Income in Connecticut Odorized Propane Industry</b>	<b>\$88,148</b>

## A.10 Odorized Propane's Impact on Delaware Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	25,246,209	50.7%
Commercial	7,181,645	14.4%
Cylinder	1,015,243	2.0%
Internal Combustion	2,806,000	5.6%
Industrial	3,189,000	6.4%
Agricultural	10,394,000	20.9%
<b>Total Delaware Odorized Propane Demand</b>	<b>49,832,096</b>	<b>100.0%</b>
<b>Total Propane-Heated Households</b>	<b>35,082</b>	
Propane Share of Delaware Home Heating		9.21%

2021 Employment	
Production	2
Transportation, Storage, and Wholesale	5
Retail	482
<b>Direct Delaware Employment Related to Odorized Propane</b>	<b>490</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	16,834,000	1.37%
Gas Processing Plants	-	0.00%
<b>Total Delaware Odorized Propane Production</b>	<b>16,834,000</b>	<b>0.19%</b>

2021 Contribution to State Economy	
	(\$1,000)
<b>Total Market Value of Odorized Propane Sold in Delaware (\$1,000)</b>	<b>\$133,021</b>
Supply	\$11,784
Transportation, Storage, and Wholesale	\$6,891
Retail	\$68,995
<b>Total Direct Value Added in Delaware</b>	<b>\$87,671</b>
Indirect and Induced	\$163,185
<b>Total Odorized Propane Industry Contribution to Delaware GDP</b>	<b>\$250,856</b>

2021 Labor Income	
	(\$1,000)
Production	\$317
Transportation, Storage, and Wholesale	\$487
Retail	\$29,994
<b>Direct Labor Income in Delaware Odorized Propane Industry</b>	<b>\$30,798</b>

## A.11 Odorized Propane's Impact on District of Columbia Economy

### 2021 Odorized Propane Sales Breakout

	(Gallons)	(% of State)
Residential	7,000	0.6%
Commercial	150,404	13.2%
Cylinder	430,000	37.7%
Internal Combustion	61,000	5.3%
Industrial	492,000	43.1%
Agricultural	-	0.0%
<b>Total District of Columbia Odorized Propane Demand</b>	<b>1,140,404</b>	<b>100.0%</b>
<b>Total Propane-Heated Households</b>	<b>2,916</b>	
Propane Share of District of Columbia Home Heating		0.94%

### 2021 Contribution to State Economy

	(\$1,000)
<b>Total Market Value of Odorized Propane Sold in District of Columbia (\$1,000)</b>	<b>\$2,747</b>
Supply	\$0
Transportation, Storage, and Wholesale	\$145
Retail	\$1,280
<b>Total Direct Value Added in District of Columbia</b>	<b>\$1,425</b>
Indirect and Induced	\$111,068
<b>Total Odorized Propane Industry Contribution to District of Columbia GDP</b>	<b>\$112,493</b>

### 2021 Employment

Production	-
Transportation, Storage, and Wholesale	1
Retail	24
<b>Direct District of Columbia Employment Related to Odorized Propane</b>	<b>25</b>

### 2021 Labor Income

	(\$1,000)
Production	\$0
Transportation, Storage, and Wholesale	\$8
Retail	\$928
<b>Direct Labor Income in District of Columbia Odorized Propane Industry</b>	<b>\$936</b>

### 2021 Odorized Propane Production

	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
<b>Total District of Columbia Odorized Propane Production</b>	<b>-</b>	<b>0.00%</b>

## A.12 Odorized Propane's Impact on Florida Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	49,760,745	22.2%	<b>Total Market Value of Odorized Propane Sold in Florida (\$1,000)</b>	<b>\$613,244</b>
Commercial	90,772,109	40.4%	Supply	\$924
Cylinder	20,183,710	9.0%	Transportation, Storage, and Wholesale	\$28,612
Internal Combustion	35,050,000	15.6%	Retail	\$337,271
Industrial	21,785,000	9.7%	<b>Total Direct Value Added in Florida</b>	<b>\$366,807</b>
Agricultural	7,081,000	3.2%	Indirect and Induced	\$1,426,373
<b>Total Florida Odorized Propane Demand</b>	<b>224,632,564</b>	<b>100.0%</b>	<b>Total Odorized Propane Industry Contribution to Florida GDP</b>	<b>\$1,793,180</b>
<b>Total Propane-Heated Households</b>	<b>70,529</b>			
Propane Share of Florida Home Heating		0.86%		

2021 Employment		2021 Labor Income	
			(\$1,000)
Production	2	Production	\$234
Transportation, Storage, and Wholesale	16	Transportation, Storage, and Wholesale	\$1,590
Retail	1,897	Retail	\$107,372
<b>Direct Florida Employment Related to Odorized Propane</b>	<b>1,915</b>	<b>Direct Labor Income in Florida Odorized Propane Industry</b>	<b>\$109,196</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	531,000	0.01%
<b>Total Florida Odorized Propane Production</b>	<b>531,000</b>	<b>0.01%</b>

## A.13 Odorized Propane's Impact on Georgia Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	77,804,515	38.0%	<b>Total Market Value of Odorized Propane Sold in Georgia (\$1,000)</b>	<b>\$576,712</b>
Commercial	48,987,758	23.9%	Supply	\$0
Cylinder	7,119,283	3.5%	Transportation, Storage, and Wholesale	\$27,717
Internal Combustion	35,858,000	17.5%	Retail	\$325,149
Industrial	4,086,000	2.0%		
Agricultural	31,007,000	15.1%		
<b>Total Georgia Odorized Propane Demand</b>	<b>204,862,556</b>	<b>100.0%</b>	<b>Total Direct Value Added in Georgia</b>	<b>\$352,866</b>
			Indirect and Induced	\$1,010,566
<b>Total Propane-Heated Households</b>	<b>173,296</b>		<b>Total Odorized Propane Industry Contribution to Georgia GDP</b>	<b>\$1,363,432</b>
Propane Share of Georgia Home Heating		4.46%		
2021 Employment			2021 Labor Income	
				(\$1,000)
Production	-		Production	\$0
Transportation, Storage, and Wholesale	19		Transportation, Storage, and Wholesale	\$1,870
Retail	1,808		Retail	\$84,925
<b>Direct Georgia Employment Related to Odorized Propane</b>	<b>1,827</b>		<b>Direct Labor Income in Georgia Odorized Propane Industry</b>	<b>\$86,795</b>
2021 Odorized Propane Production				
	(Gallons)	(% of U.S. Total)		
Refineries	-	0.00%		
Gas Processing Plants	-	0.00%		
<b>Total Georgia Odorized Propane Production</b>	<b>-</b>	<b>0.00%</b>		

## A.14 Odorized Propane's Impact on Hawaii Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	5,312,494	11.6%	<b>Total Market Value of Odorized Propane Sold in Hawaii (\$1,000)</b>	<b>\$97,867</b>
Commercial	37,662,652	82.4%	Supply	\$0
Cylinder	1,140,918	2.5%	Transportation, Storage, and Wholesale	\$5,818
Internal Combustion	367,000	0.8%	Retail	\$27,768
Industrial	1,207,000	2.6%		
Agricultural	4,000	0.0%		
<b>Total Hawaii Odorized Propane Demand</b>	<b>45,694,063</b>	<b>100.0%</b>	<b>Total Direct Value Added in Hawaii</b>	<b>\$33,586</b>
			Indirect and Induced	\$104,262
<b>Total Propane-Heated Households</b>	<b>8,301</b>		<b>Total Odorized Propane Industry Contribution to Hawaii GDP</b>	<b>\$137,848</b>
Propane Share of Hawaii Home Heating		1.74%		
2021 Employment			2021 Labor Income	
				(\$1,000)
Production	-		Production	\$0
Transportation, Storage, and Wholesale	3		Transportation, Storage, and Wholesale	\$322
Retail	57		Retail	\$7,355
<b>Direct Hawaii Employment Related to Odorized Propane</b>	<b>60</b>		<b>Direct Labor Income in Hawaii Odorized Propane Industry</b>	<b>\$7,677</b>
2021 Odorized Propane Production				
	(Gallons)	(% of U.S. Total)		
Refineries	-	0.00%		
Gas Processing Plants	-	0.00%		
<b>Total Hawaii Odorized Propane Production</b>	<b>-</b>	<b>0.00%</b>		

## A.15 Odorized Propane's Impact on Idaho Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	52,928,330	68.5%
Commercial	17,359,912	22.5%
Cylinder	1,057,484	1.4%
Internal Combustion	1,665,000	2.2%
Industrial	822,000	1.1%
Agricultural	3,457,000	4.5%
<b>Total Idaho Odorized Propane Demand</b>	<b>77,289,726</b>	<b>100.0%</b>
<b>Total Propane-Heated Households</b>	<b>34,513</b>	
Propane Share of Idaho Home Heating		5.25%

2021 Employment	
Production	0
Transportation, Storage, and Wholesale	6
Retail	239
<b>Direct Idaho Employment Related to Odorized Propane</b>	<b>245</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	59,000	0.00%
<b>Total Idaho Odorized Propane Production</b>	<b>59,000</b>	<b>0.00%</b>

2021 Contribution to State Economy	
	(\$1,000)
<b>Total Market Value of Odorized Propane Sold in Idaho (\$1,000)</b>	<b>\$158,003</b>
Supply	\$71
Transportation, Storage, and Wholesale	\$9,843
Retail	\$57,568
<b>Total Direct Value Added in Idaho</b>	<b>\$67,481</b>
Indirect and Induced	\$161,533
<b>Total Odorized Propane Industry Contribution to Idaho GDP</b>	<b>\$229,014</b>

2021 Labor Income	
	(\$1,000)
Production	\$8
Transportation, Storage, and Wholesale	\$545
Retail	\$12,270
<b>Direct Labor Income in Idaho Odorized Propane Industry</b>	<b>\$12,822</b>

## A.16 Odorized Propane's Impact on Illinois Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	286,753,728	58.3%	<b>Total Market Value of Odorized Propane Sold in Illinois (\$1,000)</b>	<b>\$948,494</b>
Commercial	77,208,039	15.7%	Supply	\$231,882
Cylinder	13,240,719	2.7%	Transportation, Storage, and Wholesale	\$76,355
Internal Combustion	38,844,000	7.9%	Retail	\$253,130
Industrial	6,573,000	1.3%		
Agricultural	69,169,000	14.1%		
<b>Total Illinois Odorized Propane Demand</b>	<b>491,788,486</b>	<b>100.0%</b>	<b>Total Direct Value Added in Illinois</b>	<b>\$561,367</b>
			Indirect and Induced	\$1,522,629
<b>Total Propane-Heated Households</b>	<b>204,950</b>		<b>Total Odorized Propane Industry Contribution to Illinois GDP</b>	<b>\$2,083,996</b>
Propane Share of Illinois Home Heating		4.16%		
2021 Employment			2021 Labor Income	
				(\$1,000)
Production		36	Production	\$4,617
Transportation, Storage, and Wholesale		67	Transportation, Storage, and Wholesale	\$6,701
Retail		1,004	Retail	\$51,002
<b>Direct Illinois Employment Related to Odorized Propane</b>		<b>1,107</b>	<b>Direct Labor Income in Illinois Odorized Propane Industry</b>	<b>\$62,320</b>
2021 Odorized Propane Production				
	(Gallons)	(% of U.S. Total)		
Refineries	59,813,000	4.85%		
Gas Processing Plants	30,181,000	0.39%		
<b>Total Illinois Odorized Propane Production</b>	<b>89,994,000</b>	<b>1.00%</b>		



## A.17 Odorized Propane's Impact on Indiana Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	125,742,447	54.3%	<b>Total Market Value of Odorized Propane Sold in Indiana (\$1,000)</b>	<b>\$443,730</b>
Commercial	41,782,172	18.0%	Supply	\$332
Cylinder	7,239,868	3.1%	Transportation, Storage, and Wholesale	\$38,964
Internal Combustion	21,862,000	9.4%	Retail	\$116,153
Industrial	3,206,000	1.4%		
Agricultural	31,827,000	13.7%		
<b>Total Indiana Odorized Propane Demand</b>	<b>231,659,487</b>	<b>100.0%</b>	<b>Total Direct Value Added in Indiana</b>	<b>\$155,450</b>
			Indirect and Induced	\$690,355
<b>Total Propane-Heated Households</b>	<b>187,276</b>		<b>Total Odorized Propane Industry Contribution to Indiana GDP</b>	<b>\$845,805</b>
Propane Share of Indiana Home Heating		7.14%		

2021 Employment		2021 Labor Income	
			(\$1,000)
Production	6	Production	\$783
Transportation, Storage, and Wholesale	42	Transportation, Storage, and Wholesale	\$4,097
Retail	1,162	Retail	\$60,638
<b>Direct Indiana Employment Related to Odorized Propane</b>	<b>1,209</b>	<b>Direct Labor Income in Indiana Odorized Propane Industry</b>	<b>\$65,518</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	34,213,000	2.78%
Gas Processing Plants	-	0.00%
<b>Total Indiana Odorized Propane Production</b>	<b>34,213,000</b>	<b>0.38%</b>

## A.18 Odorized Propane's Impact on Iowa Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	219,863,722	53.8%
Commercial	30,975,019	7.6%
Cylinder	4,746,390	1.2%
Internal Combustion	10,860,000	2.7%
Industrial	1,830,000	0.4%
Agricultural	140,464,000	34.4%

**Total Iowa Odorized Propane Demand** 408,739,131 100.0%

**Total Propane-Heated Households** 162,294  
 Propane Share of Iowa Home Heating 12.72%

2021 Employment	
Production	-
Transportation, Storage, and Wholesale	26
Retail	461

**Direct Iowa Employment Related to Odorized Propane** 487

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
<b>Total Iowa Odorized Propane Production</b>	-	<b>0.00%</b>

2021 Contribution to State Economy		(\$1,000)
<b>Total Market Value of Odorized Propane Sold in Iowa (\$1,000)</b>		<b>\$782,477</b>
Supply		\$0
Transportation, Storage, and Wholesale		\$52,163
Retail		\$204,499
<b>Total Direct Value Added in Iowa</b>		<b>\$256,662</b>
Indirect and Induced		\$511,855
<b>Total Odorized Propane Industry Contribution to Iowa GDP</b>		<b>\$768,517</b>

2021 Labor Income		(\$1,000)
Production		\$0
Transportation, Storage, and Wholesale		\$2,557
Retail		\$21,678
<b>Direct Labor Income in Iowa Odorized Propane Industry</b>		<b>\$24,236</b>

## A.19 Odorized Propane's Impact on Kansas Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	76,510,058	62.3%
Commercial	17,133,460	13.9%
Cylinder	7,822,647	6.4%
Internal Combustion	10,910,000	8.9%
Industrial	2,397,000	2.0%
Agricultural	8,060,000	6.6%
<b>Total Kansas Odorized Propane Demand</b>	<b>122,833,165</b>	<b>100.0%</b>
<b>Total Propane-Heated Households</b>	<b>87,714</b>	
Propane Share of Kansas Home Heating		7.70%

2021 Contribution to State Economy		(\$1,000)
<b>Total Market Value of Odorized Propane Sold in Kansas (\$1,000)</b>		<b>\$238,462</b>
Supply		\$91,676
Transportation, Storage, and Wholesale		\$41,491
Retail		\$64,793
<b>Total Direct Value Added in Kansas</b>		<b>\$197,960</b>
Indirect and Induced		\$409,633
<b>Total Odorized Propane Industry Contribution to Kansas GDP</b>		<b>\$607,593</b>

2021 Employment	
Production	79
Transportation, Storage, and Wholesale	80
Retail	306
<b>Direct Kansas Employment Related to Odorized Propane</b>	<b>465</b>

2021 Labor Income		(\$1,000)
Production		\$9,830
Transportation, Storage, and Wholesale		\$8,113
Retail		\$13,399
<b>Direct Labor Income in Kansas Odorized Propane Industry</b>		<b>\$31,342</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	19,414,000	1.58%
Gas Processing Plants	65,869,000	0.85%
<b>Total Kansas Odorized Propane Production</b>	<b>85,283,000</b>	<b>0.95%</b>

## A.20 Odorized Propane's Impact on Kentucky Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	72,936,751	62.2%
Commercial	22,960,346	19.6%
Cylinder	2,353,731	2.0%
Internal Combustion	8,126,000	6.9%
Industrial	1,338,000	1.1%
Agricultural	9,623,000	8.2%

**Total Kentucky Odorized Propane Demand** 117,337,828 100.0%

**Total Propane-Heated Households** 107,533

Propane Share of Kentucky Home Heating 6.15%

2021 Employment	
Production	14
Transportation, Storage, and Wholesale	11
Retail	512

**Direct Kentucky Employment Related to Odorized Propane** 537

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	19,182,000	1.56%
Gas Processing Plants	11,923,000	0.15%

**Total Kentucky Odorized Propane Production** 31,105,000 0.35%

2021 Contribution to State Economy	
	(\$1,000)

**Total Market Value of Odorized Propane Sold in Kentucky (\$1,000)** \$227,798

Supply \$14,026  
 Transportation, Storage, and Wholesale \$15,751  
 Retail \$61,899

**Total Direct Value Added in Kentucky** \$91,676

Indirect and Induced \$357,200

**Total Odorized Propane Industry Contribution to Kentucky GDP** \$448,876

2021 Labor Income	
	(\$1,000)

Production \$1,781  
 Transportation, Storage, and Wholesale \$1,121  
 Retail \$25,270

**Direct Labor Income in Kentucky Odorized Propane Industry** \$28,172

## A.21 Odorized Propane's Impact on Louisiana Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	16,834,349	30.0%	<b>Total Market Value of Odorized Propane Sold in Louisiana (\$1,000)</b>	<b>\$128,366</b>
Commercial	15,381,958	27.4%	Supply	\$281,784
Cylinder	6,188,161	11.0%	Transportation, Storage, and Wholesale	\$20,940
Internal Combustion	8,383,000	14.9%	Retail	\$65,888
Industrial	1,615,000	2.9%		
Agricultural	7,791,000	13.9%		
<b>Total Louisiana Odorized Propane Demand</b>	<b>56,193,468</b>	<b>100.0%</b>	<b>Total Direct Value Added in Louisiana</b>	<b>\$368,613</b>
			Indirect and Induced	\$664,104
<b>Total Propane-Heated Households</b>	<b>33,582</b>		<b>Total Odorized Propane Industry Contribution to Louisiana GDP</b>	<b>\$1,032,717</b>
Propane Share of Louisiana Home Heating		1.92%		
2021 Employment			2021 Labor Income	
				(\$1,000)
Production		200	Production	\$25,752
Transportation, Storage, and Wholesale		58	Transportation, Storage, and Wholesale	\$6,129
Retail		371	Retail	\$14,835
<b>Direct Louisiana Employment Related to Odorized Propane</b>		<b>629</b>	<b>Direct Labor Income in Louisiana Odorized Propane Industry</b>	<b>\$46,716</b>
2021 Odorized Propane Production				
	(Gallons)	(% of U.S. Total)		
Refineries	313,865,000	25.47%		
Gas Processing Plants	175,794,000	2.27%		
<b>Total Louisiana Odorized Propane Production</b>	<b>489,659,000</b>	<b>5.46%</b>		

## A.22 Odorized Propane's Impact on Maine Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	71,386,157	46.3%	<b>Total Market Value of Odorized Propane Sold in Maine (\$1,000)</b>	<b>\$456,042</b>
Commercial	77,521,875	50.3%	Supply	\$0
Cylinder	1,922,001	1.2%	Transportation, Storage, and Wholesale	\$19,637
Internal Combustion	1,272,000	0.8%	Retail	\$244,218
Industrial	1,869,000	1.2%		
Agricultural	244,000	0.2%		
<b>Total Maine Odorized Propane Demand</b>	<b>154,215,032</b>	<b>100.0%</b>	<b>Total Direct Value Added in Maine</b>	<b>\$263,855</b>
			Indirect and Induced	\$352,557
<b>Total Propane-Heated Households</b>	<b>68,174</b>		<b>Total Odorized Propane Industry Contribution to Maine GDP</b>	<b>\$616,412</b>
Propane Share of Maine Home Heating		11.94%		
2021 Employment			2021 Labor Income	
				(\$1,000)
Production	-		Production	\$0
Transportation, Storage, and Wholesale	11		Transportation, Storage, and Wholesale	\$1,086
Retail	1,104		Retail	\$58,071
<b>Direct Maine Employment Related to Odorized Propane</b>	<b>1,115</b>		<b>Direct Labor Income in Maine Odorized Propane Industry</b>	<b>\$59,157</b>
2021 Odorized Propane Production				
	(Gallons)	(% of U.S. Total)		
Refineries	-	0.00%		
Gas Processing Plants	-	0.00%		
<b>Total Maine Odorized Propane Production</b>	<b>-</b>	<b>0.00%</b>		

## A.23 Odorized Propane's Impact on Maryland Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	69,918,000	51.5%	<b>Total Market Value of Odorized Propane Sold in Maryland (\$1,000)</b>	<b>\$363,224</b>
Commercial	36,710,575	27.0%	Supply	\$0
Cylinder	4,248,000	3.1%	Transportation, Storage, and Wholesale	\$17,296
Internal Combustion	5,378,000	4.0%	Retail	\$188,711
Industrial	6,986,000	5.1%		
Agricultural	12,591,000	9.3%		
<b>Total Maryland Odorized Propane Demand</b>	<b>135,831,575</b>	<b>100.0%</b>	<b>Total Direct Value Added in Maryland</b>	<b>\$206,007</b>
			Indirect and Induced	\$593,218
<b>Total Propane-Heated Households</b>	<b>82,080</b>		<b>Total Odorized Propane Industry Contribution to Maryland GDP</b>	<b>\$799,226</b>
Propane Share of Maryland Home Heating		3.58%		
2021 Employment			2021 Labor Income	
				(\$1,000)
Production	-		Production	\$0
Transportation, Storage, and Wholesale	10		Transportation, Storage, and Wholesale	\$957
Retail	1,044		Retail	\$72,598
<b>Direct Maryland Employment Related to Odorized Propane</b>	<b>1,054</b>		<b>Direct Labor Income in Maryland Odorized Propane Industry</b>	<b>\$73,554</b>
2021 Odorized Propane Production				
	(Gallons)	(% of U.S. Total)		
Refineries	-	0.00%		
Gas Processing Plants	-	0.00%		
<b>Total Maryland Odorized Propane Production</b>	<b>-</b>	<b>0.00%</b>		

## A.24 Odorized Propane's Impact on Massachusetts Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	83,283,075	59.2%	<b>Total Market Value of Odorized Propane Sold in Massachusetts (\$1,000)</b>	<b>\$425,533</b>
Commercial	43,718,670	31.1%	Supply	\$0
Cylinder	5,116,786	3.6%	Transportation, Storage, and Wholesale	\$17,921
Internal Combustion	6,261,000	4.4%	Retail	\$232,279
Industrial	1,574,000	1.1%		
Agricultural	789,000	0.6%		
<b>Total Massachusetts Odorized Propane Demand</b>	<b>140,742,531</b>	<b>100.0%</b>	<b>Total Direct Value Added in Massachusetts</b>	<b>\$250,200</b>
			Indirect and Induced	\$846,410
<b>Total Propane-Heated Households</b>	<b>106,984</b>		<b>Total Odorized Propane Industry Contribution to Massachusetts GDP</b>	<b>\$1,096,610</b>
Propane Share of Massachusetts Home Heating		3.94%		
2021 Employment			2021 Labor Income	
				(\$1,000)
Production	-		Production	\$0
Transportation, Storage, and Wholesale	10		Transportation, Storage, and Wholesale	\$991
Retail	1,013		Retail	\$73,137
<b>Direct Massachusetts Employment Related to Odorized Propane</b>	<b>1,023</b>		<b>Direct Labor Income in Massachusetts Odorized Propane Industry</b>	<b>\$74,128</b>
2021 Odorized Propane Production				
	(Gallons)	(% of U.S. Total)		
Refineries	-	0.00%		
Gas Processing Plants	-	0.00%		
<b>Total Massachusetts Odorized Propane Production</b>	<b>-</b>	<b>0.00%</b>		



## A.25 Odorized Propane's Impact on Michigan Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	358,446,628	68.7%
Commercial	82,178,929	15.8%
Cylinder	16,930,746	3.2%
Internal Combustion	40,866,000	7.8%
Industrial	4,448,000	0.9%
Agricultural	18,650,000	3.6%
<b>Total Michigan Odorized Propane Demand</b>	<b>521,520,303</b>	<b>100.0%</b>
<b>Total Propane-Heated Households</b>	<b>332,764</b>	
Propane Share of Michigan Home Heating		8.37%

2021 Employment	
Production	7
Transportation, Storage, and Wholesale	39
Retail	1,758
<b>Direct Michigan Employment Related to Odorized Propane</b>	<b>1,804</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	8,115,000	0.66%
Gas Processing Plants	2,634,000	0.03%
<b>Total Michigan Odorized Propane Production</b>	<b>10,749,000</b>	<b>0.12%</b>

2021 Contribution to State Economy	
	(\$1,000)
<b>Total Market Value of Odorized Propane Sold in Michigan (\$1,000)</b>	<b>\$1,023,782</b>
Supply	\$3,677
Transportation, Storage, and Wholesale	\$66,828
Retail	\$286,503
<b>Total Direct Value Added in Michigan</b>	<b>\$357,008</b>
Indirect and Induced	\$1,010,121
<b>Total Odorized Propane Industry Contribution to Michigan GDP</b>	<b>\$1,367,129</b>

2021 Labor Income	
	(\$1,000)
Production	\$890
Transportation, Storage, and Wholesale	\$3,800
Retail	\$96,332
<b>Direct Labor Income in Michigan Odorized Propane Industry</b>	<b>\$101,022</b>

## A.26 Odorized Propane's Impact on Minnesota Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	268,836,270	55.5%
Commercial	62,515,438	12.9%
Cylinder	24,128,407	5.0%
Internal Combustion	10,915,000	2.3%
Industrial	10,831,000	2.2%
Agricultural	107,197,000	22.1%
<b>Total Minnesota Odorized Propane Demand</b>	<b>484,423,115</b>	<b>100.0%</b>
<b>Total Propane-Heated Households</b>	<b>238,928</b>	
Propane Share of Minnesota Home Heating		10.72%

2021 Employment	
Production	3
Transportation, Storage, and Wholesale	37
Retail	1,445
<b>Direct Minnesota Employment Related to Odorized Propane</b>	<b>1,485</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	23,586,000	1.91%
Gas Processing Plants	-	0.00%
<b>Total Minnesota Odorized Propane Production</b>	<b>23,586,000</b>	<b>0.26%</b>

2021 Contribution to State Economy	
	(\$1,000)
<b>Total Market Value of Odorized Propane Sold in Minnesota (\$1,000)</b>	<b>\$929,582</b>
Supply	\$0
Transportation, Storage, and Wholesale	\$62,564
Retail	\$244,599
<b>Total Direct Value Added in Minnesota</b>	<b>\$307,163</b>
Indirect and Induced	\$737,002
<b>Total Odorized Propane Industry Contribution to Minnesota GDP</b>	<b>\$1,044,166</b>

2021 Labor Income	
	(\$1,000)
Production	\$411
Transportation, Storage, and Wholesale	\$3,632
Retail	\$76,199
<b>Direct Labor Income in Minnesota Odorized Propane Industry</b>	<b>\$80,242</b>

## A.27 Odorized Propane's Impact on Mississippi Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	55,459,111	47.8%	<b>Total Market Value of Odorized Propane Sold in Mississippi (\$1,000)</b>	<b>\$273,513</b>
Commercial	21,034,273	18.1%	Supply	\$60,640
Cylinder	2,843,694	2.5%	Transportation, Storage, and Wholesale	\$16,734
Internal Combustion	7,371,000	6.4%	Retail	\$144,608
Industrial	2,039,000	1.8%		
Agricultural	27,244,000	23.5%		
<b>Total Mississippi Odorized Propane Demand</b>	<b>115,991,078</b>	<b>100.0%</b>	<b>Total Direct Value Added in Mississippi</b>	<b>\$221,982</b>
			Indirect and Induced	\$370,563
<b>Total Propane-Heated Households</b>	<b>119,232</b>		<b>Total Odorized Propane Industry Contribution to Mississippi GDP</b>	<b>\$592,545</b>
Propane Share of Mississippi Home Heating		10.75%		

2021 Employment			2021 Labor Income	
				(\$1,000)
Production	53		Production	\$6,661
Transportation, Storage, and Wholesale	16		Transportation, Storage, and Wholesale	\$1,681
Retail	730		Retail	\$31,997
<b>Direct Mississippi Employment Related to Odorized Propane</b>	<b>799</b>		<b>Direct Labor Income in Mississippi Odorized Propane Industry</b>	<b>\$40,340</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	29,181,000	2.37%
Gas Processing Plants	50,478,000	0.65%
<b>Total Mississippi Odorized Propane Production</b>	<b>79,659,000</b>	<b>0.89%</b>

## A.28 Odorized Propane's Impact on Missouri Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	137,218,292	49.7%
Commercial	79,959,844	29.0%
Cylinder	10,482,191	3.8%
Internal Combustion	21,341,000	7.7%
Industrial	4,622,000	1.7%
Agricultural	22,572,000	8.2%
<b>Total Missouri Odorized Propane Demand</b>	<b>276,195,328</b>	<b>100.0%</b>
<b>Total Propane-Heated Households</b>	<b>207,496</b>	
Propane Share of Missouri Home Heating		8.53%

2021 Employment	
Production	1
Transportation, Storage, and Wholesale	23
Retail	1,132
<b>Direct Missouri Employment Related to Odorized Propane</b>	<b>1,157</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
<b>Total Missouri Odorized Propane Production</b>	<b>-</b>	<b>0.00%</b>

2021 Contribution to State Economy	
	(\$1,000)
<b>Total Market Value of Odorized Propane Sold in Missouri (\$1,000)</b>	<b>\$524,831</b>
Supply	\$13
Transportation, Storage, and Wholesale	\$36,424
Retail	\$134,250
<b>Total Direct Value Added in Missouri</b>	<b>\$170,688</b>
Indirect and Induced	\$528,750
<b>Total Odorized Propane Industry Contribution to Missouri GDP</b>	<b>\$699,437</b>

2021 Labor Income	
	(\$1,000)
Production	\$7
Transportation, Storage, and Wholesale	\$2,274
Retail	\$68,845
<b>Direct Labor Income in Missouri Odorized Propane Industry</b>	<b>\$71,126</b>

## A.29 Odorized Propane's Impact on Montana Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	83,968,828	72.2%
Commercial	25,054,793	21.5%
Cylinder	2,010,855	1.7%
Internal Combustion	611,000	0.5%
Industrial	1,541,000	1.3%
Agricultural	3,082,000	2.7%
<b>Total Montana Odorized Propane Demand</b>	<b>116,268,475</b>	<b>100.0%</b>
<b>Total Propane-Heated Households</b>	<b>57,866</b>	
Propane Share of Montana Home Heating		13.26%

2021 Employment	
Production	22
Transportation, Storage, and Wholesale	9
Retail	249
<b>Direct Montana Employment Related to Odorized Propane</b>	<b>281</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	6,273,000	0.51%
Gas Processing Plants	3,199,000	0.04%
<b>Total Montana Odorized Propane Production</b>	<b>9,472,000</b>	<b>0.11%</b>

2021 Contribution to State Economy	
	(\$1,000)
<b>Total Market Value of Odorized Propane Sold in Montana (\$1,000)</b>	<b>\$239,151</b>
Supply	\$7,827
Transportation, Storage, and Wholesale	\$15,059
Retail	\$88,077
<b>Total Direct Value Added in Montana</b>	<b>\$110,962</b>
Indirect and Induced	\$166,966
<b>Total Odorized Propane Industry Contribution to Montana GDP</b>	<b>\$277,928</b>

2021 Labor Income	
	(\$1,000)
Production	\$2,700
Transportation, Storage, and Wholesale	\$921
Retail	\$14,020
<b>Direct Labor Income in Montana Odorized Propane Industry</b>	<b>\$17,641</b>

## A.30 Odorized Propane's Impact on Nebraska Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	65,429,641	60.5%	<b>Total Market Value of Odorized Propane Sold in Nebraska (\$1,000)</b>	<b>\$209,474</b>
Commercial	14,927,217	13.8%	Supply	\$372
Cylinder	2,281,706	2.1%	Transportation, Storage, and Wholesale	\$38,375
Internal Combustion	5,760,000	5.3%	Retail	\$56,501
Industrial	744,000	0.7%		
Agricultural	19,050,000	17.6%		
<b>Total Nebraska Odorized Propane Demand</b>	<b>108,192,564</b>	<b>100.0%</b>	<b>Total Direct Value Added in Nebraska</b>	<b>\$95,248</b>
			Indirect and Induced	\$242,531
<b>Total Propane-Heated Households</b>	<b>54,321</b>		<b>Total Odorized Propane Industry Contribution to Nebraska GDP</b>	<b>\$337,779</b>
Propane Share of Nebraska Home Heating		7.08%		

2021 Employment		2021 Labor Income	
			(\$1,000)
Production	2	Production	\$210
Transportation, Storage, and Wholesale	72	Transportation, Storage, and Wholesale	\$7,203
Retail	175	Retail	\$7,484
<b>Direct Nebraska Employment Related to Odorized Propane</b>	<b>249</b>	<b>Direct Labor Income in Nebraska Odorized Propane Industry</b>	<b>\$14,897</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
<b>Total Nebraska Odorized Propane Production</b>	<b>-</b>	<b>0.00%</b>

## A.31 Odorized Propane's Impact on Nevada Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	21,233,914	39.4%
Commercial	20,344,419	37.7%
Cylinder	3,462,536	6.4%
Internal Combustion	3,906,000	7.2%
Industrial	3,908,000	7.2%
Agricultural	1,057,000	2.0%
<b>Total Nevada Odorized Propane Demand</b>	<b>53,911,869</b>	<b>100.0%</b>
<b>Total Propane-Heated Households</b>	<b>30,489</b>	
Propane Share of Nevada Home Heating		2.67%

2021 Contribution to State Economy	
	(\$1,000)
<b>Total Market Value of Odorized Propane Sold in Nevada (\$1,000)</b>	<b>\$121,219</b>
Supply	\$48
Transportation, Storage, and Wholesale	\$6,865
Retail	\$38,554
<b>Total Direct Value Added in Nevada</b>	<b>\$45,467</b>
Indirect and Induced	\$207,714
<b>GDP</b>	<b>\$253,180</b>

2021 Employment	
Production	0
Transportation, Storage, and Wholesale	4
Retail	276
<b>Propane</b>	<b>280</b>

2021 Labor Income	
	(\$1,000)
Production	\$27
Transportation, Storage, and Wholesale	\$380
Retail	\$16,401
<b>Direct Labor Income in Nevada Odorized Propane Industry</b>	<b>\$16,808</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
<b>Total Nevada Odorized Propane Production</b>	<b>-</b>	<b>0.00%</b>

## A.32 Odorized Propane's Impact on New Hampshire Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	100,231,515	60.7%	<b>Total Market Value of Odorized Propane Sold in New Hampshire (\$1,000)</b>	<b>\$500,128</b>
Commercial	58,574,169	35.5%	Supply	\$0
Cylinder	1,935,908	1.2%	Transportation, Storage, and Wholesale	\$21,012
Internal Combustion	859,000	0.5%	Retail	\$273,551
Industrial	3,266,000	2.0%		
Agricultural	150,000	0.1%	<b>Total Direct Value Added in New Hampshire</b>	<b>\$294,563</b>
<b>Total New Hampshire Odorized Propane Demand</b>	<b>165,016,592</b>	<b>100.0%</b>	Indirect and Induced	\$405,467
			<b>Total Odorized Propane Industry Contribution to New Hampshire GDP</b>	<b>\$700,030</b>
<b>Total Propane-Heated Households</b>	<b>94,735</b>			
Propane Share of New Hampshire Home Heating		17.53%		
2021 Employment			2021 Labor Income	
				(\$1,000)
Production	-		Production	\$0
Transportation, Storage, and Wholesale	12		Transportation, Storage, and Wholesale	\$1,162
Retail	1,040		Retail	\$71,413
<b>Direct New Hampshire Employment Related to Odorized Propane</b>	<b>1,052</b>		<b>Direct Labor Income in New Hampshire Odorized Propane Industry</b>	<b>\$72,575</b>
2021 Odorized Propane Production				
	(Gallons)	(% of U.S. Total)		
Refineries	-	0.00%		
Gas Processing Plants	-	0.00%		
<b>Total New Hampshire Odorized Propane Production</b>	<b>-</b>	<b>0.00%</b>		



## A.33 Odorized Propane's Impact on New Jersey Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	37,704,431	45.3%	<b>Total Market Value of Odorized Propane Sold in New Jersey (\$1,000)</b>	<b>\$220,247</b>
Commercial	17,793,294	21.4%	Supply	\$20,838
Cylinder	7,064,595	8.5%	Transportation, Storage, and Wholesale	\$11,557
Internal Combustion	16,174,000	19.4%	Retail	\$113,352
Industrial	2,382,000	2.9%		
Agricultural	2,072,000	2.5%		
<b>Total New Jersey Odorized Propane Demand</b>	<b>83,190,319</b>	<b>100.0%</b>	<b>Total Direct Value Added in New Jersey</b>	<b>\$145,748</b>
			Indirect and Induced	\$774,932
<b>Total Propane-Heated Households</b>	<b>77,429</b>		<b>Total Odorized Propane Industry Contribution to New Jersey GDP</b>	<b>\$920,679</b>
Propane Share of New Jersey Home Heating		2.28%		

2021 Employment		2021 Labor Income	
			(\$1,000)
Production	4	Production	\$561
Transportation, Storage, and Wholesale	8	Transportation, Storage, and Wholesale	\$826
Retail	768	Retail	\$51,012
<b>Direct New Jersey Employment Related to Odorized Propane</b>	<b>780</b>	<b>Direct Labor Income in New Jersey Odorized Propane Industry</b>	<b>\$52,399</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	29,768,000	2.42%
Gas Processing Plants	-	0.00%
<b>Total New Jersey Odorized Propane Production</b>	<b>29,768,000</b>	<b>0.33%</b>

## A.34 Odorized Propane's Impact on New Mexico Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	52,478,382	64.5%	<b>Total Market Value of Odorized Propane Sold in New Mexico (\$1,000)</b>	<b>\$197,500</b>
Commercial	19,826,470	24.4%	Supply	\$552,014
Cylinder	2,569,609	3.2%	Transportation, Storage, and Wholesale	\$18,528
Internal Combustion	3,013,000	3.7%	Retail	\$107,051
Industrial	1,865,000	2.3%		
Agricultural	1,669,000	2.0%		
<b>Total New Mexico Odorized Propane Demand</b>	<b>81,421,462</b>	<b>100.0%</b>	<b>Total Direct Value Added in New Mexico</b>	<b>\$677,593</b>
			Indirect and Induced	\$806,063
<b>Total Propane-Heated Households</b>	<b>53,645</b>		<b>Total Odorized Propane Industry Contribution to New Mexico GDP</b>	<b>\$1,483,656</b>
Propane Share of New Mexico Home Heating		6.73%		

2021 Employment		2021 Labor Income	
			(\$1,000)
Production	856	Production	\$105,773
Transportation, Storage, and Wholesale	59	Transportation, Storage, and Wholesale	\$7,076
Retail	556	Retail	\$24,156
<b>Direct New Mexico Employment Related to Odorized Propane</b>	<b>1,471</b>	<b>Direct Labor Income in New Mexico Odorized Propane Industry</b>	<b>\$137,005</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	2,126,000	0.17%
Gas Processing Plants	441,044,000	5.70%
<b>Total New Mexico Odorized Propane Production</b>	<b>443,170,000</b>	<b>4.94%</b>

## A.35 Odorized Propane's Impact on New York Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	267,805,128	61.3%	<b>Total Market Value of Odorized Propane Sold in New York (\$1,000)</b>	<b>\$1,188,230</b>
Commercial	114,719,445	26.3%	Supply	\$32
Cylinder	11,766,665	2.7%	Transportation, Storage, and Wholesale	\$55,627
Internal Combustion	15,019,000	3.4%	Retail	\$627,097
Industrial	19,499,000	4.5%		
Agricultural	8,052,000	1.8%		
<b>Total New York Odorized Propane Demand</b>	<b>436,861,238</b>	<b>100.0%</b>	<b>Total Direct Value Added in New York</b>	<b>\$682,757</b>
			Indirect and Induced	\$2,245,513
<b>Total Propane-Heated Households</b>	<b>334,341</b>		<b>Total Odorized Propane Industry Contribution to New York GDP</b>	<b>\$2,928,270</b>
Propane Share of New York Home Heating		4.44%		
2021 Employment			2021 Labor Income	
				(\$1,000)
Production		0	Production	\$18
Transportation, Storage, and Wholesale		32	Transportation, Storage, and Wholesale	\$3,077
Retail		3,083	Retail	\$222,999
<b>Direct New York Employment Related to Odorized Propane</b>		<b>3,115</b>	<b>Direct Labor Income in New York Odorized Propane Industry</b>	<b>\$226,093</b>
2021 Odorized Propane Production				
	(Gallons)	(% of U.S. Total)		
Refineries	-	0.00%		
Gas Processing Plants	-	0.00%		
<b>Total New York Odorized Propane Production</b>	<b>-</b>	<b>0.00%</b>		

## A.36 Odorized Propane's Impact on North Carolina Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	156,979,820	41.8%
Commercial	99,849,594	26.6%
Cylinder	13,240,186	3.5%
Internal Combustion	21,433,000	5.7%
Industrial	13,094,000	3.5%
Agricultural	70,824,000	18.9%
<b>Total North Carolina Odorized Propane Demand</b>	<b>375,420,600</b>	<b>100.0%</b>
<b>Total Propane-Heated Households</b>	<b>263,683</b>	
Propane Share of North Carolina Home Heating		6.54%

2021 Employment	
Production	-
Transportation, Storage, and Wholesale	31
Retail	2,942
<b>Direct North Carolina Employment Related to Odorized Propane</b>	<b>2,973</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
<b>Total North Carolina Odorized Propane Production</b>	<b>-</b>	<b>0.00%</b>

2021 Contribution to State Economy	
	(\$1,000)
<b>Total Market Value of Odorized Propane Sold in North Carolina (\$1,000)</b>	<b>\$1,063,528</b>
Supply	\$0
Transportation, Storage, and Wholesale	\$49,339
Retail	\$602,570
<b>Total Direct Value Added in North Carolina</b>	<b>\$651,908</b>
Indirect and Induced	\$1,389,160
<b>Total Odorized Propane Industry Contribution to North Carolina GDP</b>	<b>\$2,041,068</b>

2021 Labor Income	
	(\$1,000)
Production	\$0
Transportation, Storage, and Wholesale	\$3,046
Retail	\$158,281
<b>Direct Labor Income in North Carolina Odorized Propane Industry</b>	<b>\$161,327</b>

## A.37 Odorized Propane's Impact on North Dakota Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	65,698,593	53.4%	<b>Total Market Value of Odorized Propane Sold in North Dakota (\$1,000)</b>	<b>\$234,819</b>
Commercial	25,496,906	20.7%	Supply	\$709,942
Cylinder	2,315,952	1.9%	Transportation, Storage, and Wholesale	\$25,311
Internal Combustion	3,078,000	2.5%	Retail	\$60,837
Industrial	10,442,000	8.5%		
Agricultural	16,003,000	13.0%		
<b>Total North Dakota Odorized Propane Demand</b>	<b>123,034,451</b>	<b>100.0%</b>	<b>Total Direct Value Added in North Dakota</b>	<b>\$796,091</b>
			Indirect and Induced	\$899,507
<b>Total Propane-Heated Households</b>	<b>43,586</b>		<b>Total Odorized Propane Industry Contribution to North Dakota GDP</b>	<b>\$1,695,598</b>
Propane Share of North Dakota Home Heating		13.77%		
2021 Employment			2021 Labor Income	
				(\$1,000)
Production		807	Production	\$99,847
Transportation, Storage, and Wholesale		64	Transportation, Storage, and Wholesale	\$7,630
Retail		102	Retail	\$4,836
<b>Direct North Dakota Employment Related to Odorized Propane</b>		<b>974</b>	<b>Direct Labor Income in North Dakota Odorized Propane Industry</b>	<b>\$112,314</b>
2021 Odorized Propane Production				
	(Gallons)	(% of U.S. Total)		
Refineries	5,034,000	0.41%		
Gas Processing Plants	591,904,000	7.64%		
<b>Total North Dakota Odorized Propane Production</b>	<b>596,938,000</b>	<b>6.65%</b>		

## A.38 Odorized Propane's Impact on Ohio Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	196,380,926	56.8%	<b>Total Market Value of Odorized Propane Sold in Ohio (\$1,000)</b>	<b>\$665,013</b>
Commercial	63,703,485	18.4%	Supply	\$139,707
Cylinder	11,709,484	3.4%	Transportation, Storage, and Wholesale	\$64,272
Internal Combustion	39,241,000	11.4%	Retail	\$176,187
Industrial	5,315,000	1.5%	<b>Total Direct Value Added in Ohio</b>	<b>\$380,167</b>
Agricultural	29,357,000	8.5%	Indirect and Induced	\$1,195,757
<b>Total Ohio Odorized Propane Demand</b>	<b>345,706,895</b>	<b>100.0%</b>	<b>Total Odorized Propane Industry Contribution to Ohio GDP</b>	<b>\$1,575,923</b>
<b>Total Propane-Heated Households</b>	<b>258,587</b>			
Propane Share of Ohio Home Heating		5.44%		

2021 Employment		2021 Labor Income	
			(\$1,000)
Production	112	Production	\$14,003
Transportation, Storage, and Wholesale	84	Transportation, Storage, and Wholesale	\$8,592
Retail	1,421	Retail	\$68,277
<b>Direct Ohio Employment Related to Odorized Propane</b>	<b>1,617</b>	<b>Direct Labor Income in Ohio Odorized Propane Industry</b>	<b>\$90,872</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	38,050,000	3.09%
Gas Processing Plants	110,850,000	1.43%
<b>Total Ohio Odorized Propane Production</b>	<b>148,900,000</b>	<b>1.66%</b>

## A.39 Odorized Propane's Impact on Oklahoma Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	80,635,091	57.2%	<b>Total Market Value of Odorized Propane Sold in Oklahoma (\$1,000)</b>	<b>\$271,119</b>
Commercial	28,898,051	20.5%	Supply	\$873,010
Cylinder	7,364,430	5.2%	Transportation, Storage, and Wholesale	\$55,096
Internal Combustion	12,731,000	9.0%	Retail	\$71,919
Industrial	3,571,000	2.5%		
Agricultural	7,680,000	5.5%		
<b>Total Oklahoma Odorized Propane Demand</b>	<b>140,879,572</b>	<b>100.0%</b>	<b>Total Direct Value Added in Oklahoma</b>	<b>\$1,000,024</b>
			Indirect and Induced	\$1,254,976
<b>Total Propane-Heated Households</b>	<b>95,641</b>		<b>Total Odorized Propane Industry Contribution to Oklahoma GDP</b>	<b>\$2,255,000</b>
Propane Share of Oklahoma Home Heating		6.36%		

2021 Employment		2021 Labor Income	
			(\$1,000)
Production	796	Production	\$98,799
Transportation, Storage, and Wholesale	153	Transportation, Storage, and Wholesale	\$17,159
Retail	591	Retail	\$28,833
<b>Direct Oklahoma Employment Related to Odorized Propane</b>	<b>1,540</b>	<b>Direct Labor Income in Oklahoma Odorized Propane Industry</b>	<b>\$144,791</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	29,291,000	2.38%
Gas Processing Plants	805,223,000	10.40%
<b>Total Oklahoma Odorized Propane Production</b>	<b>834,514,000</b>	<b>9.30%</b>

## A.40 Odorized Propane's Impact on Oregon Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	34,687,932	35.3%	<b>Total Market Value of Odorized Propane Sold in Oregon (\$1,000)</b>	<b>\$219,418</b>
Commercial	44,424,325	45.3%	Supply	\$0
Cylinder	2,233,867	2.3%	Transportation, Storage, and Wholesale	\$12,496
Internal Combustion	7,276,000	7.4%	Retail	\$68,937
Industrial	2,185,000	2.2%		
Agricultural	7,325,000	7.5%		
<b>Total Oregon Odorized Propane Demand</b>	<b>98,132,123</b>	<b>100.0%</b>	<b>Total Direct Value Added in Oregon</b>	<b>\$81,432</b>
			Indirect and Induced	\$360,299
<b>Total Propane-Heated Households</b>	<b>30,549</b>		<b>Total Odorized Propane Industry Contribution to Oregon GDP</b>	<b>\$441,731</b>
Propane Share of Oregon Home Heating		1.84%		
2021 Employment			2021 Labor Income	
				(\$1,000)
Production	-		Production	\$0
Transportation, Storage, and Wholesale	7		Transportation, Storage, and Wholesale	\$691
Retail	324		Retail	\$16,933
<b>Direct Oregon Employment Related to Odorized Propane</b>	<b>331</b>		<b>Direct Labor Income in Oregon Odorized Propane Industry</b>	<b>\$17,625</b>
2021 Odorized Propane Production				
	(Gallons)	(% of U.S. Total)		
Refineries	-	0.00%		
Gas Processing Plants	-	0.00%		
<b>Total Oregon Odorized Propane Production</b>	<b>-</b>	<b>0.00%</b>		



## A.41 Odorized Propane's Impact on Pennsylvania Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	190,126,109	51.0%	<b>Total Market Value of Odorized Propane Sold in Pennsylvania (\$1,000)</b>	<b>\$996,059</b>
Commercial	91,491,581	24.5%	Supply	\$300,793
Cylinder	15,573,280	4.2%	Transportation, Storage, and Wholesale	\$55,890
Internal Combustion	27,361,000	7.3%	Retail	\$517,058
Industrial	20,204,000	5.4%		
Agricultural	28,067,000	7.5%		
<b>Total Pennsylvania Odorized Propane Demand</b>	<b>372,822,970</b>	<b>100.0%</b>	<b>Total Direct Value Added in Pennsylvania</b>	<b>\$873,742</b>
			Indirect and Induced	\$1,753,540
<b>Total Propane-Heated Households</b>	<b>237,882</b>		<b>Total Odorized Propane Industry Contribution to Pennsylvania GDP</b>	<b>\$2,627,281</b>
Propane Share of Pennsylvania Home Heating		4.62%		
2021 Employment			2021 Labor Income	
				(\$1,000)
Production		203	Production	\$25,318
Transportation, Storage, and Wholesale		62	Transportation, Storage, and Wholesale	\$6,711
Retail		2,622	Retail	\$147,350
<b>Direct Pennsylvania Employment Related to Odorized Propane</b>		<b>2,888</b>	<b>Direct Labor Income in Pennsylvania Odorized Propane Industry</b>	<b>\$179,380</b>
2021 Odorized Propane Production				
	(Gallons)	(% of U.S. Total)		
Refineries	12,627,000	1.02%		
Gas Processing Plants	251,099,000	3.24%		
<b>Total Pennsylvania Odorized Propane Production</b>	<b>263,726,000</b>	<b>2.94%</b>		

## A.42 Odorized Propane's Impact on Rhode Island Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	15,747,000	56.9%	<b>Total Market Value of Odorized Propane Sold in Rhode Island (\$1,000)</b>	<b>\$83,366</b>
Commercial	8,409,356	30.4%	Supply	\$0
Cylinder	2,361,000	8.5%	Transportation, Storage, and Wholesale	\$3,524
Internal Combustion	798,000	2.9%	Retail	\$45,361
Industrial	185,000	0.7%		
Agricultural	176,000	0.6%		
<b>Total Rhode Island Odorized Propane Demand</b>	<b>27,676,356</b>	<b>100.0%</b>	<b>Total Direct Value Added in Rhode Island</b>	<b>\$48,885</b>
			Indirect and Induced	\$110,950
<b>Total Propane-Heated Households</b>	<b>17,055</b>		<b>Total Odorized Propane Industry Contribution to Rhode Island GDP</b>	<b>\$159,836</b>
Propane Share of Rhode Island Home Heating		4.00%		
2021 Employment			2021 Labor Income	
				(\$1,000)
Production	-		Production	\$0
Transportation, Storage, and Wholesale	2		Transportation, Storage, and Wholesale	\$195
Retail	239		Retail	\$14,501
<b>Direct Rhode Island Employment Related to Odorized Propane</b>	<b>241</b>		<b>Direct Labor Income in Rhode Island Odorized Propane Industry</b>	<b>\$14,696</b>
2021 Odorized Propane Production				
	(Gallons)	(% of U.S. Total)		
Refineries	-	0.00%		
Gas Processing Plants	-	0.00%		
<b>Total Rhode Island Odorized Propane Production</b>	<b>-</b>	<b>0.00%</b>		

## A.43 Odorized Propane's Impact on South Carolina Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	38,581,276	36.2%
Commercial	31,610,505	29.6%
Cylinder	9,129,767	8.6%
Internal Combustion	13,244,000	12.4%
Industrial	5,350,000	5.0%
Agricultural	8,762,000	8.2%
<b>Total South Carolina Odorized Propane Demand</b>	<b>106,677,548</b>	<b>100.0%</b>
<b>Total Propane-Heated Households</b>	<b>68,881</b>	
Propane Share of South Carolina Home Heating		3.49%

2021 Contribution to State Economy		(\$1,000)
<b>Total Market Value of Odorized Propane Sold in South Carolina (\$1,000)</b>		<b>\$299,077</b>
Supply		\$0
Transportation, Storage, and Wholesale		\$15,119
Retail		\$168,072
<b>Total Direct Value Added in South Carolina</b>		<b>\$183,190</b>
Indirect and Induced		\$473,244
<b>Total Odorized Propane Industry Contribution to South Carolina GDP</b>		<b>\$656,435</b>

2021 Employment	
Production	-
Transportation, Storage, and Wholesale	12
Retail	1,023
<b>Direct South Carolina Employment Related to Odorized Propane</b>	<b>1,034</b>

2021 Labor Income		(\$1,000)
Production		\$0
Transportation, Storage, and Wholesale		\$1,153
Retail		\$59,275
<b>Direct Labor Income in South Carolina Odorized Propane Industry</b>		<b>\$60,428</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
<b>Total South Carolina Odorized Propane Production</b>	<b>-</b>	<b>0.00%</b>

## A.44 Odorized Propane's Impact on South Dakota Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	46,563,837	57.2%	<b>Total Market Value of Odorized Propane Sold in South Dakota (\$1,000)</b>	<b>\$156,791</b>
Commercial	7,812,043	9.6%	Supply	\$224
Cylinder	552,586	0.7%	Transportation, Storage, and Wholesale	\$10,372
Internal Combustion	2,883,000	3.5%	Retail	\$41,616
Industrial	1,127,000	1.4%		
Agricultural	22,516,000	27.6%		
<b>Total South Dakota Odorized Propane Demand</b>	<b>81,454,467</b>	<b>100.0%</b>	<b>Total Direct Value Added in South Dakota</b>	<b>\$52,213</b>
			Indirect and Induced	\$110,296
<b>Total Propane-Heated Households</b>	<b>54,643</b>		<b>Total Odorized Propane Industry Contribution to South Dakota GDP</b>	<b>\$162,508</b>
Propane Share of South Dakota Home Heating		15.80%		
2021 Employment			2021 Labor Income	
				(\$1,000)
Production	1		Production	\$126
Transportation, Storage, and Wholesale	6		Transportation, Storage, and Wholesale	\$575
Retail	232		Retail	\$10,025
<b>Direct South Dakota Employment Related to Odorized Propane</b>	<b>239</b>		<b>Direct Labor Income in South Dakota Odorized Propane Industry</b>	<b>\$10,726</b>
2021 Odorized Propane Production				
	(Gallons)	(% of U.S. Total)		
Refineries	-	0.00%		
Gas Processing Plants	-	0.00%		
<b>Total South Dakota Odorized Propane Production</b>	<b>-</b>	<b>0.00%</b>		

## A.45 Odorized Propane's Impact on Tennessee Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	58,563,227	47.5%	<b>Total Market Value of Odorized Propane Sold in Tennessee (\$1,000)</b>	<b>\$233,392</b>
Commercial	31,898,318	25.9%	Supply	\$822
Cylinder	8,359,304	6.8%	Transportation, Storage, and Wholesale	\$16,137
Internal Combustion	16,095,000	13.0%	Retail	\$58,953
Industrial	3,933,000	3.2%		
Agricultural	4,499,000	3.6%		
<b>Total Tennessee Odorized Propane Demand</b>	<b>123,347,848</b>	<b>100.0%</b>	<b>Total Direct Value Added in Tennessee</b>	<b>\$75,912</b>
			Indirect and Induced	\$522,090
<b>Total Propane-Heated Households</b>	<b>97,786</b>		<b>Total Odorized Propane Industry Contribution to Tennessee GDP</b>	<b>\$598,002</b>
Propane Share of Tennessee Home Heating		3.67%		

2021 Employment		2021 Labor Income	
			(\$1,000)
Production	2	Production	\$315
Transportation, Storage, and Wholesale	10	Transportation, Storage, and Wholesale	\$982
Retail	710	Retail	\$37,392
<b>Direct Tennessee Employment Related to Odorized Propane</b>	<b>722</b>	<b>Direct Labor Income in Tennessee Odorized Propane Industry</b>	<b>\$38,689</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	12,911,000	1.05%
Gas Processing Plants	760,000	0.01%
<b>Total Tennessee Odorized Propane Production</b>	<b>13,671,000</b>	<b>0.15%</b>

## A.46 Odorized Propane's Impact on Texas Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	109,174,611	24.6%	<b>Total Market Value of Odorized Propane Sold in Texas (\$1,000)</b>	<b>\$1,002,803</b>
Commercial	230,952,184	52.1%	Supply	\$4,504,105
Cylinder	31,384,935	7.1%	Transportation, Storage, and Wholesale	\$140,623
Internal Combustion	50,120,000	11.3%	Retail	\$510,135
Industrial	8,035,000	1.8%		
Agricultural	13,384,000	3.0%		
<b>Total Texas Odorized Propane Demand</b>	<b>443,050,730</b>	<b>100.0%</b>	<b>Total Direct Value Added in Texas</b>	<b>\$5,154,864</b>
			Indirect and Induced	\$7,429,824
<b>Total Propane-Heated Households</b>	<b>299,884</b>		<b>Total Odorized Propane Industry Contribution to Texas GDP</b>	<b>\$12,584,687</b>
Propane Share of Texas Home Heating		2.93%		

2021 Employment			2021 Labor Income	
				(\$1,000)
Production	4,664		Production	\$578,717
Transportation, Storage, and Wholesale	511		Transportation, Storage, and Wholesale	\$59,361
Retail	2,837		Retail	\$178,148
<b>Direct Texas Employment Related to Odorized Propane</b>	<b>8,012</b>		<b>Direct Labor Income in Texas Odorized Propane Industry</b>	<b>\$816,226</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	472,107,000	38.32%
Gas Processing Plants	3,557,217,000	45.94%
<b>Total Texas Odorized Propane Production</b>	<b>4,029,324,000</b>	<b>44.90%</b>

## A.47 Odorized Propane's Impact on Utah Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	13,823,715	21.6%
Commercial	33,996,241	53.0%
Cylinder	3,244,630	5.1%
Internal Combustion	6,146,000	9.6%
Industrial	3,020,000	4.7%
Agricultural	3,912,000	6.1%
<b>Total Utah Odorized Propane Demand</b>	<b>64,142,586</b>	<b>100.0%</b>
<b>Total Propane-Heated Households</b>	<b>24,266</b>	
Propane Share of Utah Home Heating		2.35%

2021 Employment	
Production	55
Transportation, Storage, and Wholesale	10
Retail	219
<b>Direct Utah Employment Related to Odorized Propane</b>	<b>284</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	6,794,000	0.55%
Gas Processing Plants	26,191,000	0.34%
<b>Total Utah Odorized Propane Production</b>	<b>32,985,000</b>	<b>0.37%</b>

2021 Contribution to State Economy	
	(\$1,000)
<b>Total Market Value of Odorized Propane Sold in Utah (\$1,000)</b>	<b>\$120,712</b>
Supply	\$35,599
Transportation, Storage, and Wholesale	\$9,535
Retail	\$37,291
<b>Total Direct Value Added in Utah (\$1,000)</b>	<b>\$82,424</b>
Indirect and Induced	\$303,674
<b>Total Odorized Propane Industry Contribution to Utah GDP</b>	<b>\$386,098</b>

2021 Labor Income	
	(\$1,000)
Production	\$6,858
Transportation, Storage, and Wholesale	\$1,026
Retail	\$12,647
<b>Direct Labor Income in Utah Odorized Propane Industry</b>	<b>\$20,531</b>

## A.48 Odorized Propane's Impact on Vermont Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	70,426,821	64.5%
Commercial	36,034,917	33.0%
Cylinder	646,354	0.6%
Internal Combustion	265,000	0.2%
Industrial	1,288,000	1.2%
Agricultural	607,000	0.6%
<b>Total Vermont Odorized Propane Demand</b>	<b>109,268,092</b>	<b>100.0%</b>
<b>Total Propane-Heated Households</b>	<b>47,294</b>	
Propane Share of Vermont Home Heating		18.02%

2021 Employment	
Production	-
Transportation, Storage, and Wholesale	8
Retail	611
<b>Direct Vermont Employment Related to Odorized Propane</b>	<b>618</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
<b>Total Vermont Odorized Propane Production</b>	<b>-</b>	<b>0.00%</b>

2021 Contribution to State Economy	
	(\$1,000)
<b>Total Market Value of Odorized Propane Sold in Vermont (\$1,000)</b>	<b>\$333,327</b>
Supply	\$0
Transportation, Storage, and Wholesale	\$13,914
Retail	\$183,312
<b>Total Direct Value Added in Vermont</b>	<b>\$197,226</b>
Indirect and Induced	\$243,232
<b>Total Odorized Propane Industry Contribution to Vermont GDP</b>	<b>\$440,458</b>

2021 Labor Income	
	(\$1,000)
Production	\$0
Transportation, Storage, and Wholesale	\$769
Retail	\$37,396
<b>Direct Labor Income in Vermont Odorized Propane Industry</b>	<b>\$38,165</b>



## A.49 Odorized Propane's Impact on Virginia Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	120,430,898	46.6%	<b>Total Market Value of Odorized Propane Sold in Virginia (\$1,000)</b>	<b>\$737,912</b>
Commercial	85,704,882	33.2%	Supply	\$1
Cylinder	7,905,572	3.1%	Transportation, Storage, and Wholesale	\$32,904
Internal Combustion	7,459,000	2.9%	Retail	\$420,669
Industrial	12,234,000	4.7%		
Agricultural	24,673,000	9.5%		
<b>Total Virginia Odorized Propane Demand</b>	<b>258,407,352</b>	<b>100.0%</b>	<b>Total Direct Value Added in Virginia</b>	<b>\$453,574</b>
			Indirect and Induced	\$1,021,488
<b>Total Propane-Heated Households</b>	<b>137,353</b>		<b>Total Odorized Propane Industry Contribution to Virginia GDP</b>	<b>\$1,475,062</b>
Propane Share of Virginia Home Heating		4.23%		
2021 Employment			2021 Labor Income	
				(\$1,000)
Production		0	Production	\$1
Transportation, Storage, and Wholesale		19	Transportation, Storage, and Wholesale	\$1,820
Retail		1,566	Retail	\$90,899
<b>Direct Virginia Employment Related to Odorized Propane</b>		<b>1,584</b>	<b>Direct Labor Income in Virginia Odorized Propane Industry</b>	<b>\$92,720</b>
2021 Odorized Propane Production				
	(Gallons)	(% of U.S. Total)		
Refineries	-	0.00%		
Gas Processing Plants	-	0.00%		
<b>Total Virginia Odorized Propane Production</b>	<b>-</b>	<b>0.00%</b>		

## A.50 Odorized Propane's Impact on Washington Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	92,920,571	44.8%
Commercial	57,608,264	27.8%
Cylinder	9,419,788	4.5%
Internal Combustion	20,014,000	9.6%
Industrial	6,161,000	3.0%
Agricultural	21,280,000	10.3%
<b>Total Washington Odorized Propane Demand</b>	<b>207,403,624</b>	<b>100.0%</b>
<b>Total Propane-Heated Households</b>	<b>91,012</b>	
Propane Share of Washington Home Heating		3.10%

2021 Employment	
Production	2
Transportation, Storage, and Wholesale	16
Retail	812
<b>Direct Washington Employment Related to Odorized Propane</b>	<b>831</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	15,918,000	1.29%
Gas Processing Plants	-	0.00%
<b>Total Washington Odorized Propane Production</b>	<b>15,918,000</b>	<b>0.18%</b>

2021 Contribution to State Economy	
	(\$1,000)
<b>Total Market Value of Odorized Propane Sold in Washington (\$1,000)</b>	<b>\$471,395</b>
Supply	\$0
Transportation, Storage, and Wholesale	\$26,925
Retail	\$153,406
<b>Total Direct Value Added in Washington</b>	<b>\$180,331</b>
Indirect and Induced	\$813,875
<b>Total Odorized Propane Industry Contribution to Washington GDP</b>	<b>\$994,205</b>

2021 Labor Income	
	(\$1,000)
Production	\$316
Transportation, Storage, and Wholesale	\$1,589
Retail	\$47,251
<b>Direct Labor Income in Washington Odorized Propane Industry</b>	<b>\$49,156</b>

## A.51 Odorized Propane's Impact on West Virginia Economy

2021 Odorized Propane Sales Breakout			2021 Contribution to State Economy	
	(Gallons)	(% of State)		(\$1,000)
Residential	30,779,668	59.6%	<b>Total Market Value of Odorized Propane Sold in West Virginia (\$1,000)</b>	<b>\$150,963</b>
Commercial	10,886,436	21.1%	Supply	\$839,325
Cylinder	963,242	1.9%	Transportation, Storage, and Wholesale	\$44,545
Internal Combustion	1,794,000	3.5%	Retail	\$87,573
Industrial	895,000	1.7%		
Agricultural	6,335,000	12.3%		
<b>Total West Virginia Odorized Propane Demand</b>	<b>51,653,347</b>	<b>100.0%</b>	<b>Total Direct Value Added in West Virginia</b>	<b>\$971,443</b>
			Indirect and Induced	\$1,109,770
<b>Total Propane-Heated Households</b>	<b>36,994</b>		<b>Total Odorized Propane Industry Contribution to West Virginia GDP</b>	<b>\$2,081,213</b>
Propane Share of West Virginia Home Heating		5.20%		
2021 Employment			2021 Labor Income	
				(\$1,000)
Production	602		Production	\$74,857
Transportation, Storage, and Wholesale	143		Transportation, Storage, and Wholesale	\$15,957
Retail	130		Retail	\$6,542
<b>Direct West Virginia Employment Related to Odorized Propane</b>	<b>876</b>		<b>Direct Labor Income in West Virginia Odorized Propane Industry</b>	<b>\$97,356</b>
2021 Odorized Propane Production				
	(Gallons)	(% of U.S. Total)		
Refineries	-	0.00%		
Gas Processing Plants	752,234,000	9.72%		
<b>Total West Virginia Odorized Propane Production</b>	<b>752,234,000</b>	<b>8.38%</b>		

## A.52 Odorized Propane's Impact on Wisconsin Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	318,646,067	70.5%
Commercial	64,186,183	14.2%
Cylinder	5,177,799	1.1%
Internal Combustion	21,488,000	4.8%
Industrial	3,961,000	0.9%
Agricultural	38,233,000	8.5%
<b>Total Wisconsin Odorized Propane Demand</b>	<b>451,692,049</b>	<b>100.0%</b>
<b>Total Propane-Heated Households</b>	<b>278,175</b>	
Propane Share of Wisconsin Home Heating		11.58%

2021 Employment	
Production	0
Transportation, Storage, and Wholesale	33
Retail	1,327
<b>Direct Wisconsin Employment Related to Odorized Propane</b>	<b>1,360</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	2,111,000	0.17%
Gas Processing Plants	-	0.00%
<b>Total Wisconsin Odorized Propane Production</b>	<b>2,111,000</b>	<b>0.02%</b>

2021 Contribution to State Economy		(\$1,000)
<b>Total Market Value of Odorized Propane Sold in Wisconsin (\$1,000)</b>		<b>\$889,384</b>
Supply		\$0
Transportation, Storage, and Wholesale		\$57,584
Retail		\$250,838
<b>Total Direct Value Added in Wisconsin</b>		<b>\$308,423</b>
Indirect and Induced		\$736,173
<b>Total Odorized Propane Industry Contribution to Wisconsin GDP</b>		<b>\$1,044,596</b>

2021 Labor Income		(\$1,000)
Production		\$37
Transportation, Storage, and Wholesale		\$3,198
Retail		\$62,659
<b>Direct Labor Income in Wisconsin Odorized Propane Industry</b>		<b>\$65,893</b>

## A.53 Odorized Propane's Impact on Wyoming Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	34,341,537	57.2%
Commercial	10,755,167	17.9%
Cylinder	2,304,613	3.8%
Internal Combustion	940,000	1.6%
Industrial	10,686,000	17.8%
Agricultural	974,000	1.6%
<b>Total Wyoming Odorized Propane Demand</b>	<b>60,001,317</b>	<b>100.0%</b>
<b>Total Propane-Heated Households</b>	<b>24,891</b>	
Propane Share of Wyoming Home Heating		10.79%

2021 Employment	
Production	210
Transportation, Storage, and Wholesale	23
Retail	181
<b>Direct Wyoming Employment Related to Odorized Propane</b>	<b>413</b>

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	3,764,000	0.31%
Gas Processing Plants	167,377,000	2.16%
<b>Total Wyoming Odorized Propane Production</b>	<b>171,141,000</b>	<b>1.91%</b>

2021 Contribution to State Economy	
	(\$1,000)
<b>Total Market Value of Odorized Propane Sold in Wyoming (\$1,000)</b>	<b>\$119,767</b>
Supply	\$197,000
Transportation, Storage, and Wholesale	\$11,143
Retail	\$41,779
<b>Total Direct Value Added in Wyoming</b>	<b>\$249,922</b>
Indirect and Induced	\$301,118
<b>Total Odorized Propane Industry Contribution to Wyoming GDP</b>	<b>\$551,040</b>

2021 Labor Income	
	(\$1,000)
Production	\$25,986
Transportation, Storage, and Wholesale	\$2,617
Retail	\$10,480
<b>Direct Labor Income in Wyoming Odorized Propane Industry</b>	<b>\$39,082</b>

## B. Appendix: Residential Sector, 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 2021 American Community Survey (ACS). The ACS survey is performed annually.

Table 20 and Table 21 below present the U.S. Census Bureau's estimates for household heating fuel by census division 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 20: 2021 Residential Households Primary Space Heating Fuels by Division

State	Total Households in Region	Natural Gas	Propane	Electricity	Distillate <sup>41</sup>	Wood	Other/None <sup>42</sup>
New England	5,912,617	2,354,552	402,144	859,312	2,011,679	180,963	103,967
Middle Atlantic	16,075,089	9,662,190	649,652	2,687,862	2,453,177	244,358	377,850
East North Central	18,685,564	13,020,898	1,261,752	3,640,621	196,199	317,945	248,149
West North Central	8,507,758	4,947,531	848,982	2,383,478	61,363	155,913	110,491
South Atlantic	24,999,273	6,037,449	870,814	17,005,116	499,881	230,447	355,566
East South Central	7,424,919	2,310,952	430,540	4,502,697	26,453	105,197	49,080
West South Central	14,650,357	5,356,399	505,813	8,565,374	14,199	91,945	116,627
Mountain	9,208,923	5,103,594	406,952	3,281,134	26,534	240,614	150,095
Pacific	18,546,492	10,102,312	584,391	6,382,328	177,225	392,414	907,822
<b>Total U.S.</b>	<b>124,010,992</b>	<b>58,895,877</b>	<b>5,961,040</b>	<b>49,307,922</b>	<b>5,466,710</b>	<b>1,959,796</b>	<b>2,419,647</b>

Source: US Census American Community Survey

<sup>41</sup> Distillate includes Fuel Oil and Diesel Home Heated Households

<sup>42</sup> Includes Coal, Solar, Other, and No Fuel Households,

Table 21: 2021 Residential Households Primary Space Heating Fuels (1)

State	Total Households in State	Natural Gas	Propane	Electricity	Distillate	Wood	Other/None
Alabama	1,902,983	506,065	105,989	1,261,530	2,183	15,093	12,123
Alaska	260,561	129,462	5,457	34,025	74,368	12,427	4,822
Arizona	2,683,557	891,669	75,205	1,614,048	2,277	47,786	52,572
Arkansas	1,158,460	435,555	76,706	601,875	1,119	35,536	7,669
California	13,217,586	8,332,653	449,072	3,657,257	31,065	183,114	564,425
Colorado	2,227,932	1,514,366	106,077	536,917	2,493	33,934	34,145
Connecticut	1,397,324	505,046	67,902	236,949	544,406	22,039	20,982
Delaware	381,097	162,906	35,082	136,290	38,885	2,693	5,241
District of Columbia	310,104	159,746	2,916	135,740	3,271	9	8,422
Florida	8,157,420	393,172	70,529	7,475,052	11,166	10,526	196,975
Georgia	3,885,371	1,506,406	173,296	2,151,247	5,982	24,014	24,426
Hawaii	478,413	13,008	8,301	172,642	208	1,472	282,782
Idaho	657,101	340,415	34,513	222,958	9,189	42,062	7,964
Illinois	4,930,255	3,778,596	204,950	858,947	6,231	18,537	62,994
Indiana	2,622,601	1,555,229	187,276	792,518	15,872	45,586	26,120
Iowa	1,275,893	776,982	162,294	299,586	5,560	14,843	16,628
Kansas	1,139,738	733,788	87,714	292,257	2,095	15,042	8,842
Kentucky	1,748,475	642,357	107,533	928,864	13,455	41,255	15,011
Louisiana	1,748,688	572,874	33,582	1,123,321	1,210	7,480	10,221
Maine	571,064	45,251	68,174	46,277	345,180	51,807	14,375
Maryland	2,294,270	998,011	82,080	978,263	176,350	25,152	34,414
Massachusetts	2,714,448	1,412,423	106,984	458,728	662,896	31,364	42,053
Michigan	3,976,729	3,021,787	332,764	421,774	38,925	102,746	58,733
Minnesota	2,229,100	1,463,765	238,928	409,300	33,675	40,467	42,965
Mississippi	1,108,670	327,081	119,232	641,558	2,254	11,782	6,763
Missouri	2,433,819	1,224,956	207,496	905,710	4,631	71,931	19,095
Montana	436,481	228,153	57,866	108,777	3,239	31,549	6,897
Nebraska	766,887	456,506	54,321	236,792	3,087	7,748	8,433
Nevada	1,141,952	662,076	30,489	411,363	6,243	13,819	17,962
New Hampshire	540,498	113,628	94,735	54,559	228,181	34,180	15,215
New Jersey	3,397,156	2,521,916	77,429	484,942	256,421	11,506	44,942
New Mexico	797,596	497,806	53,645	177,597	1,535	50,463	16,550
New York	7,530,150	4,489,695	334,341	972,142	1,405,933	113,064	214,975
North Carolina	4,034,684	996,846	263,683	2,583,406	103,743	56,145	30,861

Source: US Census American Community Survey

Table 22: 2021 Residential Households Primary Space Heating Fuels (contd.)

State	Total Households in State	Natural Gas	Propane	Electricity	Distillate	Wood	Other/None
North Dakota	316,542	129,437	43,586	127,700	7,021	1,271	7,527
Ohio	4,754,161	3,091,191	258,587	1,171,217	92,977	77,024	63,165
Oklahoma	1,503,868	767,563	95,641	601,072	2,955	20,799	15,838
Oregon	1,658,091	625,436	30,549	860,709	25,507	94,306	21,584
Pennsylvania	5,147,783	2,650,579	237,882	1,230,778	790,823	119,788	117,933
Rhode Island	426,769	230,717	17,055	46,017	122,269	5,613	5,098
South Carolina	1,976,447	456,967	68,881	1,407,926	13,157	13,741	15,775
South Dakota	345,779	162,097	54,643	112,133	5,294	4,611	7,001
Tennessee	2,664,791	835,449	97,786	1,670,745	8,561	37,067	15,183
Texas	10,239,341	3,580,407	299,884	6,239,106	8,915	28,130	82,899
Utah	1,033,651	831,172	24,266	156,452	1,185	10,325	10,251
Vermont	262,514	47,487	47,294	16,782	108,747	35,960	6,244
Virginia	3,248,528	1,072,027	137,353	1,817,805	128,914	61,828	30,601
Washington	2,931,841	1,001,753	91,012	1,657,695	46,077	101,095	34,209
West Virginia	711,352	291,368	36,994	319,387	18,413	36,339	8,851
Wisconsin	2,401,818	1,574,095	278,175	396,165	42,194	74,052	37,137
Wyoming	230,653	137,937	24,891	53,022	373	10,676	3,754
<b>U.S. Total</b>	<b>124,010,992</b>	<b>58,895,877</b>	<b>5,961,040</b>	<b>49,307,922</b>	<b>5,466,710</b>	<b>1,959,796</b>	<b>2,419,647</b>

Source: US Census American Community Survey



## C. Appendix: NAICS Codes and Definitions

Table 23: 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 <sup>43</sup>	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 & 2019 NAICS Manuals

<sup>43</sup> 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 2<sup>nd</sup> 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.

## D. Appendix: Acronyms

<i>API</i>	American Petroleum Institute
<i>BEA</i>	Bureau of Economic Analysis (U.S. Department of Commerce)
<i>BLS</i>	Bureau of Labor Statistics (U.S. Department of Labor)
<i>EIA</i>	Energy Information Administration (U.S. Department of Energy)
<i>LNG</i>	Liquefied Natural Gas
<i>LPG</i>	Liquefied Petroleum Gas
<i>LRG</i>	Liquefied Refinery Gas
<i>NAICS</i>	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.
<i>NEB</i>	National Energy Board (Canada)
<i>NGL</i>	Natural Gas Liquid
<i>NPGA</i>	National Propane Gas Association
<i>PADD</i>	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.
<i>PERC</i>	Propane Education and Research Council
<i>QCEW</i>	Quarterly Census of Employment and Wages (performed by the BLS)
<i>RACC</i>	Refiner Acquisition Cost of Crude
<i>WTI</i>	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.

## **E. Appendix: Major Public Data Sources**

- 1) *2020 Residential Energy Consumption Survey*, Energy Information Administration
- 2) *2021 American Community Survey*, U.S. Census Bureau
- 3) *2021 Petroleum Supply Annual*, Energy Information Administration
- 4) *2021 Petroleum Marketing Annual*, Energy Information Administration
- 5) *2021 Natural Gas Annual*, Energy Information Administration
- 6) *2021 Annual Retail Propane Sales Report*, PERC
- 7) *Interactive Tariff and Trade Data Web*, 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 & 2016 & 2017)*, Energy Information Administration 757 Survey
- 13) *State Energy Data Systems, Consumption & Expenditures Data*, Energy Information Administration

