2021 Propane Industry's Economic Impact Report

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

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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.¹ In addition, over 42 million homes use propane for outdoor grilling activities.²

In addition to the significant role propane plays in the residential sector, the propane industry directly serves 1.1 million commercial accounts, 128,766 industrial accounts, and 589,377 agricultural accounts.³ Propane also continues to be the most common internal combustion fuel for forklifts and has rapidly become the third most common fuel for school buses behind gasoline and diesel.

Transportation demand accounts for 8 percent of global propane consumption,⁴ 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 globally⁵ 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).⁶ 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

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

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

³ 2021 Annual Retail Propane Sales Report, ICF and the Propane Education and Research Council, Washington, DC January 2020.

⁴Guide to New Autogas Markets, page 16, <u>https://online.fliphtml5.com/addge/whce/#p=1</u>, December 2021. ⁵ <u>Autogas Incentive Policies 2022 (fliphtml5.com)</u>

⁶2018 Study of the Propane Industry's Impact on U.S. and State Economics, 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 \$54.5 billion, to \$64.8 billion in 2021 – an 18.9 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 \$53.6 billion in 2018 to \$63.7 billion in 2021. The value of gallons imported have also gone up from \$0.9 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 2018⁷.

The overall impact of COVID-19 pandemic on propane demand was short-lived and was not quantitively 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

⁷ NOAA National Centers for Environmental information, Climate at a Glance: National Time Series, published May 2023 <u>https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/national/time-</u> 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).⁸

Million Gallons	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%

Table 1: Propane Production and Consumption⁹

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.

http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/cdus/degree_days/ddayexp.shtml.

⁸ 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

⁹ 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.







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 very significant increase from \$13.7 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, though one that was proportionally smaller, with its increase from \$1.9 billion direct value added in 2018 to \$2.4 billion in 2021. The retail sector experienced a decrease in the direct value added from \$11.3 billion in 2018 to \$8.95 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, 24 percent up from 2018 levels. The midstream sector/ wholesale sector accounts for 5 percent of the total direct value added, which is 2 percent lower from the 2018 levels. The retail sector of the propane industry accounts for 20 percent of total direct value added in the propane sector, which is 22 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 Northeast and South, while the West North Central, East North Central and East South Central states have 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 and midstream sectors now account for a larger percentage of the value-added activities than those associated with 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. In particular, the Pacific and West South Central saw the added economic value from odorized propane increase by over 70 percent between 2018 and 2021. These were regions that experienced one of the largest changes in propane consumption. The South Atlantic and New England census regions both experienced gains of over 60 percent and 24 percent from 2018 to 2021, respectively.



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, stayed close to 95 percent in 2018 and 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 82 percent in 2018 to 89 percent in 2021. When imports of Canadian purity propane¹⁰ and refining and gas plant feedstock are included, North American contribution to volumes increased from 94 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.

¹⁰ 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 Supply⁹

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 twostep 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 PADD¹¹ level, or in some cases at the refining district level¹², 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.¹³ 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.

¹¹ 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)

¹² 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.

¹³ 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 propane¹⁰, 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 50¹⁴, and macro-level economic drivers in its determination of state-level wage and employment data for the LPG dealers.

¹⁴ 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.

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
Odorized Propane	9,685	2,056	47,187	58,928

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
Odorized Propane	1,202,848	221,114	2,694,299	4,118,261

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.

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

		20	021 Total Employ	ees	Τα	otal ₩a	ages (\$1 ,(000)		Averag	je ₩eekly ₩a	ages	202	21 Employee	e Counts Allocated	to:	20	21 ₩ages (\$	1,000) Allocated (o:
Description	NAICS Code	Private	Government	Total	Private	Gove	ernment	1	Total	Private G	övernment	Total	All NGLs	Propane/P ropylene	Consumer-Grade Propane (C3H8)	Odorized Propane	All NGLs	Propane <i>l</i> Propylene	Consumer- Grade Propane (C3H8)	Odorized Propane
Oil and Gas Extraction	211111	112,603	-	112,603	\$20,168,878	\$	-	\$ 2	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	S	-	\$	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	s	-	\$ 1	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	s -	\$	-	\$	-	\$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	s	-	\$	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	S	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	s	-	\$	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	\$ 2	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	S	-	\$	4,525,574	\$2,970	-	\$2,970	-	-	-	-	-	-	-	-
LPG Dealers	454312	42,136	-	42,136	\$ 2,558,381	s	-	\$	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	s	-	\$ 1	13,823,761	\$2,398	-	\$2,398	-	-	-	-	-	-	-	-
Total		1,680,121	2,727	1,682,848	111,828,148		112,339	1	11,940,487	1,280	792	1,279	148,176	93,723	87,739	58,928	14,672,818	8,343,280	7,612,376	4,118,261

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

Table 4: Odorized Propane Employment and Wages Summary, 2021

	Prod	uction	Trans	., Stor., esaling	R	etail	т	Total		
State	Employee	Wages (Thousand \$)	Employee	Wages (Thousand \$)	Employee	Wages (Thousand \$)	Employee	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		
lowa	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	/68	51,012	780	52,399		
New Mexico	856	105,773	59	7,076	556	24,156	1,4/1	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	607	99,647	04	7,630	1 421	4,630	974	00.972		
Ohio	112	14,003	452	8,592	1,421	08,277	1,017	90,872		
Oklanoma	/96	96,799	103	17,159	224	28,833	1,540	144,791		
Deppendicenie	202	25.219	62	6 711	324	147 250	2000	170,220		
Pennsylvania Phodo Jolond	203	25,516	02	0,711	2,022	147,350	2,000	14 606		
Rhode Island	0	0	12	1 153	239	14,501	241	14,090		
South Dakata	0	126	12	1,133	1,023	59,275	1,034	10 726		
Johnossoo	2	215	10	092	232	27 202	238	29,690		
Terras	4 664	578 717	511	50 361	2 837	178 148	8 012	816 226		
litah	4,004	510,111	10	1 026	2,037	12 6/7	0,012	20 521		
Vermont	55	0,050	10	760	219	37 306	204	20,001		
Virginia	1	1	10	1 820	1 566	00 800	1 585	92 720		
Washington	2	316	19	1,520	1,300 810	17 251	1,303	10 156		
West Virginia	602	74 857	1/3	15 957	130	6 5/2	876	97 356		
Wisconsin	1	37	145	3 198	1 327	62 659	1 361	65 893		
Wyoming	210	25,986	23	2,617	181	10,480	413	39,082		
US Total	9,685	1,202,848	2,056	221,114	47,187	2,694,299	58,928	4,118,261		

Table 5: Propane Employment and Wages Summary, 2021

	Brod	luction	Trans	s., Stor.,	P	otail	-	otal
	Piou	luction	Who	lesaling	N	etan		otai
State	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
lowa	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
Marvland	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 Jersev	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	2,001	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
US Total	33,451	4,154,393	7,101	763,684	47,187	2,694,299	87,739	7,612,376

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

		Trans	S. Stor.					
	Prod	luction	Who	lesaling	R	etail	Т	otal
	Employee	Wages	Employee	Wages	Employee	Wages	Employee	Wages
State	Count	(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
lowa	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
US Total	74,434	9,237,318	26,555	2,741,201	47,187	2,694,299	148,176	14,672,818

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 2021.¹⁵ 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.





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.¹⁶ Table 7 shows the numbers of direct and indirect jobs

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

¹⁶ 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

Manufacturing Category	Direct	Indirect	Induced	Total
Residential Sector	5,568	4,275	5,853	15,696
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
Commercial Sector	1,557	1,196	1,637	4,390
New Construction	233	179	245	657
Appliance Replacements	1,324	1,017	1,392	3,733
Internal Combustion Engines	1,353	1,039	1,422	3,813
Forklifts	868	666	912	2,446
School Buses	144	111	152	407
LDV/MDVs	252	194	265	711
Irrigation	89	68	93	250
Agricultural Products	62	48	65	176
Industrial / Other	74	57	78	210
Total Impact	8,615	6,613	9,056	24,283

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,¹⁷ 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.

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%
Total U.S. Odorized Propane Demand	9,546		21,852	

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

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

¹⁷ 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 supply¹⁸ 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.

¹⁸ 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, up from 57.3 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 1.8 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, significantly up from \$1.9 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.
- \$1.2 billion for terminaling at NGL export and import terminals, a sharp increase from \$798 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).¹⁹ Pricing information for odorized propane is drawn from the Energy Information Administration's database of retail prices by region²⁰ 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 \$10.6 billion – a 16 percent decrease from 2018 value of \$12.5 billion. On a per-gallon basis, average retail markup across all consumer groups stayed just above the 2018 value of 121.3 cents per gallon, reaching 122.7 cents per gallon

¹⁹ 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.

²⁰ 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.

in 2021. The contribution of the retail portion of the odorized propane segment to the total value add decreased from 66 percent in 2018 to 44 percent in 2021.

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.²¹ 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.²² 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

²¹ Not all companies choose to participate in the LP Gas Magazine survey.

²² 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.²³ 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 \$36.6 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 19 percent increase from the \$53.6 billion GDP contribution the U.S. economy in 2018. The increase from in 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 23 percent from the \$16.9 billion in 2018.

²³ 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

	Val	ue Added (\$1,000)	Employment	Wages (\$1,000)	
		Indirect			
	Direct	&	Total	Direct	Direct
State		Induced			
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
Oklanoma	1,000,024	1,254,976	2,255,000	1,540	144,791
Oregon	81,432	360,299	441,731	331	17,625
Pennsylvania Rhodo Jolond	0/3,/42	1,755,540	2,027,201	2,000	14,606
	40,000	110,950	159,650	241	14,090
South Carolina	183,190	473,244	656,435	1,034	60,428
	52,213	TTU,290	102,508	239	10,720
Texas	5 154 964	7 420 924	12 594 697	9 012	20,009
litah	5,154,604 82 //2/	303 674	386.098	28/	20 531
Verment	107,026	242,074	440,459	204	20,331
Virginio	197,220	243,232	440,458	018	38,165
Washington	400,074	1,UZ1,400	1,475,002	1,084	92,720
West Virginia	100,001 071 //2	1 100 770	384,200 2 081 212	031	49,100
Wisconsin	3/1,443	736 173	1 044 506	1 360	91,000
Wyoming	240.022	201 110	551.040	1,000	20,090
U.S. State Tetale	249,922	JUI, 110	62 609 464	413	39,082
U.S. State Totals	20,221,038	43,470,322	03,098,101	20,928	4,118,201
	1,0/5,10/		1,0/5,10/		
Total Including Imports	21,296,805	43,476,522	64,773,328		

Table 10: State Production of Odorized Propane, 2021

	Vo	lume (1,000 Gal)		Percentage of National Total				
				of	of Gas Plt.	of Total		
State	Refinery	Gas Plant	Total	Ref. Prod.	Production	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%		
lowa	-	-	-	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 Jersev	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%		
	0,.04	,		0.01	2.1070			
U.S. Total	1,232,166	7,742,779	8,974,943	100.00	% 100.00%	100.00%		

		Value Added (\$1,000)											
			Transportation,			Direct		Indirect &	& Indu				
			Storage, and				In-State	Manufacturing	GI				
	SUB		Wholesaling	Wholesale	Retail	Value	Contribution	Allocation	Alloc				
State	PAD	Supply	Markup	Value	Markup	Added	To GDP	Contribution	Contri				
Alabama	3	33,652	14,936	48,588	135,471	184,059	195,179	87,445	1				
Alaska	5	67,575	2,329	69,904	9,795	79,699	84,514	3,793					
Arizona	5	1	14,663	14,664	83,888	98,552	104,506	82,968	2				
Arkansas	3	1,449	11,959	13,408	109,390	122,798	130,217	48,206	1				
California	5	41,092	71,828	112,920	397,589	510,509	541,350	871,163	2,4				
Colorado	4	698,645	43,632	742,276	139,680	881,956	935,238	63,729	3				
Connecticut	1-A	0	16,284	16,284	215,207	231,491	245,476	76,951	2				
Delaware	1-B	11,784	6,891	18,675	68,995	87,671	92,967	12,356					
District of Columbia	1-B	0	145	145	1,280	1,425	1,511	0	1				
Florida	1-C	924	28,612	29,536	337,271	366,807	388,967	142,272	8				
Georgia	1-C	0	27,717	27,717	325,149	352,866	374,183	143,297	4				

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

State	PAD	Supply	Markup	Value	Markup	Added	To GDP	Contribution	Contribution	to GDP	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	12,000	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=0 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
lowa	2	0	52 163	52 163	204 499	256 662	272 168	85,080	154 608	511 855	768 517
Kansas	2	91.676	/1 /01	133 167	64 793	107 060	200 010	63 271	136 //3	409 633	607 503
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	300 882	88 877	184 345	664 104	1 032 717
Maine	1.4	201,704	10 637	10 637	244 218	263 855	270 706	17 178	55 583	352 557	616 /12
Mandand	1.8	0	17 206	17,007	199 711	205,055	219,150	58 271	316 404	503 218	700 226
Massachusette	1-D	0	17,290	17,230	232 270	250,007	265 315	123 865	457 230	846 410	1 096 610
Michigan	2	3 677	66,828	70 505	232,279	357.008	378 576	223,500	407,230	1 010 121	1 367 120
Minnosota	2	3,077	62 564	62 564	244 500	307,163	325 720	117 225	204.057	737.002	1,044,166
Mississippi	2	60.640	16 734	77 374	144,599	221 082	235 303	44.407	294,037	370 563	502 545
Missouri	2	13	36 424	36 437	134 250	170 688	180 000	02 111	255 630	528 750	600 /37
Montana	2	7 927	15 050	22,995	99.077	110,000	117 665	7 451	233,039	166,066	277 029
Nebraska	4	372	38 375	22,003	56 501	95 248	101 002	37 237	104 202	242 531	277,920
Neurada	5	19	6 865	6 012	39 554	45 467	49 212	20.844	139 657	242,331	253 190
New Hampshire	1 /	40	21 012	21 012	273 551	204 563	312 350	20,044	71.061	405 467	200,030
New Jarsey	1.8	20.838	11 557	32 306	113 352	145 748	154 553	133 /81	486.808	774 032	920 670
New Mexico	3	552 014	18 528	570 542	107.051	677 593	718 528	9 /10	78 126	806.063	1 483 656
New York	1 B	302,014	55 627	55 659	627.007	682 757	710,520	166 003	1 355 506	2 245 513	2 928 270
North Carolina	1-D	52	/0 330	10 330	602 570	651 908	601 202	225 817	472 051	1 389 160	2,020,270
North Dakota	2	700 0/2	25 311	735 254	60,837	796 091	844 185	10 008	472,001	800 507	1 605 509
Obio	2	139 707	64 272	203 979	176 187	380 167	403 134	253 203	539 /21	1 195 757	1 575 923
Oklahoma	2	873 010	55,096	928 105	71 010	1 000 024	1 060 438	41 017	153 521	1 254 976	2 255 000
Oregon	5	0/3,010	12 / 96	12 / 96	68 937	81 / 32	86 352	79,892	194 055	360 299	4/1 731
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	1-0	000,100	3 524	3 524	45 361	48 885	51 839	11 651	47 461	110 950	159 836
South Carolina	1-0	0	15 119	15 119	168 072	183 190	194 257	86,635	102 352	473 244	656 / 35
South Dakota	2	224	10 372	10,596	41 616	52 213	55 367	10 951	13 978	110 296	162 508
Tennessee	2	822	16 137	16,000	58 953	75 912	80,498	137 078	304 513	522 090	598.002
Техас	3	4 504 105	140 623	4 644 728	510 135	5 154 864	5 466 283	500 758	1 462 783	7 /29 82/	12 584 687
litah	4	35 599	9 535	45 133	37 291	82 424	87 404	55 617	160 653	303 674	386 098
Vermont	1_4	00,000	13 91/	13 91/	183 312	107 226	209 1/1	7 639	26 453	2/3 232	440,458
Virginia	1-0	1	32 904	32 905	120,669	453 574	480 976	109,216	/31 207	1 021 /88	1 475 062
Washington	5	0	26 925	26,905	153 406	180 331	191 225	139,642	483.007	813 875	994 205
West Virginia	1-0	839 325	44 545	883 870	87 573	971 //3	1 030 131	18 730	60,007	1 109 770	2 081 213
Wisconsin	2	000,020	57 584	57 584	250 838	308 423	327 055	146 322	262 707	736 173	1 044 596
Wyoming	4	197 000	11 1/13	208 144	41 779	249 922	265 021	6 503	29 594	301 118	551 0/0
Total Allocated to sta	tes	9 720 885	1 549 475	11 270 350	8 951 279	20 221 629	21 //3 292	5 508 340	16 524 924	43 476 522	63 698 464
Values Not Applied to	States	3,720,003	1,549,475	11,210,333	5,051,279	20,221,030	21,445,202	0,000,010	10,524,851	-13,710,5ZZ	00,000,101

U.S. Total	10,796,052	1,549,475	12,345,526	8,951,279	21,296,805	21,296,805	5,801,182	17,403,547	44,501,534	65,798,339
Import Adjustments	278,008				0					
Storage Inventory Change	65,279	Value in Non-U.S. Consumption 😒								
Value in Foreign Natural Gas	57,052									
Value in Imported Crude	547,660									
Value of Imported NGL Product	127,168									

Total

Contribution

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Contribution

Table 12: State Level Value Summary for Propane (C₃H₈), 2021

		Value Added (\$1,000)									
			Transactor			Direct		Indirect 8	Induced		Total
			Transportation,	• • •			In State	Monufacturing	CDB		
	SUB		Wholesaling	Wholesale	Petail	Value	Contribution		Allocation	Contribution	Contribution
State	PAD	Supply	Markup	Value	Markup	Added	To GDP	Contribution	Contribution	to GDP	To GDP
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	2 102	145	145	1,280	1,425	1,511	201.667	232,300	233,811	235,237
Fiorida	1-0	3,193	28,032	31,825	337,271	369,096	391,394	301,007	1,898,004	2,591,005	2,960,161
Hawaii	5	0	5 818	5 818	27 768	33 586	376,427	7 8/9	137 708	181 172	2,084,054
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
lowa	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	6/1,081	1,013,089	1,219,097
Massachusetts	1-A	12 608	17,921	17,921	232,279	250,200	265,315	262,638	969,490	1,497,443	1,747,643
Minnosoto	2	12,090	64 725	64,725	200,503	307,003	309,230	249 550	622 507	1,720,340	2,095,403
Mississinni	2	209 437	21 554	230 991	144,599	375 600	398 291	248,559 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	3 015 108	1/6 271	3 161 469	71 010	3 233 388	3 /28 726	330,000	325 510	2,499,997	7 074 604
Oregon	5	3,013,190	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	2 909 960	28,190	28,190	153,406	181,596	192,507	296,091	1,024,148	1,512,806	1,694,402
Wisconsin	2	2,090,000	57 752	57 752	250 838	3,124,142	3,312,000	39,714	557 223	3,401,743	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
Total Allocated to sta	ates	33,573,964	2,414,059	35,988,024	8,951,279	44,939,303	47,654,206	11,679,582	35,038,747	94,372,535	139,311,838
Values Not Applied to	o States										
Value of Imported NGI	L Product	439,213									
Value in Imported Cruc	de	1,891,506									
Value in Foreign Natur	al Gas	197,046									
Storage Inventory Cha	inge	225,460		Value	in Non-U.S. C	onsumption \2					
Import Adjustments		960,184				-23,008,959					
U.S. Total		37,287,372	2,414,059	39,701,432	8,951,279	25,643,751	25,643,751	6,664,730	19,994,189	52,302,670	77,946,422

960,184 37,287,372 -23,008,959 25,643,751 2,414,059 39,701,432 8,951,279 25,643,751 6,664,730 19,994,189 52,302,670 77,946,422
Table 13: State Level Value Summary for Total NGLs / LRGs, 2021

						Value Adde	d (\$1,000)				
						Direct		Indirect 8	Induced		Total
			Transportation,								
	OUD		Storage, and		Detail		In-State	Manufacturing	GDP	Constrait and in a	C
State	SUB	Supply	Wholesaling	Wholesale	Retail	Value	Contribution	Allocation	Allocation	Contribution	
Alehomo	PAD	Supply 284 501	Markup 27.405	211.005	125 471	Added	10 GDP	429.267	Contribution	1 820 740	2 269 216
Alabama	5	1 339 272	27,495	1 362 255	10 264	1 372 519	1 455 436	436,207	20/ 903	1,620,749	2,200,210
Arizona	5	1,555,272	14 663	14 673	83 888	98 561	104 515	415 827	1 500 836	2 021 179	2 119 740
Arkansas	3	11 607	30 419	42 026	109 390	151 416	160 563	241 606	531 247	933 417	1 084 833
California	5	601,121	255,942	857.063	415,966	1.273.029	1.349.936	4.366.204	12.053.227	17,769,367	19.042.396
Colorado	4	5,913,453	1,065,448	6,978,901	184,090	7,162,991	7,595,727	319,405	1,559,193	9,474,325	16,637,316
Connecticut	1-A	0	16,284	16,284	215,207	231,491	245,476	385,673	1,066,222	1,697,371	1,928,862
Delaware	1-B	97,798	7,987	105,785	68,995	174,781	185,339	61,929	290,000	537,268	712,049
District of Columbia	1-B	0	145	145	1,280	1,425	1,511	0	549,092	550,603	552,028
Florida	1-C	7,075	28,696	35,771	337,271	373,042	395,578	713,056	4,486,346	5,594,980	5,968,022
Georgia	1-C	0	32,858	32,858	325,149	358,007	379,635	718,191	2,471,314	3,569,140	3,927,147
Hawaii	5	0	5,818	5,818	27,768	33,586	35,615	18,552	325,503	379,670	413,256
Idaho	4	601	9,852	10,453	57,568	68,021	72,130	106,911	344,037	523,079	591,100
Illinois	2	1,958,966	529,553	2,488,519	273,854	2,762,373	2,929,255	1,268,730	3,379,072	7,577,057	10,339,430
Indiana	2	2,569	193,203	195,773	119,582	315,355	334,406	1,158,203	1,475,638	2,968,247	3,283,601
lowa	2	795 610	180,675	180,075	205,933	380,008	409,964	420,414	692 940	1,011,259	1,997,867
Kentucky	2	116 314	70 526	186 840	71 /73	2,032,038	2,155,450	455 533	847 496	1 576 9/8	1 835 261
Louisiana	3	2 439 253	669 773	3 109 026	160 755	3 269 781	3 467 317	445 447	923 923	4 836 686	8 106 467
Maine	1-A	2,400,200	19 637	19 637	244 218	263 855	279 796	86 097	278 577	644 469	908 325
Maryland	1-B	0	17.296	17,296	188,711	206,007	218,453	292.051	1,586,246	2,096,749	2,302,756
Massachusetts	1-A	0	17,921	17,921	232,279	250,200	265,315	620,801	2,291,600	3,177,717	3,427,917
Michigan	2	29,420	73,272	102,692	287,353	390,045	413,608	1,120,660	2,044,600	3,578,869	3,968,913
Minnesota	2	0	64,672	64,672	244,599	309,271	327,955	587,524	1,473,794	2,389,273	2,698,544
Mississippi	3	510,700	99,159	609,858	154,710	764,568	810,758	222,566	454,896	1,488,219	2,252,787
Missouri	2	101	57,392	57,493	135,060	192,553	204,186	461,655	1,281,245	1,947,086	2,139,639
Montana	4	64,056	16,256	80,312	88,077	168,388	178,561	37,343	209,746	425,651	594,039
Nebraska	2	2,878	384,775	387,653	56,501	444,154	470,986	186,628	522,704	1,180,318	1,624,472
Nevada New Homoshiro	5 1 A	300	0,000	21 012	30,334	40,707	40,000	1104,400	256 150	770,009	093,743
New Jersey	1-A	172 935	160 339	333 274	135.060	294,505	496 627	668 998	2 440 295	3 605 920	4 074 254
New Mexico	3	4 604 703	147 696	4 752 399	108 512	4 860 911	5 154 572	47 160	391 561	5 593 293	10 454 204
New York	1-B	248	55.627	55.875	627.097	682.973	724.233	831,997	6.793.693	8.349.923	9.032.895
North Carolina	1-C	0	54,177	54,177	602,570	656,747	696,423	1,131,779	2,365,883	4,194,086	4,850,833
North Dakota	2	5,735,466	125,766	5,861,233	60,837	5,922,070	6,279,838	50,161	227,112	6,557,111	12,479,181
Ohio	2	1,184,070	410,690	1,594,760	185,489	1,780,249	1,887,798	1,269,032	2,703,535	5,860,366	7,640,615
Oklahoma	2	7,072,998	665,402	7,738,400	99,341	7,837,741	8,311,240	205,572	769,436	9,286,248	17,123,989
Oregon	5	0	12,496	12,496	68,937	81,432	86,352	400,411	972,590	1,459,353	1,540,785
Pennsylvania	1-B	2,289,888	850,395	3,140,283	993,917	4,134,200	4,383,959	1,127,384	3,017,544	8,528,886	12,663,086
Rhode Island	1-A	0	3,524	3,524	45,361	48,885	51,839	58,393	237,871	348,103	396,988
South Carolina	1-0	4 704	19,957	19,957	168,072	188,029	199,388	434,209	964,053	1,597,651	1,785,680
	2	1,734	17,372	24 251	41,010	03,723	20,900	54,007	1 526 109	2 201 560	2 204 965
Terras	2	38 398 263	5 361 511	43 759 774	1 207 264	44 967 039	47 683 618	2 509 762	7 331 358	57 524 738	102 491 776
Utah	4	297 115	253 604	550 719	93,996	644 715	683 664	278 748	805 182	1 767 595	2 412 309
Vermont	1-A	207,110	13.914	13,914	183,312	197,226	209,141	38,285	132,580	380.005	577,231
Virginia	1-C	8	32,904	32,912	420,669	453,581	480,983	547,381	2.161.629	3,189,993	3.643.574
Washington	5	0	59,625	59,625	157,627	217,252	230,377	699,876	2,420,796	3,351,050	3,568,302
West Virginia	1-C	6,377,672	246,825	6,624,497	87,573	6,712,070	7,117,565	93,873	305,272	7,516,710	14,228,780
Wisconsin	2	0	57,626	57,626	250,838	308,464	327,100	733,353	1,317,117	2,377,569	2,686,033
Wyoming	4	1,663,747	114,842	1,778,589	45,473	1,824,062	1,934,259	32,595	148,323	2,115,177	3,939,239
Total Allocated to sta	tes	81,971,164	13,688,227	95,659,391	10,564,432	106,223,823	112,641,088	27,607,235	82,821,705	223,070,029	329,293,852
Values Not Applied to	States	4 000 470									

U.S. Total	92,024,633	13,688,227	105,712,860	10,564,432	77,591,520	77,591,520	20,165,790	60,497,371	158,254,681	235,846,202
Import Adjustments	1,630,165				-38,685,772					
Storage Inventory Change	1,693,046	Value in Non-U.S. Consumption 🖄			nsumption 🛛					
Value in Foreign Natural Gas	571,995									
Value in Imported Crude	4,237,786									
Value of Imported NGL Product	1,920,478									

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 1st and December 31st 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)

Domestic Contribution to Value:	95%
North American Contribution to Value:	99%



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

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



Figure 10. Value Chain for All Purity Propane (C₃H₈), 2021 (Million Dollars)

Domestic Contribution to Value:	174%
North American Contribution to Value:	96%



Figure 11. Volume Chain for All Purity Propane (C₃H₈), 2021 (Thousand Gallons)

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

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



Figure 12. Value Chain for Butanes (C₄H₁₀), 2021 (Million Dollars)

Figure 13. Volume Chain for Butanes (C₄H₁₀), 2021 (Thousand Gallons)



Domestic Contribution to Supply:	92%
North American Contribution to Supply:	99%



Figure 14. Value Chain for Ethane (C_2H_6), 2021 (Million Dollars)

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



Figure 15. Volume Chain for Ethane (C₂H₆), 2021 (Thousand Gallons)

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

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



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

Domestic Contribution to Value:	143%
North American Contribution to Value:	151%



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.
Refining			
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
Refinery Sales	1,232,166	1,651.2	1.340
Gas Processing			
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
Gas Plants (With Fractionation)	7,742,779	8,424.4	1.088
EIA Product Imports			
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
Imports (With Terminaling)	91,290	127.2	1.393
Inventory Change	60,861	65.3	1.073
Supply	9,127,095	10,268.1	1.125
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
Total Supply	9,546,219	10,796.1	1.131
Exports			
Export Product Value	-	-	
Terminaling	-	-	
Export Value (FOB)	-	-	
Domestic Demand	9,546,219	12,345.5	1.293
Balancing Item	-	-	1.293
Total Domestic Demand (Wholesale Value)	9,546,219	12,345.5	1.293
Supply Value	9,546,219	10,796.1	1.131
Wholesale Value	9,546,219	12,345.5	1.293
Wholesale Market Services	9,546,219	1,549.5	0.162
Breakout of Wholesale Market Services			
Long Distance P/L Transportation		168.7	
Intra PAD P/L Transporation		165.2	
Storage and Wholesale Markup		1,215.6	
Wholesale Value Balancing Item			
Total Wholesale Market Services	9,546,219	1,549.5	0.162
Final Retail Values			
Wholesale Value	9,546,219	12,345.5	1.293
Retail Markup on Total Volume	9,546,219	8,951.3	0.938
Total Retail Value	9,546,219	21,296.8	2.231

Table 15: National Value Summary for All Purity Propane (C_3H_8), 2021

	Volume	Value	Price
	Gallons (1,000)	\$ Million	\$ per Gal.
Refining			
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
Refinery Sales	4,255,650	5,703.1	1.340
Gas Processing			
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
Gas Plants (With Fractionation)	26,741,988	29,096.3	1.088
EIA Product Imports			
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
Imports (With Terminaling)	315,298	439.2	1.393
Inventory Change	210,200	225.5	1.073
Supply	31,523,136	35,464.1	1.125
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
Total Supply	32,970,702	37,287.4	1.131
Exports			
Export Product Value	20,063,193	22,554.2	1.124
Terminaling	20,063,193	736.9	0.037
Export Value (FOB)	20,063,193	23,291.1	1.161
Domestic Demand	11,570,941	14,964.0	1.293
Balancing Item	1,336,568	1,728.5	1.293
Total Domestic Demand (Wholesale Value)	12,907,509	16,692.5	1.293
Supply Value	12,907,509	14,597.4	1.131
Wholesale Value	12,907,509	16,692.5	1.293
Wholesale Market Services	12,907,509	2,095.1	0.162
Breakout of Wholesale Market Services			
Long Distance P/L Transportation		582.7	
Intra PAD P/L Transporation		570.5	
Storage and Wholesale Markup		941.8	
Wholesale Value Balancing Item		(872.6)	
Total Wholesale Market Services	12,907,509	1,222.5	0.095
Final Retail Values			
Wholesale Value	12,907,509	16,692.5	1.293
Retail Markup on Total Volume	12.907.509	8.951.3	0.693
Total Retail Value	12,907,509	25,643.8	1.987

Table 16: National Value Summary for Butanes (C₄H₁₀), 2021

	Volume	Value	Price
	Gallons (1.000)	\$ Million	\$ per Gal.
Refining			
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
Refinery Sales	807,240	1,361.8	1.687
-		-	
Gas Processing			
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
Gas Plants (With Fractionation)	7,764,666	9,479.9	1.221
EIA Product Imports			
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
Imports (With Terminaling)	587,244	1,000.1	1.703
Inventory Change	335,832	402.7	1.199
Supply	9,494,982	12,244.6	1.290
Import Adjust (Imports Not Counted by EIA)	_		
Aux Sable Value Added by Cas Decession and Erac	175 588	220.8	1 258
Aux Sable Value of Canadian Car	175,588	64.8	0.360
Total Supply	9 670 570	12 530 2	1 296
	0,010,010	12,000.2	1.200
Exports			
Export Product Value	6,338,941	10,209.3	1.611
Terminaling	6,338,941	221.7	0.035
Export Value (FOB)	6,338,941	10,431.0	1.646
Domestic Demand	7,761,180	12,734.5	1.641
Balancing Item	(4,429,552)	(7,268.0)	1.641
Total Domestic Demand (Wholesale Value)	3,331,628	5,466.5	1.641
Supply Value	3,331,628	4,316.8	1.296
Wholesale Value	3,331,628	5,466.5	1.641
Wholesale Market Services	3,331,628	1,149.7	0.345
Breakout of Wholesale Market Services			
Long Distance P/L Transportation		491.9	
Intra PAD P/L Transporation		158.3	
Storage and Wholesale Markup		499.5	
Wholesale Value Balancing Item		1,774.2	
Total Wholesale Market Services	3,331,628	2,923.9	0.345
Final Retail Values			
Wholesale Value	3,331,628	5,466.5	1.641
Retail Markup on Total Volume	3,331,628	496.6	0.149
Total Retail Value	3,331,628	5,963.1	1.790

Table 17: National Value Summary for Ethane (C₂H₆), 2021

	Volume	Value	Price
	Gallons (1,000)	\$ Million	\$ per Gal.
Refining			
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
Ketinery Sales	74,844	70.1	0.937
Gas Processing			
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
Gas Plants (With Fractionation)	32,948,412	10,136.3	0.308
EIA Product Imports			
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
Imports (With Terminaling)	1,512	0.6	0.421
Inventory Change	267,036	82.2	0.308
Supply	33,291,804	10,289.2	0.309
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
Total Supply	34,036,889	10,602.5	0.312
Exports			
Export Product Value	5,660,970	2,223.0	0.393
Terminaling	5,660,970	157.8	0.028
Export Value (FOB)	5,660,970	2,380.8	0.421
Domestic Demand	32,948,412	13,857.1	0.421
Balancing Item	(4,572,493)	(1,923.1)	0.421
Total Domestic Demand (Wholesale Value)	28,375,919	11,934.1	0.421
Supply Value	28,375,919	8,839.1	0.312
Wholesale Value	28,375,919	11,934.1	0.421
Wholesale Market Services	28,375,919	3,094.9	0.109
Breakout of Wholesale Market Services			
Long Distance P/L Transportation		597.6	
Intra PAD P/L Transporation		611.0	
Storage and Wholesale Markup		1,886.4	
Wholesale Value Balancing Item		301.9	
Total Wholesale Market Services	28,375,919	3,396.8	0.109
Retail Margin			
Non-Chemical Retail Value	664,887	988.7	1.487
Non-Chemical Wholesale Value	664,887	279.6	0.421
Difference = Retail Markup on Non-Chem.	664,887	709.1	1.066
Final Retail Values			
Wholesale Value	28,375,919	11,934.1	0.421
Retail Markup on Total Volume	28,375.919	709.1	0.025
Total Retail Value	28,375.919	12,643,1	0.446

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

	Volume	Value	Price
	Gallons (1,000)	\$ Million	\$ per Gal.
Refining			
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
Refinery Sales	9,458,610	12,970.7	1.371
Gas Processing			
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
Gas Plants (With Fractionation)	83,163,570	71,646.4	0.862
EIA Product Imports			
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
Imports (With Terminaling)	1,225,949	1,920.5	1.567
Inventory Change	1,467,900	1,693.0	1.153
Supply	95,316,029	88,230.7	0.926
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
Total Supply	98,627,592	92,024.6	0.933
Exports			
Export Product Value	35,396,593	41,751.8	1.180
Terminaling	35,396,593	1,230.5	0.035
Export Value (FOB)	35,396,593	42,982.3	1.214
Domestic Demand	70,329,315	75,742.0	1.077
Balancing Item	(7,098,316)	(8,714.9)	1.228
Total Domestic Demand (Wholesale Value)	63,230,999	67,027.1	1.060
Supply Value	63,230,999	53,547.3	0.847
Wholesale Value	63,230,999	67,027.1	1.060
Wholesale Market Services	63,230,999	13,479.8	0.213
Breakout of Wholesale Market Services			
Long Distance P/L Transportation		2,847.2	
Intra PAD P/L Transporation		1,709.9	
Storage and Wholesale Markup		8,922.7	
Wholesale Value Balancing Item		2,043.9	
Total Wholesale Market Services	63,230,999	15,523.7	0.246
Final Retail Values			
Wholesale Value	63,230,999	67,027.1	1.060
Retail Markup on Total Volume	63,230,999	10,564.4	0.167
Total Retail Value	63,230,999	77,591.5	1.227

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.

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

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

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.

²⁴ 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).²⁵ 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.

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

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.²⁶ 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.

²⁶ 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 fuels²⁷ represented 75 percent of all outdoor grills used in the U.S., according to the Hearth, Patio & Barbeque Association²⁸, 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.

²⁷ Gaseous fuels include propane, butane, and natural gas.

²⁸ 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 2012.²⁹

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.³⁰

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.

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

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





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.³¹ In the U.S., nearly 60,000 vehicles used propane as fuel in 2021 as per the Propane Education and Research Council (PERC).³²

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.³³ However, a large number of propane autogas vehicles are part of private fleet operations that are not reported in this public directory. ICF

Source: ICF, EIA CBECS 2018

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

³² 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.

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

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

Based on 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 standalone 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 \$225,000.³⁴

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

³⁴ <u>https://propane.com/for-my-business/fleet-vehicles/propane-autogas-refueling-options/#/find/nearest?fuel=LPG&lpg_secondary=true&country=US</u>

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.³⁵ 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.³⁶ 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.

 ³⁵ SCHOOL TRANSPORTATION: 2021-22 SCHOOL YEAR; <u>https://www.schoolbusfleet.com/download?id=10188282&dl=1</u>
³⁶ <u>https://www.blue-bird.com/alternative-fuels</u>





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.³⁷ Electric Class 1 & 2 engines accounted for roughly 38 percent of these

³⁷ Market Intelligence - Industrial Truck Association - Industrial Truck Association (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.





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.





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.³⁸ 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.³⁹

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

³⁹ 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.⁴⁰

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.

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

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



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

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)



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

5.4. Total Propane Employment by State

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



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

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 P	ropane Sales E	Breakout
		(1,000 Gal.) (% of Total)

Residential	4.923.946	51.6%
Commercial	2,372,506	24.9%
Internal Combustion	680,193	7.1%
Agricultural	942,173	9.9%
Total United States Odorized Propane Demand	9,546,228	100.0%
Total Barrana Hastad		
Households Propane Share of United States	5,961,040	4.81%

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

(\$1,000

2021 Contribution to the U.S. Economy

2021 Employment

Production Transportation, Storage, and	9,686 2,057
Retail	47,187
Direct United States Employment Related to	58,929
Indirect and Induced Labor	37,475
Total United States Employment Related to	96,404

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

2021 Odorized Propane Supply

						/
	(1,000 Gal.)				Share of Supply (%)	
	Domestic	Canadian	From Outside N. America	Total	From U.S.	From N. America
Odorized Propane from Crude	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%
Total Odorized Propane Produced in the United States	8,477,585	429,838	242,614	9,150,038	88.81%	93.31%
Odorized Propane Imports		334,496	825	335,321	0.00%	3.50%
Inventory Changes	60,861			60,861	0.64%	0.64%
Total Supply of Odorized	8,538,446	764,334	243,439	9,546,219	89.44%	97.45%

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

	In-State P	roduction	In-State Co	nsumption	Economic Impact		Propane Heated Households	
	Total Volume	Share of U.S.	Total Volume	Share of U.S.	Direct	Total Value	Households	Market
State	(1,000 Gal)	Total (%)	(1,000 Gal)	Total (%)	Labor	Added (\$1,000)		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%
lowa	-	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%
vvasnington	15,918	0.18%	207,403	2.17%	831	994,205	91,012	3.10%
vvest Virginia	752,233	8.38%	51,653	0.54%	876	2,081,213	36,994	5.20%
vvisconsin Moscols	2,111	0.02%	451,692	4.73%	1,360	1,044,596	278,175	11.58%
vvyoming	1/1,142	1.91%	60,001	0.63%	413	551,040	24,891	10.79%
U.S. Total	8,974,943	100.00%	9,546,219	100.00%	58,928	63,698,161	5,961,040	4.81%

Odorized Propane's Impact on Alabama Economy A.3

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

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

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

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	31,900,000	0.41%
Total Alabama Odorizod Bronano Broduction	31,900,000	0.36%

Total Alabama Odorized Propane Production

2021 Labor Income

Direct Labor Income in Alabama Odorized Propane Industry	\$44,694
	1
Retail	\$39,917
Transportation, Storage, and Wholesale	\$1,216
Production	\$3,561

Odorized Propane's Impact on Alaska Economy A.4 2021 Odorized Propane Sales Breakout

	(Ganons)	(% Of State)
Residential	3,624,695	24.2%
Commercial	8,918,927	59.6%
Cylinder	958,788	6.4%
Internal Combustion	426,000	2.8%
Industrial	1,013,000	6.8%
Agricultural	11,000	0.1%
Total Alaska Odorized Propane Demand	14,952,409	100.0%
-		
Total Pronane-Heated Households	5 457	
	0,401	
Propane Share of Alaska Home Heating		2.09%

2021 Contribution to State Economy

Total Market Value of Odorized Propane Sold in Alaska (\$1,000)	\$32,728
Supply	\$67,575
Transportation, Storage, and Wholesale	\$2,329
Retail	\$9,795
Total Direct Value Added in Alaska	\$79,699
Indirect and Induced	\$129,193
Total Odorized Propane Industry Contribution to Alaska GDP	\$208,892

(\$1,000)

2021 Employment	
Production Transportation, Storage, and Wholesale Retail	175 4 134
Direct Alaska Employment Related to Odorized Propane	313

2021 Labor Income	
(\$1,000)	
Production Transportation, Storage, and Wholesale Retail	\$21,506 \$514 \$4,319
Direct Labor Income in Alaska Odorized Propane Industry	\$26,339

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

Odorized Propane's Impact on Arizona Economy A.5 2021 Contribution to State Economy

2021 Odorized Propane Sales Breakou	L	
	(Gallons)	(% of State)
Residential	48,430,658	42.1%
Commercial	39,521,660	34.3%
Cylinder	7,349,620	6.4%
Internal Combustion	14,448,000	12.5%
Industrial	3,780,000	3.3%
Agricultural	1,622,000	1.4%
Total Arizona Odorized Propane Demand	115,151,938	100.0%
Total Propane-Heated Households	75,205	
Propane Share of Arizona Home Heating		2.80%

a contribution to etate aconomy	
	(\$1,000)
Total Market Value of Odorized Propane Sold in Arizona	\$260,447
(\$1,000)	
Supply Transportation, Storage, and Wholesale Retail	\$1 \$14,663 \$83,888
Total Direct Value Added in Arizona	\$98,552
Total Odorized Propane Industry Contribution to Arizona GDP	\$585,479

2021 Employment	
Production Transportation, Storage, and Wholesale Retail	0 8 666
Direct Arizona Employment Related to Odorized Propane	674

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total Arizona Odorized Propane Production	-	0.00%

2021 Labor Income	
(\$1,000)	
Production	\$1
Transportation, Storage, and Wholesale Retail	\$811 \$33,353
Direct Labor Income in Arizona Oderiand Dreasure Industry	\$34,165

Direct Labor Income in Arizona Odorized Propane Industry

Odorized Propane's Impact on Arkansas Economy A.6 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%
Total Arkansas Odorized Propane Demand	88,422,939	100.0%
Total Propane-Heated Households	76,706	
Propane Share of Arkansas Home Heating		6.62%

2021 Contribution to State Economy

	(\$1,000)
Total Market Value of Odorized Propane Sold in Arkansas (\$1,000)	\$207,663
Supply Transportation, Storage, and Wholesale Retail	\$1,449 \$11,959 \$109,390
Total Direct Value Added in Arkansas Indirect and Induced	\$122,798 \$284,420
Total Odorized Propane Industry Contribution to Arkansas GDP	\$407,218

2021 Employment

Production	5
Transportation, Storage, and Wholesale	8
Retail	449
Direct Arkansas Employment Related to Odorized	462
Propane	402

2021 Odorized Propane Production (% of U.S. (Gallons) Total) 2,328,000 0.19% Refineries Gas Processing Plants 0.01% 518,000 0.03%

2,846,000 Total Arkansas Odorized Propane Production

2021 Labor Income (\$1.00

Industry

Production	\$600
Transportation, Storage, and Wholesale	\$812
Retail	\$23,142
Direct Labor Income in Arkansas Odorized Propane	\$24,554

A.7 Odorized Propane's Impact on California Economy

2021 Odorized Propane Sales Breakout			
	(Gallons)	(% of State)	
Residential	228,655,419	41.9%	
Commercial	154,613,398	28.3%	
Cylinder	36,463,139	6.7%	
Internal Combustion	61,954,000	11.3%	
Industrial	15,610,000	2.9%	
Agricultural	48,808,000	8.9%	
Total California Odorized Propane Demand	546,103,957	100.0%	
Total Propane-Heated Households	449,072		
Propane Share of California Home Heating		3.40%	

2021	Contribution	to State	Economy
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Total Market Value of Odorized Propane Sold in California	\$1,234,917
(\$1,000)	
Supply	\$41,092
Transportation, Storage, and Wholesale	\$71,828
Retail	\$397,589
Total Direct Value Added in California	\$510,509
Indirect and Induced	\$3,817,423
Total Odorized Propane Industry Contribution to California	¢4 227 022
GDP	\$4,327,932

(\$1,000)

2021 Employment

Production	151
Transportation, Storage, and Wholesale	47
Retail	2,680
Direct California Employment Related to Odorized Propane	2,878

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries Gas Processing Plants	66,036,000 9,533,000	5.36% 0.12%
Total California Odorized Propane Production	75,569,000	0.84%

2021 Labor Income

Production	\$18,849
Transportation, Storage, and Wholesale	\$4,628
Retail	\$162,316

Direct Labor Income in California Odorized Propane \$185,793
Industry

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%	
Total Colorado Odorized Propane Demand	195,553,265	100.0%	
Total Dranana Heated Heuseholde	406 077		
Total Propane-neated nouseholds	106,077		
Propane Share of Colorado Home Heating		4.76%	

2021 Contribution to State Economy

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

2021 Employment

Production	585
Transportation, Storage, and Wholesale	94
Retail	698
Direct Colorado Employment Related to Odorized Propane	1,376

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	2,823,000	0.23%
Gas Processing Plants	629,397,000	8.13%

Total Colorado Odorized Propane Production 632,220,000 7.04%

2021 Labor Income (\$1,000)

Production	\$72,570
Transportation, Storage, and Wholesale	\$10,558
Retail	\$37,947

Direct Labor Income in Colorado Odorized Propane	\$121.075
Industry	\$121,075

A.9 Odorized Propane's Impact on Connecticut Economy

0.00%

2021 Odorized Propane Sales Breakout			
	(Gallons)	(% of State)	
B 11 11 1		o= 404	
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%	
Total Connecticut Odorized Propane Demand	127,885,232	100.0%	
Total Propane-Heated Households	67,902		
Propane Share of Connecticut Home Heating		4.86%	

2021 Contribution to State Economy

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

2021 Employment

Production	-
Transportation, Storage, and Wholesale	9
Retail	1,115
Direct Connecticut Employment Related to Odorized Propane	1,125

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%

Total Connecticut Odorized Propane Production -

2021 Labor Income (\$1,000) Production Transportation, Storage, and Wholesale Retail Direct Labor Income in Connecticut Odorized Propane Industry

Odorized Propane's Impact on Delaware Economy A.10

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%	
Total Delaware Odorized Propane Demand	49,832,096	100.0%	
Total Propane-Heated Households	35,082		
Propane Share of Delaware Home Heating		9.21%	

2021 Contribution to State Economy

	(\$1,000)
Total Market Value of Odorized Propane Sold in Delaware	\$133,021
(\$1,500)	
Supply Transportation, Storage, and Wholesale Retail	\$11,784 \$6,891 \$68,995
Total Direct Value Added in Delaware	\$87,671
Indirect and Induced	\$163,185
Total Odorized Propane Industry Contribution to Delaware GDP	\$250,856

2021 Employment

2
5
482
490

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries Gas Processing Plants	16,834,000 -	1.37% 0.00%
g · · · · · · · · · · · · · · · · ·		

Total Delaware Odorized Propane Production 16,834,000 0.19%

2021 Labor Income (\$1.00

Industry

Direct Labor Income in Delaware Odorized Propane	\$30.798
	+==,==
Retail	\$29,994
Transportation, Storage, and Wholesale	\$487
Production	\$317

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%
Total District of Columbia Odorized Propane		400.00
Demand	1,140,404	100.0%
Total Propane-Heated Households	2,916	
Propane Share of District of Columbia Home Heating		0.94%

	(\$1,000)
Total Market Value of Odorized Propane Sold in District of Columbia (\$1,000)	\$2,747
Supply Transportation, Storage, and Wholesale Retail	\$0 \$145 \$1,280
Total Direct Value Added in District of Columbia	\$1,425
Indirect and Induced	\$111,068

\$112,493

Total Odorized Propane Industry Contribution to District of

Columbia GDP

2021 Contribution to State Economy

2021 Employment	
Production Transportation, Storage, and Wholesale Retail	- 1 24
Direct District of Columbia Employment Related to Odorized Propane	25

2021 Odorized Propane Production]	
	(Gallons)	(% of U.S. Total)
Refineries Gas Processing Plants	-	0.00% 0.00%
Total District of Columbia Odorized Propane	-	0.00%

2021 Labor Income	
(\$1,000)	
	6 0
Production	\$0
Transportation, Storage, and Wholesale	\$8
Retail	\$928
Direct Labor Income in District of Columbia Odorized	\$936
Propane Industry	

A.12 Odorized Propane's Impact on Florida Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	49,760,745	22.2%
Commercial	90,772,109	40.4%
Cylinder	20,183,710	9.0%
Internal Combustion	35,050,000	15.6%
Industrial	21,785,000	9.7%
Agricultural	7,081,000	3.2%
Total Florida Odorized Propane Demand	224,632,564	100.0%
Total Propane-Heated Households	70,529	
Propane Share of Florida Home Heating		0.86%

2021 Contribution to State Economy

	(\$1,000)
Total Market Value of Odorized Propane Sold in Florida (\$1,000)	\$613,244
Supply	\$924
Transportation, Storage, and Wholesale	\$28,612
Retail	\$337,271
Total Direct Value Added in Florida	\$366,807
Indirect and Induced	\$1,426,373
Total Odorized Propane Industry Contribution to Florida GDP	\$1,793,180

2021 Employment

Production	2
Retail	1,897
Direct Florida Employment Related to Odorized	4.045
Propane	1,915

2021 Labor Income	
(\$1,000)	
Production Transportation, Storage, and Wholesale Retail	\$234 \$1,590 \$107,372
Direct Labor Income in Florida Odorized Propane Industry	\$109,196

 2021 Odorized Propane Production

 (% of U.S. (Gallons)

 Total)

 Refineries Gas Processing Plants
 0.00% 531,000

Total Florida Odorized Propane Production 531,000 0.01%

Odorized Propane's Impact on Georgia Economy A.13 2021 Odorized Propane Sales Breakout

	(Gallons)	(% of State)
Residential	77,804,515	38.0%
Commercial	48,987,758	23.9%
Cylinder	7,119,283	3.5%
Internal Combustion	35,858,000	17.5%
Industrial	4,086,000	2.0%
Agricultural	31,007,000	15.1%
Total Georgia Odorized Propane Demand	204,862,556	100.0%
Total Propane-Heated Households	173,296	
Propane Share of Georgia Home Heating		4.46%

2021 Contribution to State Economy

	(\$1,000)
Total Market Value of Odorized Propane Sold in Georgia (\$1,000)	\$576,712
Supply	\$0
Transportation, Storage, and Wholesale	\$27,717
Retail	\$325,149
Total Direct Value Added in Georgia	\$352,866
Indirect and Induced	\$1,010,566
Total Odorized Propane Industry Contribution to Georgia GDP	\$1,363,432

2021 Employment

Production	-
Transportation, Storage, and Wholesale	19
Retail	1,808
Direct Georgia Employment Related to Odorized Propane	1,827

2021 Labor Income (\$1,000) Production \$0 Transportation, Storage, and Wholesale \$1,870 Retail \$84,925 \$86,795 Direct Labor Income in Georgia Odorized Propane Industry

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total Georgia Odorized Propane Production	-	0.00%

Total Georgia Odorized Propane Production

A.14 Odorized Propane's Impact on Hawaii Economy

0.00%

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential Commercial Cylinder Internal Combustion Industrial Agricultural	5,312,494 37,662,652 1,140,918 367,000 1,207,000 4,000	11.6% 82.4% 2.5% 0.8% 2.6% 0.0%
Total Hawaii Odorized Propane Demand	45,694,063	100.0%
Total Propane-Heated Households	8,301	
Propane Share of Hawaii Home Heating		1.74%

2021 Contribution to State Economy

Total Market Value of Odorized Propane Sold in Hawaii (\$1,000)	\$97,867
Supply Transportation, Storage, and Wholesale Retail	\$0 \$5,818 \$27,768
Total Direct Value Added in Hawaii	\$33,586
Indirect and Induced Total Odorized Propane Industry Contribution to Hawaii GDP	\$104,262 \$137,848

(\$1,000)

2021 Employment

Production	-
Transportation, Storage, and Wholesale	3
Retail	57
Direct Hawaii Employment Related to Odorized Propane	60

2021 Labor Income	
(\$1,000)	
Production Transportation, Storage, and Wholesale Retail	\$0 \$322 \$7,355
Direct Labor Income in Hawaii Odorized Propane Industry	\$7,677

2021 Odorized Propane Production (% of U.S. Total) Refineries Gas Processing Plants 0.00%

Total Hawaii Odorized Propane Production -

Odorized Propane's Impact on Idaho Economy A.15 2021 Odorized Propane Sales Breakout

0.00%

2021 Guorizeu i ropune Guies Bre	Junout	
	(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%
Total Idaho Odorized Propane Demand	77,289,726	100.0%
Total Dranana Hastad Hayaahalda	24 542	
Total Propane-neated households	34,513	
Propane Share of Idaho Home Heating		5.25%

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

2021 Employment

Production	0
Transportation, Storage, and Wholesale	6
Retail	239
Direct Idaho Employment Related to Odorized Propane	245

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

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

59,000 Total Idaho Odorized Propane Production

A.16 Odorized Propane's Impact on Illinois Economy

1.00%

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	286,753,728	58.3%
Commercial	77,208,039	15.7%
Cylinder	13,240,719	2.7%
Internal Combustion	38,844,000	7.9%
Industrial	6,573,000	1.3%
Agricultural	69,169,000	14.1%
Total Illinois Odorized Propane Demand	491,788,486	100.0%
Total Propane-Heated Households	204,950	
Propane Share of Illinois Home Heating		4.16%

2021 Contribution to State Economy

	(+-,)
Total Market Value of Odorized Propane Sold in Illinois (\$1,000)	\$948,494
Supply Transportation, Storage, and Wholesale Retail	\$231,882 \$76,355 \$253,130
Total Direct Value Added in Illinois	\$561,367
Indirect and Induced	\$1,522,629
Total Odorized Propane Industry Contribution to Illinois GDP	\$2,083,996

(\$1,000)

2021 Employment

Production	36
Transportation, Storage, and Wholesale	67
Retail	1,004
Direct Illinois Employment Related to Odorized Propane	1,107

2021 Labor Income (\$1,000) Production Transportation, Storage, and Wholesale Retail \$51,002 Direct Labor Income in Illinois Odorized Propane Industry

 2021 Odorized Propane Production

 (% of U.S. (Gallons)

 Total)

 Refineries
 59,813,000
 4.85%

 Gas Processing Plants
 30,181,000
 0.39%

Total Illinois Odorized Propane Production 89,994,000

A.17 Odorized Propane's Impact on Indiana Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	125,742,447	54.3%
Commercial	41,782,172	18.0%
Cylinder	7,239,868	3.1%
Internal Combustion	21,862,000	9.4%
Industrial	3,206,000	1.4%
Agricultural	31,827,000	13.7%
Total Indiana Odorized Propane Demand	231,659,487	100.0%
Tatal Bases and Useda d Usera balda	407 070	
lotal Propane-Heated Households	187,276	
Propane Share of Indiana Home Heating		7.14%

2021 Contribution to State Economy

Total Market Value of Odorized Propane Sold in Indiana (\$1,000)	\$443,730
Supply Transportation, Storage, and Wholesale Retail	\$332 \$38,964 \$116,153
Total Direct Value Added in Indiana Indirect and Induced	\$155,450 \$690,355
Total Odorized Propane Industry Contribution to Indiana GDP	\$845,805

(\$1,000)

....

2021 Employment

Production	6
Transportation, Storage, and Wholesale	42
Retail	1,162
Direct Indiana Employment Related to Odorized Propane	1,209

2021 Labor Income (\$1,000) Production

Retail	\$60,638
Transportation, Storage, and Wholesale	\$4,097
Production	\$783

Direct Labor Income in Indiana Odorized Propane Industry \$65,518

2021 Odorized Propane Production]	
	(Callons)	(% of U.S.
	(Gallons)	TOtal)
Refineries	34,213,000	2.78%
Gas Processing Plants	-	0.00%

Total Indiana Odorized Propane Production 34,213,000 0.38%

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

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

(\$1,000)

2021 Employment

Production	-
Transportation, Storage, and Wholesale	26
Retail	461
Direct Iowa Employment Related to Odorized Propane	487

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

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

Total Iowa Odorized Propane Production

Odorized Propane's Impact on Kansas Economy A.19

2021 Odorized Propane Sales Brea	ikout	
	(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%
Total Kansas Odorized Propane Demand	122,833,165	100.0%
Total Propane-Heated Households	87,714	
Propane Share of Kansas Home Heating		7.70%

2021 Contribution to State Economy

	(\$1,000)
Total Market Value of Odorized Propane Sold in Kansas	\$238,462
(\$1,000)	
Supply	\$91,676
Transportation, Storage, and Wholesale	\$41,491
Retail	\$64,793
Total Direct Value Added in Kansas	\$197,960
Indirect and Induced	\$409,633
Total Odorized Propane Industry Contribution to Kansas	¢607 502
GDP	φo07,593

2021 Employment

Production	79
Transportation, Storage, and Wholesale	80
Retail	306
Direct Kansas Employment Related to Odorized	465
Propane	

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

2021 Odorized Propane Production (% of U.S. (Gallons) Total) 19,414,000 1.58% Refineries Gas Processing Plants 65,869,000 0.85% 0.95%

85,283,000 Total Kansas Odorized Propane Production

Odorized Propane's Impact on Kentucky Economy A.20

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

Production	14
Transportation, Storage, and Wholesale	11
Retail	512
Direct Kentucky Employment Related to Odorized	537
Propane	557

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%

Total Kentucky Odorized Propane Production 31,105,000

2021 Labor Income (\$1,000

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

Direct Labor Income in Kentucky Odorized Propane	\$20 472
Industry	φ20,172

Odorized Propane's Impact on Louisiana Economy A.21 2021 Odorized Propane Sales Breakout

	(Gallons)	(% of State)
Residential	16,834,349	30.0%
Commercial	15,381,958	27.4%
Cylinder	6,188,161	11.0%
Internal Combustion	8,383,000	14.9%
Industrial	1,615,000	2.9%
Agricultural	7,791,000	13.9%
Total Louisiana Odorized Propane Demand	56,193,468	100.0%
Total Propane-Heated Households	33,582	
Propane Share of Louisiana Home Heating		1.92%

2021 Contribution to State Economy

Total Market Value of Odorized Propane Sold in Louisiana (\$1,000)	\$128,366
Supply	\$281,784
Transportation, Storage, and Wholesale	\$20,940
Retail	\$65,888
Total Direct Value Added in Louisiana	\$368,613
Indirect and Induced	\$664,104
Total Odorized Propane Industry Contribution to Louisiana GDP	\$1,032,717

(\$1,000)

2021 Employment

Production	200
Transportation, Storage, and Wholesale	58
Retail	371
Direct Louisiana Employment Related to Odorized Propane	629

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	313,865,000	25.47%
Gas Processing Plants	175,794,000	2.27%
Total Louisiana Odorized Propane Production	489,659,000	5.46%

2021 Labor Income (\$1.0

Production	\$25,752
Transportation, Storage, and Wholesale	\$6,129
Retail	\$14,835

Direct Labor Income in Louisiana Odorized Propane	¢46 746
Industry	\$40,7 TO

A.22 Odorized Propane's Impact on Maine Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	71,386,157	46.3%
Commercial	77,521,875	50.3%
Cylinder	1,922,001	1.2%
Internal Combustion	1,272,000	0.8%
Industrial	1,869,000	1.2%
Agricultural	244,000	0.2%
Total Maine Odorized Propane Demand	154,215,032	100.0%
Total Branana Heated Households	69 474	
rotar Propane-neated nousenoids	60,174	
Propane Share of Maine Home Heating		11.94%

2021 Contribution to State Economy

Total Market Value of Odorized Propane Sold in Maine (\$1,000)	\$456,042
Supply Transportation, Storage, and Wholesale	\$0 \$19.637
Retail	\$244,218
Total Direct Value Added in Maine	¢262.055
Indirect and Induced	\$352,557
Total Odorized Propane Industry Contribution to Maine GDP	\$616,412

(\$1.000)

2021 Employment

Production	-
ransportation, Storage, and wholesale Retail	11 1.104
Direct Maine Employment Related to Odorized Propane	1,115

2021 Labor Income	
(\$1,000)	
Production Transportation, Storage, and Wholesale Retail	\$0 \$1,086 \$58,071

Direct Labor Income in Maine Odorized Propane Industry \$59,157

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries Gas Processing Plants	-	0.00% 0.00%
Total Maine Odorized Propane Production	-	0.00%

Odorized Propane's Impact on Maryland Economy A.23

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	69,918,000	51.5%
Commercial	36,710,575	27.0%
Cylinder	4,248,000	3.1%
Internal Combustion	5,378,000	4.0%
Industrial	6,986,000	5.1%
Agricultural	12,591,000	9.3%
Total Maryland Odorized Propane Demand	135,831,575	100.0%
Iotal Propane-Heated Households	82,080	
Propane Share of Maryland Home Heating		3.58%

2021 Contribution to State Economy

	(\$1,000)
Total Market Value of Odorized Propane Sold in Maryland (\$1,000)	\$363,224
Supply	\$0
Transportation, Storage, and Wholesale	\$17,296
Retail	\$188,711
Total Direct Value Added in Maryland	\$206,007
Indirect and Induced	\$593,218
Total Odorized Propane Industry Contribution to Maryland	\$799,226

2021 Employment

Production	-
Transportation, Storage, and Wholesale	10
Retail	1,044
Direct Maryland Employment Related to Odorized Propane	1,054

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total Maryland Odorized Propane Production	-	0.00%

2021 Labor Income (\$1.0

Industry

Production	\$0
Transportation, Storage, and Wholesale	\$957
Retail	\$72,598
Direct Labor Income in Maryland Odorized Propane	\$73,554

A.24 Odorized Propane's Impact on Massachusetts Economy

2021 Odorized Propane Sales Breakout (Gallons) (% of State)		
	(Gallons)	(% of State)
Residential	83,283,075	59.2%
Commercial	43,718,670	31.1%
Cylinder	5,116,786	3.6%
Internal Combustion	6,261,000	4.4%
Industrial	1,574,000	1.1%
Agricultural	789,000	0.6%
Total Massachusetts Odorized Propane Demand	140,742,531	100.0%
T. (1 B	400.004	
Total Propane-Heated Households	106,984	
Propane Share of Massachusetts Home Heating		3.94%

	(\$1,000)
Total Market Value of Odorized Propane Sold in Massachusetts (\$1,000)	\$425,533
Supply	\$0
Transportation, Storage, and Wholesale	\$17,921
Retail	\$232,279

2021 Contribution to State Economy

Total Direct Value Added in Massachusetts	\$250,200
Indirect and Induced	\$846,410
Total Odorized Propane Industry Contribution to Massachusetts GDP	\$1,096,610

2021 Employment	
Production Transportation, Storage, and Wholesale Retail	- 10 1,013
Direct Massachusetts Employment Related to Odorized Propane	1,023

2021 Labor Income	
(\$1,000)	
Production Transportation, Storage, and Wholesale Retail	\$0 \$991 \$73,137
Direct Labor Income in Massachusetts Odorized Propane	\$74,128

2021 Odorized Propane Production (% of U.S. Total) Refineries Gas Processing Plants 0.00% Total Massachusetts Odorized Propane Production 0.00%

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A.25 Odorized Propane's Impact on Michigan Economy

2021 Odorized Propane Sales Breakout			
	(Gallons)	(% of State)	
Residential Commercial Cylinder Internal Combustion Industrial Agricultural	358,446,628 82,178,929 16,930,746 40,866,000 4,448,000 18,650,000	68.7% 15.8% 3.2% 7.8% 0.9% 3.6%	
Total Michigan Odorized Propane Demand	521,520,303	100.0%	
Total Propane-Heated Households	332,764	8 37%	

2021 Contribution to State Economy

Total Market Value of Odorized Propane Sold in Michigan	\$1,023,782
(\$1,000)	
Supply	\$3,677
Transportation, Storage, and Wholesale	\$66,828
Retail	\$286,503
Total Direct Value Added in Michigan	\$357,008
Indirect and Induced	\$1,010,121
Total Odorized Propane Industry Contribution to Michigan	\$1 367 129
GDP	ψ1,307,123

(\$1,000)

2021 Employment

Production	7
Transportation, Storage, and Wholesale Retail	39 1,758
Direct Michigan Employment Related to Odorized Propane	1,804

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	8,115,000	0.66%
Gas Processing Plants	2,634,000	0.03%
-		

Total Michigan Odorized Propane Production 10,749,000 0.12%

2021 Labor Income (\$1,000)

Production	\$890
Transportation, Storage, and Wholesale	\$3,800
Retail	\$96,332

Direct Labor Income in Michigan Odorized Propane \$101,022 Industry

A.26 Odorized Propane's Impact on Minnesota Economy

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

2021 Contribution to State Economy

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

(\$1,000)

2021 Employment

Production	3
Transportation, Storage, and Wholesale	37
Retail	1,445
Direct Minnesota Employment Related to Odorized	1 485
Propane	1,405

2021 Odorized Propane Production (% of U.S. Total) Refineries 23,586,000 1.91% Gas Processing Plants 0.00%

Total Minnesota Odorized Propane Production 23,586,000 0.26%

2021 Labor Income

\$411
\$3,632
\$76,199

Direct Labor Income in Minnesota Odorized Propane \$80,242
Industry

Odorized Propane's Impact on Mississippi Economy A.27 2021 Odorized Propane Sales Breakout

	(Gallons)	(% of State)
Residential	55,459,111	47.8%
Commercial	21,034,273	18.1%
Cylinder	2,843,694	2.5%
Internal Combustion	7,371,000	6.4%
Industrial	2,039,000	1.8%
Agricultural	27,244,000	23.5%
Total Mississippi Odorized Propane Demand	115,991,078	100.0%
Total Dranana Hastad Hawashalda	440.000	
rotar Propane-neated nouseholds	119,232	
Propane Share of Mississippi Home Heating		10.75%

2021 Contribution to State Economy

Total Market Value of Odorized Propane Sold in	\$273.513
Mississippi (\$1,000)	,
Supply Transportation, Storage, and Wholesale	\$60,640 \$16,734
Ketaii	\$144,608
Total Direct Value Added in Mississippi	\$221,982
Indirect and Induced	\$370,563
Total Odorized Propane Industry Contribution to Mississippi GDP	\$592,545

(\$1,000)

2021 Employment Production 53 Transportation, Storage, and Wholesale 16 Retail 730 Direct Mississippi Employment Related to 799 Odorized Propane

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

2021 Labor Income	
(\$1,000)	
Production Transportation, Storage, and Wholesale Retail	\$6,661 \$1,681 \$31,997
Direct Labor Income in Mississippi Odorized Propane Industry	\$40,340

Odorized Propane's Impact on Missouri Economy A.28

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%
Total Missouri Odorized Propane Demand	276,195,328	100.0%
Total Bronana Haatad Hausahalda	207 496	
rotar Propane-neated nousenolus	207,496	
Propane Share of Missouri Home Heating		8.53%

2021 Contribution to State Economy

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

2021 Employment

Production	1
Transportation, Storage, and Wholesale	23
Retail	1,132
Direct Missouri Employment Related to Odorized Propane	1,157

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

2021 Labor Income (\$1,000) Production Transportation, Storage, and Wholesale \$2,274 Retail \$68,845

\$7

Direct Labor Income in Missouri Odorized Propane	\$71 126	
Industry	\$71,120	
Odorized Propane's Impact on Montana Economy A.29

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%	
Total Montana Odorized Propane Demand	116,268,475	100.0%	
Total Propane-Heated Households	57,866		
Propane Share of Montana Home Heating		13.26%	

2021 Contribution to State Economy

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

2021 Employment

Production	22
Transportation, Storage, and Wholesale	9
Retail	249
Direct Montana Employment Related to Odorized Propane	281

2021 Odorized Propane Production (% of U.S. (Gallons) Total) 6,273,000 0.51% Refineries Gas Processing Plants 3,199,000 0.04%

9,472,000 0.11% Total Montana Odorized Propane Production

2021 Labor Income (\$1.00

Industry

Production	\$2,700
Transportation, Storage, and Wholesale	\$921
Retail	\$14,020
Direct Labor Income in Montana Odorized Propane	\$17,641

Odorized Propane's Impact on Nebraska Economy A.30 2021 Odorized Propane Sales Breakout

	(Gallons)	(% of State)
Residential	65,429,641	60.5%
Commercial	14,927,217	13.8%
Cylinder	2,281,706	2.1%
Internal Combustion	5,760,000	5.3%
Industrial	744,000	0.7%
Agricultural	19,050,000	17.6%
Total Nebraska Odorized Propane Demand	108,192,564	100.0%
Total Propane-Heated Households	54,321	
Propane Share of Nebraska Home Heating		7.08%

2021 Contribution to State Economy

	(\$1,000)
Total Market Value of Odorized Propane Sold in Nebraska (\$1,000)	\$209,474
Supply Transportation, Storage, and Wholesale Retail	\$372 \$38,375 \$56,501
Total Direct Value Added in Nebraska Indirect and Induced	\$95,248 \$242,531
Total Odorized Propane Industry Contribution to Nebraska GDP	\$337,779

2021 Employment

Production	2
Transportation, Storage, and Wholesale	72
Retail	175
Direct Nebraska Employment Related to Odorized Propane	249

2021 Odorized Propane Production (% of U.S. (Gallons) Total) 0.00% Refineries -Gas Processing Plants -0.00% 0.00%

Total Nebraska Odorized Propane Production -

2021 Labor Income (\$1.00

Industry

Direct Labor Income in Nebraska Odorized Propane	\$14.897
Retail	\$7,203 \$7,484
Production	\$210

A.31 Odorized Propane's Impact on Nevada Economy 2021 Odorized Propane Sales Breakout 2021 Contribution to State Economy

	(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%	
Total Nevada Odorized Propane Demand	53,911,869	100.0%	
Total Propane-Heated Households	30,489		
Propane Share of Nevada Home Heating		2.67%	

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

	0	
2021 Employment		

Production	0
Transportation, Storage, and Wholesale	4
Retail	276
Propane	280

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

2021 Labor Income

(\$1,000)	
Production	\$27
Transportation, Storage, and Wholesale	\$380
Retail	\$16,401

Direct Labor Income in Nevada Odorized Propane Industry \$16,808

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

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	100.231.515	60.7%
Commercial	58,574,169	35.5%
Cylinder	1,935,908	1.2%
Internal Combustion	859,000	0.5%
Industrial	3,266,000	2.0%
Agricultural	150,000	0.1%
Total New Hampshire Odorized Propane Demand	165,016,592	100.0%
Total Propane-Heated Households	94,735	
Propane Share of New Hampshire Home Heating		17.53%
2021 Employment		
Des dusting		
Production Transportation Storage and Whalasala		-
Retail		1 040
i totali		1,040
Direct New Hampshire Employment Related to Odorized Propane		1,052
2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries		0.00%
Gas Processing Plants	-	0.00%

Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total New Hampshire Odorized Propane		0.00%
Production	-	0.00%

2021 Contribution to State Economy

	(\$1,000)
Total Market Value of Odorized Propane Sold in New Hampshire (\$1,000)	\$500,128
Supply	\$0
Transportation, Storage, and Wholesale	\$21,012
Retail	\$273,551
Total Direct Value Added in New Hampshire	\$294,563
Indirect and Induced	\$405,467
Total Odorized Propane Industry Contribution to New Hampshire GDP	\$700,030
2021 Labor Income	
(\$1,000)	
Production	\$0
Transportation, Storage, and Wholesale	\$1,162
Retail	\$71,413

Direct Labor Income in New Hampshire Odorized Propane \$72,575
Industry

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

Jersey GDP

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	37,704,431	45.3%
Commercial	17,793,294	21.4%
Cylinder	7,064,595	8.5%
Internal Combustion	16,174,000	19.4%
Industrial	2,382,000	2.9%
Agricultural	2,072,000	2.5%
Total New Jersey Odorized Propane Demand	83,190,319	100.0%
Total Base and Handa d Hannahalda		
Iotal Propane-Heated Households	77,429	
Propane Share of New Jersey Home Heating		2.28%

2021 Contribution to State Economy	
	(\$1,000)
Total Market Value of Odorized Propane Sold in New Jersey (\$1,000)	\$220,247
Supply Transportation, Storage, and Wholesale Retail	\$20,838 \$11,557 \$113,352
Total Direct Value Added in New Jersey	\$145,748
Indirect and Induced	\$774,932
Total Odorized Propane Industry Contribution to New	\$920,679

2021 Employment	
Production	4
Transportation, Storage, and Wholesale	8
Retail	768
Direct New Jersey Employment Related to Odorized Propane	780

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

2021 Labor Income	
(\$1,000)	
Production Transportation, Storage, and Wholesale Retail	\$561 \$826 \$51,012
Direct Labor Income in New Jersey Odorized Propane	\$52,399

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

Mexico GDP

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	52,478,382	64.5%
Commercial	19,826,470	24.4%
Cylinder	2,569,609	3.2%
Internal Combustion	3,013,000	3.7%
Industrial	1,865,000	2.3%
Agricultural	1,669,000	2.0%
Total New Mexico Odorized Propane Demand	81,421,462	100.0%
Total Branana Hastad Hayaabalda	E2 64E	
Iotal Propane-Heated Households	53,645	
Propane Share of New Mexico Home Heating		6.73%

2021 Contribution to State Economy	
	(\$1,000)
Total Market Value of Odorized Propane Sold in New Mexico (\$1,000)	\$197,500
Supply Transportation, Storage, and Wholesale Retail	\$552,014 \$18,528 \$107,051
Total Direct Value Added in New Mexico	\$677,593
Indirect and Induced	\$806,063
Total Odorized Propane Industry Contribution to New	\$1 A92 656

\$1,483,656

2021 Employment	
Production	856
Transportation, Storage, and Wholesale	59
Retail	556
Direct New Mexico Employment Related to Odorized Propane	1,471

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

2021 Labor Income	
(\$1,000)	
Production Transportation, Storage, and Wholesale Retail	\$105,773 \$7,076 \$24,156
Direct Labor Income in New Mexico Odorized Propane Industry	\$137,005

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

0.00%

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	267,805,128	61.3%
Commercial	114,719,445	26.3%
Cylinder	11,766,665	2.7%
Internal Combustion	15,019,000	3.4%
Industrial	19,499,000	4.5%
Agricultural	8,052,000	1.8%
Total New York Odorized Propane Demand	436,861,238	100.0%
Total Deserves Heated Haveshelds	004.044	
i otal Propane-Heated Households	334,341	
Propane Share of New York Home Heating		4.44%

2021 Contribution to State Economy

Total Market Value of Odorized Propane Sold in New York (\$1,000)	\$1,188,230
Supply	\$32
Transportation, Storage, and Wholesale	\$55,627
Retail	\$627,097
Total Direct Value Added in New York	\$682,757
Indirect and Induced	\$2,245,513
Total Odorized Propane Industry Contribution to New York GDP	\$2,928,270

(\$1,000)

2021 Employment

Production	0
Transportation, Storage, and Wholesale	32
Retail	3,083
Direct New York Employment Related to Odorized Propane	3,115

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%

Total New York Odorized Propane Production -

2021 Labor Income

Production	\$18
Transportation, Storage, and Wholesale	\$3,077
Retail	\$222,999

Direct Labor Income in New York Odorized Propane \$226,093
Industry

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

(% of U.S.

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%	
•			
Total North Carolina Odorized Propane Demand	375,420,600	100.0%	
Total Propane-Heated Households	263,683		
Propage Share of North Carolina Home Heating		6 54%	
riopano onaro orriorar carolina rione ricating		0.0470	

	(\$1,000)
Total Market Value of Odorized Propane Sold in North	\$1,063,528
Carolina (\$1,000)	
Supply	\$0
Transportation, Storage, and Wholesale	\$49,339
Retail	\$602,570

2021 Contribution to State Economy

Total Direct Value Added in North Carolina	\$651,908
Indirect and Induced	\$1,389,160
Total Odorized Propane Industry Contribution to North Carolina GDP	\$2,041,068

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

2021 Labor Income	
(\$1,000)	
Deschustion	¢0
Production	\$0
Transportation, Storage, and Wholesale	\$3,046
Retail	\$158,281

Direct Labor Income in North Carolina Odorized Propane \$161,327 Industry

2021 Odorized Propane Production

	(Gallons)	Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total North Carolina Odorized Propane		0.000
Production	-	0.00%

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

2021 Odorized Propane Sales Breakout			
	(Gallons)	(% of State)	
Residential	65,698,593	53.4%	
Commercial	25,496,906	20.7%	
Cylinder	2,315,952	1.9%	
Internal Combustion	3,078,000	2.5%	
Industrial	10,442,000	8.5%	
Agricultural	16,003,000	13.0%	
Total North Dakota Odorized Propane Demand	123,034,451	100.0%	
	40 500		
Total Propane-Heated Households	43,586		
Propane Share of North Dakota Home Heating		13.77%	

	(\$1,000)
Total Market Value of Odorized Propane Sold in North Dakota (\$1,000)	\$234,819
Supply Transportation, Storage, and Wholesale Retail	\$709,942 \$25,311 \$60,837

2021 Contribution to State Economy

Total Direct Value Added in North Dakota	\$796,091
Indirect and Induced	\$899.507
Total Odorized Propane Industry Contribution to North Dakota GDP	\$1,695,598

2021 Employment	
Production Transportation, Storage, and Wholesale Retail	807 64 102
Direct North Dakota Employment Related to Odorized Propane	974

2021 Labor Income	
(\$1,000)	
Production	\$99,847
Transportation, Storage, and Wholesale	\$7,630
Retail	\$4,836
Direct Labor Income in North Dakota Oderized Bronane	

Direct Labor Income in North Dakota Odorized Propane \$112,314 Industry

2021 Odorized Propane Production (% of U.S. (Gallons) Total) Refineries 5,034,000 0.41% Gas Processing Plants 591,904,000 7.64% Specimies Total North Delivate Oderiged Process Production 596,938,000 6.65%

Total North Dakota Odorized Propane Production 596,9

Odorized Propane's Impact on Ohio Economy A.38 2021 Odorized Propane Sales Breakout

	(Gallons)	(% of State
Residential	196,380,926	56.8%
Commercial	63,703,485	18.4%
Cylinder	11,709,484	3.4%
Internal Combustion	39,241,000	11.49
Industrial	5,315,000	1.5%
Agricultural	29,357,000	8.5%
Total Ohio Odorized Propane Demand	345,706,895	100.0%
Total Dranana Hastad Hawashalda	259 597	
rotar Propane-neated Households	258,587	
Propane Share of Ohio Home Heating		5.44%

2021 Contribution	to State Economy
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Total Market Value of Odorized Propane Sold in Ohio (\$1,000)	\$665,013
Supply Transportation, Storage, and Wholesale Retail	\$139,707 \$64,272 \$176,187
Total Direct Value Added in Ohio	\$380,167
Indirect and Induced	\$1,195,757
Total Odorized Propane Industry Contribution to Ohio GDP	\$1,575,923

(\$1,000)

2021 Employment

Production Transportation. Storage, and Wholesale	112 84
Retail	1,421
Direct Ohio Employment Related to Odorized Propane	1,617

2021 Labor Income	
(\$1,000)	
Production Transportation, Storage, and Wholesale Retail	\$14,003 \$8,592 \$68,277
Direct Labor Income in Ohio Odorized Propane Industry	\$90,872

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

Total Ohio Odorized Propane Production 148,900,000

A.39 Odorized Propane's Impact on Oklahoma Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
		· · · · · · · · · · · · · · · · · · ·
Residential	80.635.091	57.2%
Commercial	28,898,051	20.5%
Cylinder	7,364,430	5.2%
Internal Combustion	12,731,000	9.0%
Industrial	3,571,000	2.5%
Agricultural	7,680,000	5.5%
-		
Total Oklahoma Odorized Propane Demand	140,879,572	100.0%
Total Decessory Us at ad Usersa balda	05.044	
Total Propane-Heated Households	95,641	
Propane Share of Oklahoma Home Heating		6.36%

2021 Contribution to State Economy

Total Market Value of Odorized Propane Sold in Oklahoma (\$1,000)	\$271,119
Supply	\$873,010
Transportation, Storage, and Wholesale	\$55,096
Retail	\$71,919
Total Direct Value Added in Oklahoma	\$1,000,024
Indirect and Induced	\$1,254,976
Total Odorized Propane Industry Contribution to Oklahoma GDP	\$2,255,000

(\$1,000)

2021 Employment

Production	796
Transportation, Storage, and Wholesale	153
Retail	591
Direct Oklahoma Employment Related to Odorized Propane	1,540

2021 Odorized Propane Production (% of U.S. (Gallons) Total) Refineries 29,291,000 2.38% Gas Processing Plants 805,223,000 10.40%

Total Oklahoma Odorized Propane Production 834,514,000 9.30%

2021 Labor Income

Production	\$98,799
Transportation, Storage, and Wholesale	\$17,159
Retail	\$28,833

Direct Labor Income in Oklahoma Odorized Propane \$144,791 Industry

A.40 Odorized Propane's Impact on Oregon Economy

0.00%

2021 Odorized Propane Sales Breakout		
(Gallons)	(% of State	
34,687,932 44,424,325 2,233,867 7,276,000 2,185,000 7,325,000	35.3% 45.3% 2.3% 7.4% 2.2% 7.5%	
98,132,123	100.0%	
30,549	1.84%	
	Cout (Gallons) 34,687,932 44,424,325 2,233,867 7,276,000 2,185,000 7,325,000 98,132,123 30,549	

2021 Contribution to State Economy

	(\$1,000)
Total Market Value of Odorized Propane Sold in Oregon (\$1,000)	\$219,418
Supply	\$0
Transportation, Storage, and Wholesale	\$12,496
Retail	\$68,937
Total Direct Value Added in Oregon	\$81,432
Indirect and Induced	\$360,299
Total Odorized Propane Industry Contribution to Oregon GDP	\$441,731

2021 Employment

Production	
Transportation, Storage, and Wholesale	7
Retail	324
Direct Oregon Employment Related to Odorized Propane	331

2021 Labor Income	
(\$1,000)	
Production Transportation, Storage, and Wholesale	\$0 \$691
Retail	\$16,933
Direct Labor Income in Oregon Odorized Propane Industry	\$17,625

 Contraction

 (% of U.S. (Gallons)

 Refineries Gas Processing Plants
 0.00%

Total Oregon Odorized Propane Production -

A.41 Odorized Propane's Impact on Pennsylvania Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	190,126,109	51.0%
Commercial	91,491,581	24.5%
Cylinder	15,573,280	4.2%
Internal Combustion	27,361,000	7.3%
Industrial	20,204,000	5.4%
Agricultural	28,067,000	7.5%
•		
Total Pennsylvania Odorized Propane Demand	372,822,970	100.0%
Total Propane-Heated Households	237,882	
Propane Share of Pennsylvania Home Heating		4.62%

	(\$1,000)
Total Market Value of Odorized Propane Sold in Pennsylvania (\$1,000)	\$996,059
Supply Transportation, Storage, and Wholesale Retail	\$300,793 \$55,890 \$517,058

2021 Contribution to State Economy

Total Direct Value Added in Pennsylvania	\$873,742
Indirect and Induced	\$1,753,540
Total Odorized Propane Industry Contribution to Pennsylvania GDP	\$2,627,281
-	

2021 Employment	
Production Transportation, Storage, and Wholesale Retail	203 62 2,622
Direct Pennsylvania Employment Related to Odorized Propane	2,888

2021 Labor Income	
(\$1,000)	
Production	\$25,318
Transportation, Storage, and Wholesale	\$6,711
Retail	\$147,350

Direct Labor Income in Pennsylvania Odorized Propane \$179,380 Industry

2021 Odorized Propane Production (% of U.S. (Gallons) Refineries Gas Processing Plants 12,627,000 251,099,000 1.02% 3.24% Total Pennsylvania Odorized Propane Production 263,726,000 2.94%

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

2021 Odorized Propane Sales Breakout						
	(Gallons)	(% of State)				
Residential	15,747,000	56.9%				
Commercial	8,409,356	30.4%				
Cylinder	2,361,000	8.5%				
Internal Combustion	798,000	2.9%				
Industrial	185,000	0.7%				
Agricultural	176,000	0.6%				
Total Rhode Island Odorized Propane Demand	27,676,356	100.0%				
Total Propane-Heated Households	17,055					
Propane Share of Rhode Island Home Heating		4.00%				

	(\$1,000)
Total Market Value of Odorized Propane Sold in Rhode	\$83,366
Island (\$1,000)	
Supply	\$0
Transportation, Storage, and Wholesale	\$3,524
Retail	\$45,361

2021 Contribution to State Economy

Total Direct Value Added in Rhode Island	\$48,885
Indirect and Induced	\$110,950
Total Odorized Propane Industry Contribution to Rhode Island GDP	\$159,836

2021 Employment	
Production Transportation, Storage, and Wholesale Retail	- 2 239
Direct Rhode Island Employment Related to Odorized Propane	241

2021 Labor Income	
(\$1,000)	
Production Transportation, Storage, and Wholesale Retail	\$0 \$195 \$14,501
Direct Labor Income in Rhode Island Odorized Propane	\$14,696

Industry

2021 Odorized Propane Production (% of U.S. (Gallons) Total) 0.00% Refineries -Gas Processing Plants 0.00% --0.00%

Total Rhode Island Odorized Propane Production

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

(% of U.S.

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%				
Total South Carolina Odorized Propane Demand	106,677,548	100.0%				
Total Propane-Heated Households	68,881					
Propane Share of South Carolina Home Heating		3.49%				

2021	Contrib	ution to) Sta	ite E	cond	omy	/	
								(\$1,000)
						-		

\$0
5,119
8,072

Total Direct Value Added in South Carolina	\$183,190
Indirect and Induced	\$473,244
Total Odorized Propane Industry Contribution to South Carolina GDP	\$656,435

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

2021 Labor Income	
(\$1,000)	
Production	\$0
Transportation, Storage, and Wholesale	\$1,153
Retail	\$59,275

Direct Labor Income in South Carolina Odorized Propane \$60,428 Industry

2021 Odorized Propane Production

	(Gallons)	l otal)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total South Carolina Odorized Propane		0.000
Production	-	0.00%

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

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	46,563,837	57.2%
Commercial	7,812,043	9.6%
Cylinder	552,586	0.7%
Internal Combustion	2,883,000	3.5%
Industrial	1,127,000	1.4%
Agricultural	22,516,000	27.6%
Total South Dakota Odorized Propane Demai	nd 81,454,467	100.0%
Total Propane-Heated Households	54,643	
Propane Share of South Dakota Home Heating		15.80%

021 Contri	bution to S	tate Economy
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Total Market Value of Odorized Propane Sold in South Dakota (\$1,000)	\$156,791
Supply	¢004
Supply	\$ 224
Transportation, Storage, and Wholesale	\$10,372
Retail	\$41,616

(\$1,000)

Total Direct Value Added in South Dakota \$52,	,213
Indirect and Induced \$110,	,296
Total Odorized Propane Industry Contribution to South Dakota GDP \$162,	,508

2021 Employment	
Production Transportation, Storage, and Wholesale Retail	1 6 232
Direct South Dakota Employment Related to Odorized Propane	239

2021 Labor Income	
(\$1,000)	
Production	\$126
Transportation, Storage, and Wholesale	\$575
Retail	\$10,025
Direct Labor Income in South Dakota Odorized Propane	\$10,726

Industry

2021 Odorized Propane Production (% of U.S. (Gallons) Total) 0.00% Refineries -Gas Processing Plants 0.00% -0.00% -

Total South Dakota Odorized Propane Production

A.45 Odorized Propane's Impact on Tennessee Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential Commercial Cylinder Internal Combustion Industrial Agricultural	58,563,227 31,898,318 8,359,304 16,095,000 3,933,000 4,499,000	47.5% 25.9% 6.8% 13.0% 3.2% 3.6%
-		
Total Tennessee Odorized Propane Demand	123,347,848	100.0%
Iotal Propane-Heated Households	97,786	
Propane Share of Tennessee Home Heating		3.67%

2021 Contribution to State Economy

\$233,392
\$822 \$16,137 \$58,953
\$75,912 \$522,090
\$598,002

(\$1,000)

2021 Employment

Production	2
Transportation, Storage, and Wholesale	10
Retail	710
Direct Tennessee Employment Related to	700
Odorized Propane	122

(% of U.S. Total)
1.05% 0.01%

Total Tennessee Odorized Propane Production 13,671,000 0.15%

2021 Labor Income	
(\$1,000)	
Production Transportation, Storage, and Wholesale Retail	\$315 \$982 \$37,392
Direct Labor Income in Tennessee Odorized Propane Industry	\$38,689

Odorized Propane's Impact on Texas Economy A.46

2021 Odorized Propane Sales Breakout			
	(Gallons)	(% of State)	
Residential	109,174,611	24.6%	
Commercial	230,952,184	52.1%	
Cylinder	31,384,935	7.1%	
Internal Combustion	50,120,000	11.3%	
Industrial	8,035,000	1.8%	
Agricultural	13,384,000	3.0%	
Total Texas Odorized Propane Demand	443,050,730	100.0%	
Total Propane-Heated Households	299,884		
Propane Share of Texas Home Heating		2.93%	

2021 Contribution to State Economy

	(\$1,000)
Total Market Value of Odorized Propane Sold in Texas (\$1,000)	\$1,002,803
Supply Transportation, Storage, and Wholesale Retail	\$4,504,105 \$140,623 \$510,135
Total Direct Value Added in Texas	\$5,154,864
Indirect and Induced	\$7,429,824
Total Odorized Propane Industry Contribution to Texas GDP	\$12,584,687

2021 Employment

Production	4,664
Transportation, Storage, and Wholesale	511
Retail	2,837
Direct Texas Employment Related to Odorized Propane	8,012

2021 Labor Income (\$1,000) \$578,717 Production Transportation, Storage, and Wholesale \$59,361 Retail \$178,148 \$816,226 Direct Labor Income in Texas Odorized Propane Industry

2021 Odorized Propane Production (% of U.S. (Gallons) Total) 472,107,000 38.32% Refineries Gas Processing Plants 3,557,217,000 45.94% 44.90%

4,029,324,000 Total Texas Odorized Propane Production

Odorized Propane's Impact on Utah Economy A.47

202	1 Odorized Propane Sales Brea	kout	
		(Gallons)	(% of State)
Res	sidential mmercial	13,823,715 33,996,241	21.6% 53.0%
Cyl Inte	inder ernal Combustion	3,244,630 6,146,000	5.1% 9.6%
Ind Agr	ustrial ricultural	3,020,000 3,912,000	4.7% 6.1%
Total	Utah Odorized Propane Demand	64,142,586	100.0%
Total	Propane-Heated Households	24,266	
Propa	ane Share of Utah Home Heating		2.35%

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

2021 Employment

Production	55
Transportation, Storage, and Wholesale	10
Retail	219
Direct Utah Employment Related to Odorized Propane	284

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

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

Total Utah Odorized Propane Production 32,985,000

Odorized Propane's Impact on Vermont Economy A.48 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%
Total Vermont Odorized Propane Demand	109,268,092	100.0%
	17.004	
Total Propane-Heated Households	47,294	
Propane Share of Vermont Home Heating		18.02%

2021 Contribution to State Economy

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

2021 Employment

Production	-
Transportation, Storage, and Wholesale	8
Retail	611
Direct Vermont Employment Related to Odorized Propane	618

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

2021 Labor Income (\$1.00

Industry

A.49 Odorized Propane's Impact on Virginia Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
Residential	120,430,898	46.6%
Commercial	85,704,882	33.2%
Cylinder	7,905,572	3.1%
Internal Combustion	7,459,000	2.9%
Industrial	12,234,000	4.7%
Agricultural	24,673,000	9.5%
Total Virginia Odorized Propane Demand	258,407,352	100.0%
Total Pronane-Heated Households	137 353	
	107,000	
Propane Share of Virginia Home Heating		4.23%

2021	Contribution to	State Econom
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Total Market Value of Odorized Propane Sold in Virginia	\$737,912
(\$1,000)	
Supply	\$1
Transportation, Storage, and Wholesale	\$32,904
Retail	\$420,669
Total Direct Value Added in Virginia	\$453,574
Indirect and Induced	\$1,021,488
Total Odorized Propane Industry Contribution to Virginia GDP	\$1,475,062

(\$1,000)

2021 Employment

0
19
1,566
1,584

2021 Labor Income	
(\$1,000)	
Production Transportation, Storage, and Wholesale Retail	\$1 \$1,820 \$90,899
Direct Labor Income in Virginia Odorized Propane Industry	\$92,720

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries	-	0.00%
Gas Processing Plants	-	0.00%
Total Virginia Odorized Propane Production	-	0.00%

A.50 Odorized Propane's Impact on Washington Economy

2021 Odorized Propane Sales Breakout		
	(Gallons)	(% of State)
	00 000 574	44.00/
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%
Total Washington Odorized Propane Demand	207,403,624	100.0%
Total Propane-Heated Households	91,012	
Propane Share of Washington Home Heating		3.10%

2021 Contribution to State Economy

	(\$1,000)
Total Market Value of Odorized Propane Sold in	\$471,395
washington (\$1,000)	
Supply	\$0
Transportation. Storage, and Wholesale	\$26.925
Retail	\$153,406
Total Direct Value Added in Washington	\$180,331
Indirect and Induced	\$813,875
Total Odorized Propane Industry Contribution to	\$994 205
Washington GDP	ψ 3 34,203

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

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

Total Washington Odorized Propane Production 15,918,000 0.18%

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

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

2021 Odorized Propane Sales Breakout			
	(Gallons)	(% of State)	
Residential	30,779,668	59.6%	
Commercial	10,886,436	21.1%	
Cylinder	963,242	1.9%	
Internal Combustion	1,794,000	3.5%	
Industrial	895,000	1.7%	
Agricultural	6,335,000	12.3%	
Total West Virginia Odorized Propane Demand	51,653,347	100.0%	
Total Deserves the start the wash alds	20.004		
i otal Propane-Heated Households	36,994		
Propane Share of West Virginia Home Heating		5.20%	

	(\$1,000)
Total Market Value of Odorized Propane Sold in West	\$150,963
Virginia (\$1,000)	
Supply	\$839,325
Transportation, Storage, and Wholesale	\$44,545
Retail	\$87,573

2021 Contribution to State Economy

Total Direct Value Added in West Virginia	\$971,443
Indirect and Induced	\$1,109,770
Total Odorized Propane Industry Contribution to West Virginia GDP	\$2,081,213

2021 Employment	
Production Transportation, Storage, and Wholesale Retail	602 143 130
Direct West Virginia Employment Related to Odorized Propane	876

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries Gas Processing Plants	- 752,234,000	0.00% 9.72%
Total West Virginia Odorized Propane Production	752,234,000	8.38%

2021 Labor Income	
(\$1,000)	
Production	\$74,857
Transportation, Storage, and Wholesale	\$15,957
Retail	\$6,542

Direct Labor Income in West Virginia Odorized Propane \$97,356 Industry

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Odorized Propane's Impact on Wisconsin Economy A.52

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%	
Total Wisconsin Odorized Propane Demand	451,692,049	100.0%	
Total Propane-Heated Households	278,175		
Propane Share of Wisconsin Home Heating		11.58%	

2021 Contribution	to State Economy

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

(\$1,000)

2021 Employment

Production	0
Transportation, Storage, and Wholesale	33
Retail	1,327
Direct Wisconsin Employment Related to Odorized Propane	1,360

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

2,111,000 Total Wisconsin Odorized Propane Production

2021 Labor Income (\$1.00

Production	\$37
Transportation, Storage, and Wholesale	\$3,198
Retail	\$62,659

Direct Labor Income in Wisconsin Odorized Propane	\$65 803
Industry	\$00,090

Odorized Propane's Impact on Wyoming Economy A.53 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%
Total Wyoming Odorized Propane Demand	60,001,317	100.0%
Tetal Drenana Hastad Hayeshalda	24 904	
Total Propane-Heated Households	24,891	
Propane Share of Wyoming Home Heating		10.79%

2021 Contributio	on to State Economy
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Total Market Value of Odorized Propane Sold in Wyoming (\$1,000)	\$119,767
Supply Transportation, Storage, and Wholesale	\$197,000 \$11,143
Retail	\$41,779
Total Direct Value Added in Wyoming	\$240.022
Indirect and Induced	\$301,118
Total Odorized Propane Industry Contribution to Wyoming GDP	\$551,040

(\$1,000)

2021 Employment

Production	210
Transportation, Storage, and Wholesale Retail	23 181
Direct Wyoming Employment Related to Odorized Propane	413

2021 Odorized Propane Production		
	(Gallons)	(% of U.S. Total)
Refineries Gas Processing Plants	3,764,000 167,377,000	0.31% 2.16%

Total Wyoming Odorized Propane Production 171,141,000 1.91%

2021 Labor Income (\$1.00

Production	\$25.986
Transportation, Storage, and Wholesale	\$2,617
Netali	φ10,460

Direct Labor Income in Wyoming Odorized Propane \$39,082 Industry

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.

State	Total Households in Region	Natural Gas	Propane	Electricity	Distillate ⁴¹	Wood	Other/None ⁴²
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
Total U.S.	124,010,992	58,895,877	5,961,040	49,307,922	5,466,710	1,959,796	2,419,647

Table 20: 2021 Residential Households Primary Space Heating Fuels by Division

Source: US Census American Community Survey

⁴¹ Distillate includes Fuel Oil and Diesel Home Heated Households

⁴² Includes Coal, Solar, Other, and No Fuel Households,

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
lowa	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

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

Source: US Census American Community Survey

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
U.S. Total	124,010,992	58,895,877	5,961,040	49,307,922	5,466,710	1,959,796	2,419,647

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

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 ⁴³	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

⁴³ The North American Industry Classification System (NAICS) suspended separate reporting of economic activity in the LPG Dealers (454312) and Heating Oil Dealers (454311) classifications starting in the 2nd quarter of 2011, merging both into the Fuel Dealers (45431) classification. 2012 employment figures are estimates derived from total 45431 reported data using historical trends in LPG Dealers and Heating Oil Dealers share of total Fuel Dealers, total number of gallons sold, and customers served, state-level relationships between customer and employee numbers, and state-level economic conditions.

D. Appendix: Acronyms

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

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

