

POTENTIAL COVERAGE OF ALTERNATIVE FUEL INDUSTRIES UNDER EPACT SECTION 501

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ABSTRACT

The Energy Policy Act (EPACT) has a goal of replacing ten percent of transportation petroleum fuel with alternative fuels and replacement fuels by the year 2000, and 30 percent by 2010. Sections 501 and 507 of EPACT encourage and mandate use of alternative fueled vehicles (AFVs) in fleet applications. In particular, Section 501 mandates that certain percentages of new light-duty vehicles (LDVs) acquired by alternative fuel providers be AFVs. The first step in estimating the effects of these mandates entails identifying affected fleets that are covered by the Act. This paper presents an assessment of potential fleet coverage of Section 501. This assessment concludes that a limited number of companies in the methanol, ethanol, propane, and hydrogen industries are likely to be covered by this mandate. On the other hand, many of the large crude oil producers, petroleum refiners, natural gas producers and transporters, and natural gas and electric utilities are likely to be subject to this mandate.

Key Word List

1. Alternative Fuels
2. Alternative Fueled Vehicles
3. Energy Policy Act
4. Transportation Fuel Use
5. Fuel Vehicles

INTRODUCTION

In 1992, the EPACT was enacted to provide a comprehensive national energy policy. One of EPACT's motivations is to gradually increase the United States energy security in ways that are both cost-effective and environmentally prudent. Consistent with this motivation, one of EPACT's objectives is to decrease the nation's dependence on imported oil. To meet this objective, Section 502 of the EPACT requires the Energy Secretary to determine the feasibility of achieving a goal of reducing petroleum-based motor fuel consumption by ten percent by the year 2000 and 30 percent by 2010.

Many strategies can be used to accomplish this goal. Since the largest opportunity for reducing imported oil dependence is in the 22 quadrillion British thermal units (Btu's) of petroleum consumed by almost 200 million cars and trucks, the use of alternative motor fuels is a prime candidate. However, two factors limit the replacement of gasoline today: the access to alternative fuel refueling stations and the availability of vehicles that operate on alternative fuels.

In the hope of encouraging the development of a nationwide alternative fuel refueling infrastructure and the expanded use of AFVs, the Alternative Fuel Provider Vehicle Acquisition Mandate was established under Section 501 of EPACT. Alternative fuel providers are targeted as the first market segment required to use large quantities of alternative fuels and AFVs because alternative fuel providers are, in theory, most likely to benefit from the success of alternative fuels in the marketplace. By being the "test-bed," they can demonstrate the commercial feasibility of alternative fuels and AFVs, thereby enhancing public acceptance and inducing widespread use.

Section 501 requires that an increasing percentage of the new LDVs acquired by a "covered person" be AFVs. Except for electric vehicles, the shares of new LDVs that must use alternative fuels are as follows:

- 30 percent for model year 1996,
- 50 percent for 1997,
- 70 percent for 1998, and
- 90 percent for 1999 and thereafter.

For covered persons whose principal business is to generate, transmit, import, or sell electricity, this vehicle acquisition mandate does not apply until after December of 1997, if they intend to comply with the mandate by using electric vehicles.

To understand the potential impact of this mandate, the size and composition of vehicle fleets that are likely to be regulated under Section 501 are estimated. This paper presents estimates of alternative fuel providers expected to be covered under this mandate and the number of alternative fueled LDVs that will be acquired as a result of this mandate.

QUALIFYING CRITERIA

For purposes of Section 501, alternative fuels include methanol, ethanol, natural gas, propane, electricity, and hydrogen. Excluded from this list are mixtures with less than 70 percent of methanol or ethanol, methyl tertiary butyl ether (MTBE), ethyl tertiary butyl ether (ETBE) and reformulated gasoline. Further, AFVs acquired pursuant to this mandate must be operated solely on alternative fuels, except when operating in areas where these fuels are not available.

To qualify as a "covered person" subject to this mandate, an organization must meet *all* of the following criteria:

1. Owns, operates, or otherwise controls a fleet of *20 or more LDVs*, at least 20 of which are used within a single *metropolitan statistical area (MSA)* or a consolidated metropolitan statistical areas (CMSA).
2. Owns, operates, or otherwise controls a fleet that contains at least 20 LDVs within a single MSA or CMSA that are *centrally fueled or capable of being centrally fueled*.
3. Owns, operates, or otherwise controls at least *50 LDVs nationwide*.
- 4.1 Produces, stores, refines, processes, transports, distributes, imports, or sells any *alternative fuel*, other than electricity, as one's *principal business*, or
- 4.2 Generates, transmits, imports, or sells *electricity as one's principal business*, or
- 4.3 Produces, imports, or produces and imports in combination, an average of *50,000 barrels per day or more of petroleum*; and has a *substantial portion of one's business producing alternative fuels*.

If one's principal business is to (1) transform a product that can be used as an alternative fuel into a product that is not an alternative fuel, or (2) use a product that can be used as an alternative fuel as a feedstock or fuel in the manufacture of a product that is not an alternative fuel, one is not subject to this mandate. Examples of such activities are using methanol as a feedstock in producing windshield washer fluid, and reacting methanol with isobutylene in producing MTBE, an octane enhancing gasoline additive but not an alternative fuel.

In this assessment, all fleet vehicles are assumed to have the *capability* of being centrally fueled, whether or not they are actually centrally fueled. The definition of "principal business" is interpreted in such a way that if an organization or business unit generates its largest share of revenue from alternative fuels, or directs its largest share of investment to alternative fuels, its principal business is alternative fuels.

DATA AND METHODOLOGY

The assessment of fleets likely to be regulated under Section 501 is based on survey data from the Energy Information Administration (EIA) and other organizations, information collected from individual fuel providers, in the literature or proprietary databases, and discussions with trade associations. In response to EPACT Section 407, EIA conducted surveys of alternative fuel providers.^{1, 2, 3} One of the reasons that EIA focuses its data collection effort on these three alternative fuel industries is because these industries operate most of the AFVs now in use.

To fill the data gap on the remaining alternative fuels—methanol, ethanol, and hydrogen—and the petroleum industries, all methanol and ethanol producers, all oil explorers and producers, and a random sample of petroleum refiners that are located within EPACT MSAs were contacted for information on fleet sizes and locations, the extent to which the company is involved in alternative fuels, and on the use of alternative fuels in existing vehicular operations.

A "pathway" analysis was conducted for each of the alternative fuels and petroleum to ensure that every industry function that is likely to be regulated under Section 501 is included—from producers downstream to retailers. These pathways serve as the basis for determining whether a business unit qualifies as a "covered person."

COVERAGE ASSESSMENT

Instead of repetitively describing the steps used to assess fleet vehicle coverage for each of the different alternative fuel industries, the essence of the assessment approach is illustrated by using the methanol industry as an example. Since the qualifying criteria for assessing the petroleum industry are different from the alternative fuel industries, it is discussed separately.

Methanol Industry

Methanol is produced primarily from natural gas feedstocks (75 percent). Since U.S. natural gas is produced mostly in Louisiana and Texas, most methanol plants are located there as well (~88 percent of U.S. methanol production). The U.S. currently imports about 20 percent of its methanol. The primary use of methanol is as a feedstock for other products, such as chemicals, extractants, solvents, MTBE and TAME (tertiary amyl methyl ether). To a lesser extent, methanol is used as an alternative fuel, in the form of M85 (85 percent methanol and 15 percent gasoline by volume) or M100.

Methanol is shipped from producer to storage terminals, where it is picked up by wholesalers, retailers, or even end users, by tank truck haulers. Methanol marketers and retailers include the larger integrated oil companies, such as Chevron, and independent marketers, such as Olympian Oil Co. End users include state groups, municipalities, and the private sector. Figure 1 illustrates a generic methanol pathway.

Manufacturing Function

Of the 12 methanol producers listed in the *Petroleum Supply Annual 1992*⁴, 11 are located within EPACT MSAs. Those 11 producers were contacted for detailed information on their fleets, and nine responded. Only one of the responding companies owns, operates, or otherwise controls at least 20 LDVs in an MSA, and at least 50 LDVs nationwide. Furthermore, producing methanol is the principal business of this company. The "20 LDVs in an EPACT MSA" and "50 LDVs nationwide" criteria disqualify most of the methanol producers from being "covered persons." None of the responding companies presently operate AFVs.

Manufacturing:

Predominantly in Texas and Louisiana, from natural gas feedstocks. Other feedstocks include coal, residual oil, and biomass. Of the over 3 million gallons/day produced (U.S.), about 41% is used to make MTBE, and 2% for methanol or methanol/gas blends.

Refining:

Produce MTBE, which in turn is used to make oxygenated gasoline. However, these refineries are exempt from Section 501 of EPACT because they use alternative fuel to make a product that is not an alternative fuel.

Storage/Blending:

Located mostly in MSA's across the U.S. Various fuels are typically stored here. Methanol mixed with gasoline forms different blends, such as M85 (85% methanol and 15% conventional gasoline).

Transportation:

Dedicated pipeline, barge, rail car, and tank truck are each used to transport from mfr. to terminals; tank trucks are used to move from terminals to local retail outlets.

Wholesale:

Refiner marketers are often representatives of the big oil companies, such as Exxon, Shell, etc., who own their own tanks at the terminals, and distribute to retail outlets. Jobbers shop around for the best prices at terminals, then sell to the independent retailers.

Retail:

Generally sold at larger, multi-service, conventional gasoline filling stations.

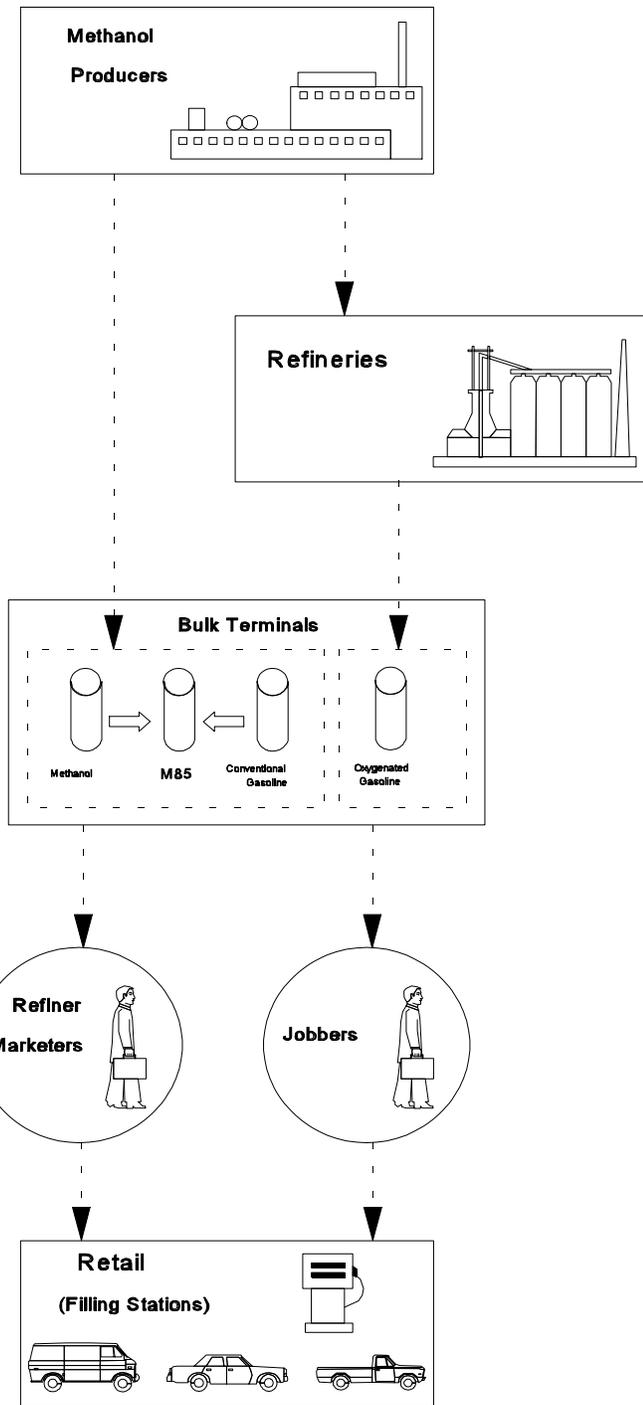


FIGURE 1 Pathway of Industry Functions in the Methanol Industry

Refining Function

The component of "refining" in the methanol pathway is bypassed in this analysis because the "refining" step produces MTBE which is blended with gasoline to make oxygenated gasoline. Neither MTBE nor oxygenated gasoline are defined as alternative fuels in EPACT.

Storage/Blending Function

Blending of M85 is typically done by splash blending—the tank hauler will fill 85 percent of the tank with methanol and top off the load with conventional gasoline. However, due to the limited demand for M85, the principal business of the tank truck carriers is gasoline, not methanol.

Transport Function

Thirty tank truck companies were selected at random from the *National Tank Truck Carriers Directory*⁵. None of the 17 responding companies characterize transporting methanol as their principal business. In fact, most of the responding tank carriers move large amounts of gasoline and diesel fuel, but little methanol.

Wholesale Function

This component includes refiner marketers and jobbers. Refiner marketers are often representatives of the integrated oil companies who own tanks at the terminals, and distribute fuel to their own retail outlets. On the other hand, jobbers are independent marketers who "shop around" for the best prices at terminals, and sell fuel to independent retailers. None of the refiner marketers or jobbers generate their largest share of revenue from either M100 or M85, thereby disqualifying them from Section 501.

Retail Function

Methanol as a vehicle fuel is generally sold at larger, multi-service conventional gasoline filling stations. Since the principal business of these stations is gasoline retailing, none of the retailers are likely to qualify under Section 501.

Assessment Results

Based on information provided by the American Methanol Institute, and data collected from a number of companies with part of their activities associated with methanol, we conclude that only a negligible percentage of the companies in the methanol pathway is required to comply with the Alternative Fuel Provider Vehicle Acquisition Mandate.

The only future coverage would be the methanol producers, since they are most likely to produce, sell or transport enough methanol as their principal business. However, the fleet size requirement currently exempts most of the nation's large methanol producers from this mandate. In fact, only one methanol producer met all of the qualifying criteria. This "covered person" generates about 40

percent of its revenue from the sale and handling of methanol and operates approximately 60 LDVs in an EPACT MSA. Any companies downstream from the producers typically do not meet the "principal business" and "fleet size" qualifying criteria.

Ethanol Industry

More than 95 percent of ethanol is produced using corn as the basic feedstock. The remaining is made from biomass feedstocks. Some companies, such as A. E. Staley, whose primary product is corn syrup, make ethanol a secondary product. Their ethanol customers include those in the perfume, liquor (overseas), and assorted industrial businesses. Those who are in the business solely for the purpose of producing ethanol are selling it mostly to the petroleum industry to make gasoline blends, such as gasohol, or oxygenated gasoline.

Currently, the use of ethanol as an alternative vehicular fuel is not nearly as widespread as methanol, propane, or natural gas. For example, in 1992 the federal government operated approximately 2,565 methanol fueled vehicles, 677 CNG vehicles, but only 25 ethanol fueled vehicles. Blends such as E85 (85 percent ethanol and 15 percent gasoline by volume), E90, and E100 have been used to some extent in AFVs. The pathway which encompasses all ethanol industry functions is similar to the methanol pathway (see Figure 1).

Assessment Results

Based on information provided by the Renewable Fuels Association, and on data collected from a number of companies with part of their activities associated with ethanol, we conclude that none of the companies in the ethanol pathway are likely to be required to comply with the vehicle acquisition mandate.

Like methanol, the only ethanol market segment that is likely to be covered under Section 501 are the ethanol producers, since they are most likely to produce, transport, or distribute a large enough quantity of ethanol to be characterized as having their "principal business" in ethanol. However, even with these producers that currently meet the "principal business" criterion, the "fleet size" requirements exempt them from Section 501. The refining component in the ethanol industry is bypassed because neither ETBE nor oxygenated gasoline are defined as EPACT alternative fuels. None of the companies involved in storing ethanol to downstream retailing are likely to be covered because none of them generate their largest share of revenue from activities associated with ethanol.

Natural Gas Industry

Although the production of natural gas can coincide with crude oil production because they are often found together in underground reservoirs, natural gas is mostly recovered in gas fields. Raw natural gas is sent to gas plants where it is cleaned, purified, and odorized. Distribution of natural gas from the producers is handled through 532,910 kilometers (331,000 miles) of pipeline. Storage and marketing natural gas involve intermittent storage prior to distribution to natural gas utilities. For vehicular use, natural gas is compressed at end-use stations or outlets. Currently there are

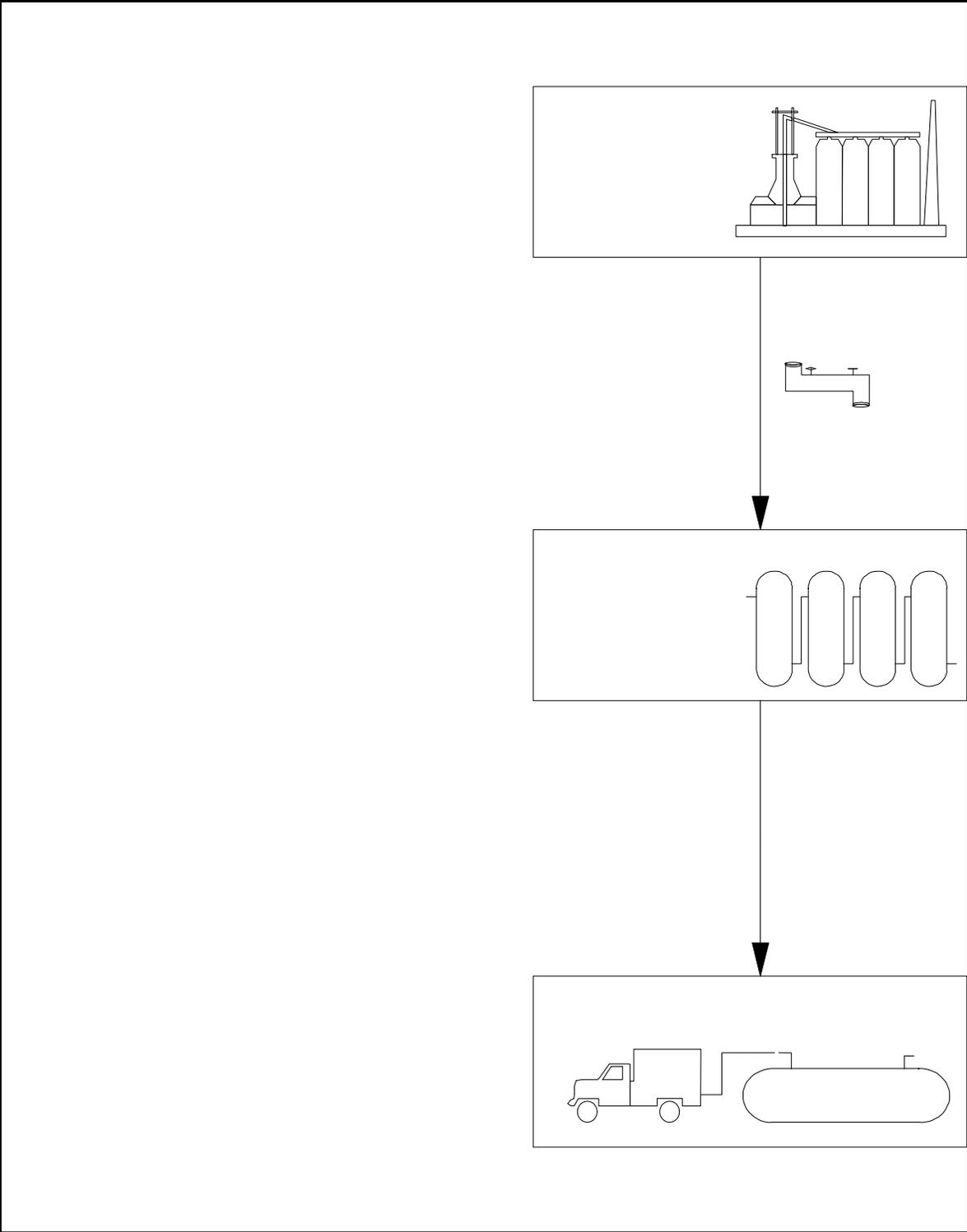


FIGURE 3 Natural Gas Industry Pathway

approximately 30,000 natural gas vehicles operating in the U.S., most of which are dual-fuel vehicles (i.e., can be operated on natural gas or gasoline).

Data for the natural gas industry came from a variety of sources. EIA's Natural Gas Providers Fleet Survey collected data from 358 utilities, and 195 producers and transporters of natural gas³. The sample reflects almost all of the industry functions shown on Figure 2. The survey, however, missed a number of large natural gas companies. To fill this data gap, the following supplemental data sources were used to determine company location, fleet size, and vehicle type: (1) a survey conducted for the American Gas Association and the Edison Electric Institute (AGA/EEI) in 1993⁶; (2) a survey by the Natural Gas Fuel Magazine⁷; and (3) the National Fleet Vehicle Database by Dwight's Energy Research⁸. Even using these sources, fleet data were still missing for 56 utilities. Based on the available data, an estimation procedure was developed for these utilities by establishing a regression relationship between the number of LDVs and the number of customers served. Information on customers and service areas was obtained for most utilities in *1993-94 Brown's Directory of North American and International Gas Companies*⁹. Furthermore, state utility commissions and, in some cases, the utilities were contacted. Applicability of Section 501 was determined by reviewing information on fleet locations in *Brown's Directory*⁹ and from an EIA publication¹⁰.

Assessment Results

There are about 1,000 natural gas utilities in the U.S. A majority of these utilities fail to meet the fleet requirement and/or the EPACT MSA requirement. One hundred and twenty-seven natural gas only utilities and 55 dual utilities (providing both natural gas and electricity) are likely to be "covered." The "covered, gas only" utilities operate approximately 30,000 LDVs within EPACT MSAs with 19.4 percent of the vehicles already being AFVs (mostly natural gas- and propane-fueled). The "covered" dual utilities operate approximately 33,400 LDVs within EPACT MSAs and ten percent of those vehicles already operate on alternative fuels.

Based on EIA data, 63 producers and transporters of natural gas were identified as candidates for Section 501 coverage. Those "covered" companies operate fleets of approximately 9,700 LDVs, of which seven percent are already operating on alternative fuels. AFV percentage of the vehicle stock ranges from seven percent in producers and transporters to almost 20 percent in utilities.

Propane Industry

Propane is produced as a by-product of natural gas processing and of crude oil refining. Approximately 88 percent of U.S. consumed propane is produced in the U.S., and the rest imported. Of the propane produced domestically, about 70 percent comes from natural gas processing, with the rest from the crude oil refining process as a by-product.

Transport of propane to regional bulk storage facilities is about 90 percent by pipeline, with other methods including tank truck, tank car, and barge (Figure 3). Pipelines distribute propane from bulk storage facilities to regional terminals, from which tank trucks distribute it to local, lower volume users.

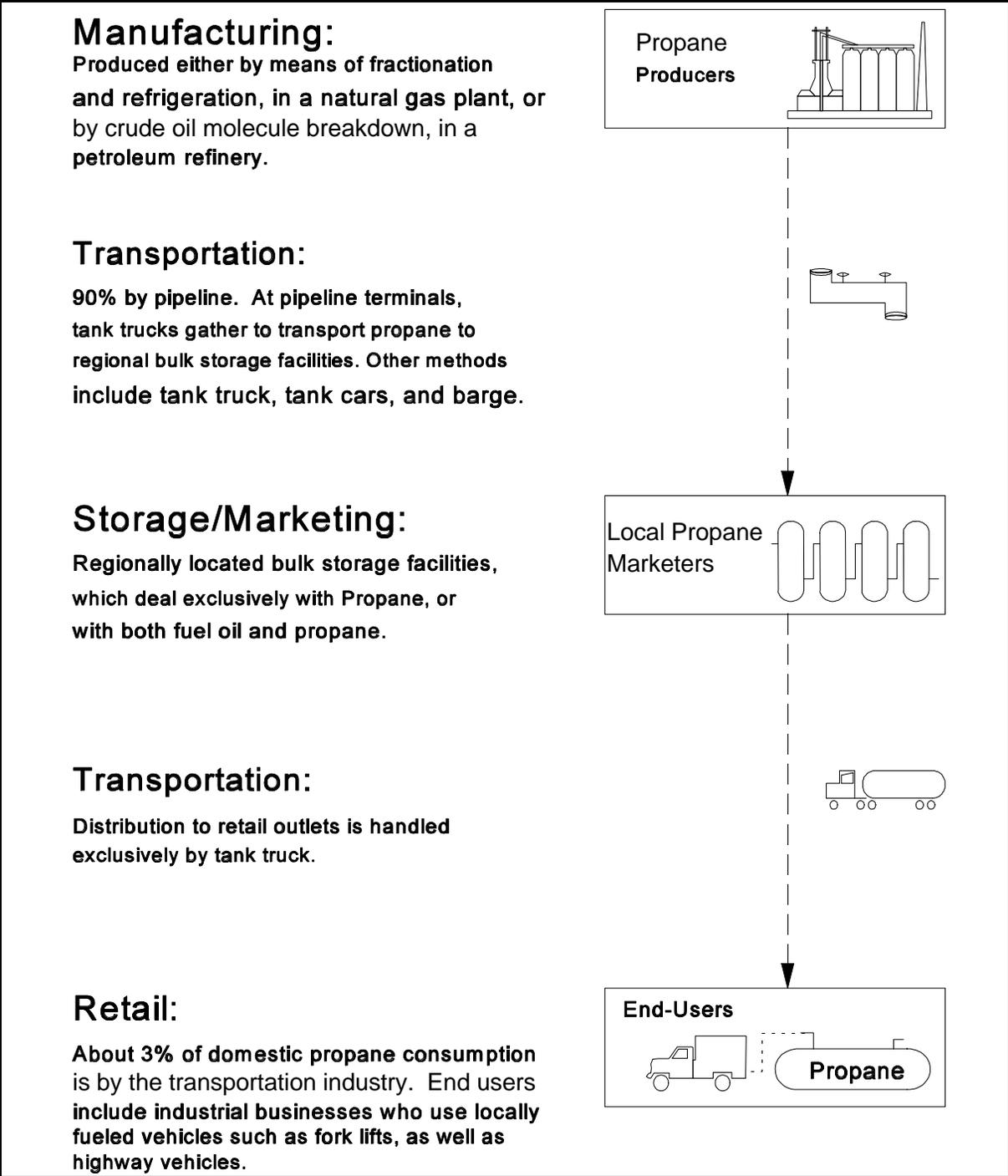


FIGURE 3 Propane Industry Pathway

Some propane is shipped from natural gas plants to fractionators which may be operated by gas producers, oil companies, transporters or wholesalers. However, most propane is shipped to wholesalers with little or no additional processing. Wholesalers may supply propane to "sister" companies within a single corporate structure, or to independent retailers. Propane is stored in salt domes near production facilities, and in tanks at each production stage.

Currently, there are approximately 350,000 propane-powered vehicles in the U.S., being served by 10,000 public propane refueling stations, as well as by fuel storage and refueling facilities for private fleets¹¹. A large percentage of these vehicles are probably off-road vehicles, such as fork lifts, tractors, etc., and "bobtails" which are used to deliver propane.

Assessment Results

According to results of the EIA Propane Provider Fleet Survey¹, there were an estimated 81,000 vehicles operated by propane providers in 1993. LDVs of 3,859 kilograms (8,500 pounds) or less accounted for approximately one third (22,150) of those vehicles. Of those LDVs, nearly 42 percent are propane-fueled, either exclusively (31 percent) or via a dual-fuel capability (11 percent).

Using EIA survey data and subsequent, follow-up contacts with company representatives, we determine that three propane companies are likely to be covered under Section 501. One of them is a natural gas and propane provider. The three "covered" companies operate a total of 1,100 LDVs nationwide, with 423 LDVs operating within EPACT MSAs. Nearly 70 percent of the covered LDVs are already operating on propane (29 percent dedicated vehicles and 41 percent dual-fuel vehicles). Furthermore, 98 percent of the medium and heavy trucks operated by these covered companies operate on propane. Unlike other alternative fuel industries, much of the propane industry had already converted far more than the EPACT-mandated share of its light-duty fleet to propane fuel.

Hydrogen Industry

There are a number of possible methods to produce hydrogen, but approximately 80 percent of U.S. produced hydrogen comes either as a by-product in the chlor-alkali industry or from steam reforming of natural gas. The raw hydrogen captured from these processes is purchased by companies specializing in producing high grade hydrogen for further processing. Transport of hydrogen is primarily by tank trucks, but pipelines such as those used for natural gas can also be used to transport hydrogen.

Hydrogen is used extensively in the chemical and petrochemical industries, primarily for producing ammonia. Hydrogen-fueled vehicles are not yet commercially available. The Chemical Economic Handbook provides lists of producers of merchant gaseous hydrogen, of by-product hydrogen, and of captive hydrogen¹². Many of the by-product and captive hydrogen producers are oil and chemical companies.

Assessment Results

Based on information provided by the National Hydrogen Association and on data collected from a limited number of hydrogen producers, we conclude that none of the companies in the hydrogen pathway are likely to be covered under Section 501 because none of these companies characterize hydrogen as their principal business.

No contacts were made to by-product hydrogen producers (such as oil refineries) nor captive hydrogen producers (such as ammonia producers) because: (1) revenue from hydrogen-related activities is extremely low, and (2) hydrogen generated by captive producers is usually for their own consumption. Nonetheless, we conclude that there is little likelihood that either would be covered under Section 501.

Electricity Industry

There are three general stages involved in the electricity supply pathway. These stages are generation, transmission, and end-use distribution (Figure 4). In the generation stage, utility companies and independent power producers generate electric power. Independent power producers usually sell electricity to utilities at power plant gates. Investor-owned companies are usually large in size, and are involved in generation, transmission, and distribution of electricity. According to Electric World's Directory of Electric Utilities¹³, there are about 3,200 electric utility companies nationwide. Among them, about 1,500 are investor-owned, and 1,700 are municipal or cooperative.

EIA conducted a fleet survey of about 2,400 electricity providers². Of those, 997 companies which have fleets of ten or more vehicles completed the survey. Among these responding companies, EIA determined that about 300 companies operate 20 or more vehicles in a single MSA. Therefore, these 300 companies are potentially subject to Section 501 requirements. Information from these companies forms the foundation for our assessment. Unfortunately, EIA's survey lacks information on some large and dual utilities. To supplement EIA's data, three supplementary data sources were used: a fleet vehicle survey conducted for American Gas Association and Edison Electric Institute⁶, a fleet vehicle survey conducted by Natural Gas Fuels Magazine⁷, and the National Fleet Vehicle Database by Dwight's Energy Research⁸.

Assessment Results

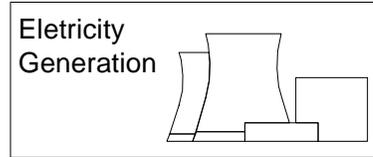
The electric industry may be the largest fuel provider sector in terms of the number of fleet vehicles to be covered under Section 501. Based on our assessment, 166 electric utilities are likely to be subject to the mandate. These "covered" utilities operate about 59,000 LDVs. This estimate may under-represent the actual covered fleet vehicles for two reasons. First, some federal power agencies, such as Bonneville Power Administration and Tennessee Valley Authority, are deliberately excluded from our estimation, because it is not clear whether these agencies are subject to Section 501, or to other requirements applicable to federal agencies. Second, many electric companies were not included in the aforementioned four data sources. Although a regression model was developed to estimate the fleet size of 14 large electric companies, fleet size for many companies remained

Electricity: Who Are The Key Players?

Generation:

Utilities, municipalities, and independent power companies each produce electricity.

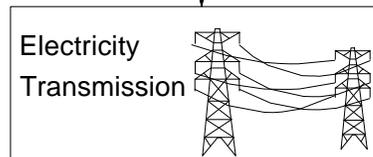
Means of production include steam plants which burn coal, natural gas, and residual oil; other methods include hydroelectric, nuclear generation, and renewable resources.



Transmission:

Utility companies and municipalities which transmit electricity often belong to the same company that manages the generators.

Electricity is transmitted from a power plant to a distribution network.



Distribution:

Utility companies and municipalities also are generally the distributors of power at the local level.

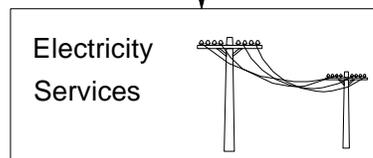


FIGURE 4 Electricity Industry Pathway

missing. Note that dual utilities are excluded from this assessment and are included in the natural gas assessment.

Petroleum Industry

In the petroleum industry, the large integrated oil companies participate in all areas of the pathway—from exploration to retailing. Independent oil companies are also involved in some of the nine basic industry functions (Figure 5).

The petroleum pathway begins with exploration. Production basically involves drilling and capturing of the crude oil. Crude oil is then bulk transported to refineries by tanker or pipeline. The U.S. imports a large percentage of its crude oil; approximately 45 percent of the domestic crude oil consumption in the past several years has been imported.

Refined petroleum products are mostly bulk transported from refineries to storage terminals by pipeline, tank truck, barge, or marine tanker. Storage terminals, usually located in larger metropolitan areas, act as hubs in the overall supply and distribution process.

Wholesalers include integrated oil companies, branded jobbers, and private brand marketers. Tank trucks are used to transport products from terminals to retail filling stations. Filling stations are either owned or leased by wholesalers, or owned by open dealers (private ownership).

Assessment Results

One of the qualifying criteria for the petroleum industry is that a business entity must "produce, import or produce and import in combination, an average of 50,000 barrels per day or more of petroleum; *and* a substantial portion of its business be producing alternative fuels." This criterion exempts any business unit that is involved in storing, transporting, and/or selling petroleum products from Section 501. As a result, only entities that are associated with the "exploration and production" and the "refining" components, and any activities between these two components, are included in this assessment.

The nature of crude oil exploration and petroleum refining complicates the assessment of the petroleum companies. When crude oil explorers and producers extract crude oil from underground reservoirs, raw natural gas may be extracted as a "by-product." Since natural gas is an EPACT alternative fuel, a *substantial* portion of oil explorers' and producers' business might be producing alternative fuels. Under this premise, crude oil explorers and producers are evaluated to determine whether they meet the remaining three qualifying criteria—(1) located in an EPACT MSA, (2) own and/or operate 20 or more LDVs in an EPACT MSA, and (3) own and/or operate 50 or more LDVs nationwide.

Similarly, since propane is a "by-product" of the petroleum refining process, all of the *large* petroleum refiners are evaluated for their coverage under Section 501. "Large" is defined in the sense of meeting the "petroleum production" criterion of 50,000 barrels per day.

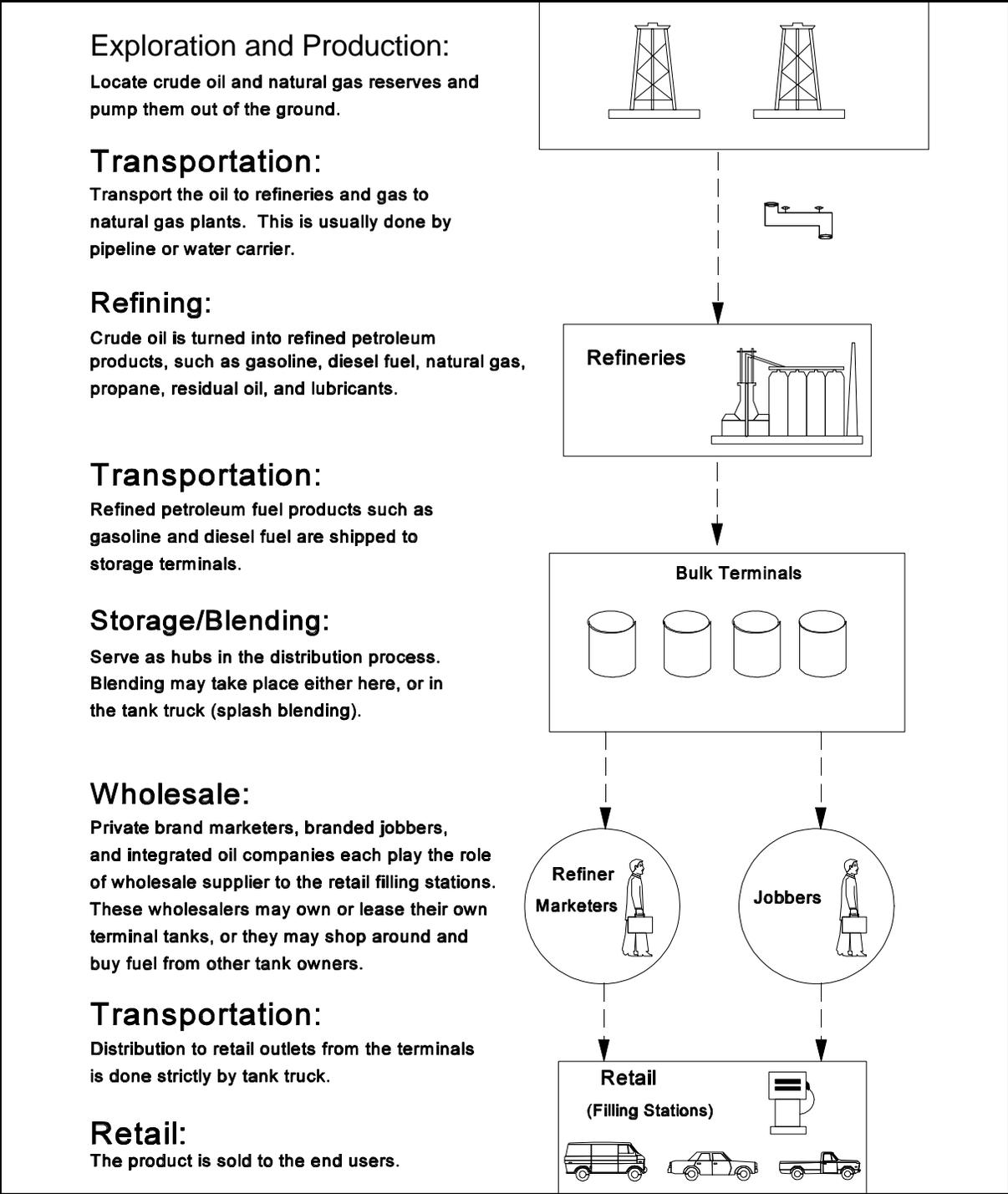


FIGURE 5 Petroleum Industry Pathway

Separate listings of crude oil explorers and producers¹⁴, and petroleum refiners⁴ are the bases for this coverage evaluation. Among the 98 refiners that have production capability of at least 50,000 barrels per day, 67 (70 percent) are located within EPACT MSAs. A random sample of 34 refiners were contacted, and 13 responded. Since all of the responding companies operate 20 or more LDVs within an EPACT MSA, we assume that everyone of the 67 refiners operates 20 or more LDVs within a single EPACT MSA. Based on the information from these 13 refiners, we estimate that the 67 "covered" refiners operate a total of 10,000 LDVs (45 percent cars and 55 percent light trucks/vans) within EPACT MSAs.

There are ten crude oil *explorers and producers* reported to have a production capacity exceeding 50,000 barrels per day. Among them, five are located within EPACT MSAs. We estimate that these five "covered" crude oil explorers and producers own and operate a total of 1,100 LDVs (one-third cars and two-thirds light trucks/vans).

SUMMARY RESULTS

Alternative fuel providers must meet a number of criteria in order to qualify as "covered" persons under Section 501. The qualifying criteria include consideration of: fleet size, geographic location, central-fueling capability, and the level of involvement in alternative fuels activities. EPACT defines alternative fuels as: methanol, ethanol, propane, natural gas, hydrogen and electricity. Also included in Section 501 are petroleum companies that produce a substantial amount of alternative fuels. For the petroleum industry, the qualifying criteria differ somewhat. A pathway analysis was conducted for each EPACT alternative fuel to ensure that every stage in the pathway is assessed, from producers to downstream retailers.

The assessment was based on data from three EIA surveys^{1,2,3} and surveys conducted by other organizations, on data that we collected from trade associations and companies whose activities are associated with alternative fuels, and from information in proprietary data sources. All methanol and ethanol producers, and all oil explorers and producers that are located within EPACT MSAs were contacted. A random sample of petroleum refiners and tank truck companies were contacted.

The determination of a company's "coverage" is based exclusively on our interpretation of Section 501. For example, the "principal business" of a "covered person" is interpreted as the activity from which the largest share of one's revenue is generated or to which the major share of one's investment is directed. Also, the "fleet size" requirement of 20 LDVs is interpreted in such a way that as long as there are 20 or more LDVs operated in an EPACT MSA by one of the company's offices, this company meets the "fleet size of 20" requirement. That is, under the circumstance where a company operates many satellite offices around the country, as long as one of the offices located within an EPACT MSA owns and operates 20 or more LDVs within that MSA, this company qualifies for Section 501 (given that all other qualifying criteria are met). However, in estimating the number of covered LDVs for the companies, only the LDVs operated by the "covered" offices were numerated.

In the case of methanol, the factor that exempts most companies from Section 501 is the criterion of having one's principal business in methanol. Most of the methanol producers do not characterize methanol as their principal product. Only one of the responding methanol producers is subject to

Section 501 and it operates 60 LDVs within an EPACT MSA and 110 LDVs nationwide. Companies downstream from the manufacturing of methanol typically engage primarily in transporting, marketing and/or selling gasoline, diesel, or other refined petroleum products. The only potential coverage in the future would be the methanol producers, since they are the only ones likely to produce enough methanol as their principal business. However, the nation's largest methanol producer is exempt from this mandate because it does not own 20 or more LDVs within an EPACT MSA.

In the ethanol industry, the only companies that meet the "principal business" criterion are the ethanol producers. However, all of them fail to meet the "fleet size" and/or "EPACT MSA" criteria. Companies downstream from the manufacturing of ethanol generally do not characterize their principal business as ethanol. Like the methanol industry, the only potential coverage in the future would be the ethanol producers.

Our analysis suggests that most large natural gas utilities (both natural gas-only and dual) and large producers and transporters will be covered under Section 501. Though we identified only 18 percent of the utilities and less than 20 percent of the producers and transporter fleets as covered, the coverage, in terms of the total LDVs, is extensive. The "covered" natural gas providers own and operate nearly 73,000 LDVs within EPACT MSAs.

The natural gas providers are experienced AFV operators as they already own a large number of AFVs. Nearly 20 percent of the natural gas utilities owned LDV are AFVs, the dual utilities have ten percent, and the natural gas producers and transporters have seven percent. The AFV purchase requirements of Section 501 are less likely to affect the natural gas industry.

Three of the top 35 propane providers were identified as likely to be covered by the mandate. These companies operate a total of 1,100 LDVs of which about 40 percent are operating within EPACT MSAs. Seventy percent of the 1,100 LDVs are already propane fueled, either dedicated or dual-fuel. Forty-one percent of the vehicles operated by the entire propane industry are dedicated propane vehicles, five percent dual-fuel propane, and less than one percent compressed natural gas vehicles. Since much of the industry has already converted their LDVs to use propane in percentages greater than the EPACT-mandated share, the industry as a whole is probably more than halfway there in meeting the vehicle acquisition mandate for model year 1996.

None of the hydrogen companies that we contacted characterize their principal business as being in hydrogen, even for the nation's two largest hydrogen producers. For these two hydrogen producers, the revenue shares generated from producing, transporting, distributing, and selling hydrogen range from three to five percent. We conclude that no companies in the hydrogen industry are likely to be regulated by Section 501.

Of the 3,200 electric utilities nationwide, only about 300 companies meet the "20 LDVs" and "EPACT MSA" criteria. Among them, about half (≈ 166) are likely to be "covered" by this mandate. These "covered" utilities operate a total of 59,000 LDVs. This leads us to conclude that large electric utilities would probably be required to comply with Section 501.

TABLE 1 Summary of EPACT Section 501 Coverage by Industry, 1994

Fuel	Percentage of Companies Likely to be "Covered"	Estimated Number of LDVs "Covered"	Current AFV Percentage of Total "Covered" LDVs
Methanol	10%	60	0%
Ethanol	0%	0	0%
Natural Gas	23%	73,000 ^a	20%
Propane ^b	8%	420	78%
Electricity	5%	59,000	2%
Petroleum ^c	30%	11,000	0.4%
Hydrogen	0%	0	0%

^a Among these vehicles, 30,000 are owned/operated by gas-only companies, 33,000 by dual utilities and 10,000 by gas producers and transporters.

^b Of the top 35 propane providers only.

^c Those with production capability of at least 50,000 barrels per day.

Determining the coverage of petroleum companies is complicated by the fact that petroleum companies are also involved in producing, distributing and selling natural gas and propane. As discussed in the petroleum section, only companies that are associated with "exploration and production" and "refining" activities (and any activities between these components) are assessed for their coverage using the appropriate criteria. Based on limited information, we conclude that almost half of the oil producers and two-thirds of the petroleum refiners, as long as they meet the "production" and "EPACT MSA" criteria, are likely to be regulated by this vehicle acquisition mandate.

Based on EIA's surveys, surveys by other organizations, data collected from trade associations and alternative fuel companies, and by our interpretation of Section 501, we conclude that very few companies in the methanol, ethanol, propane, and hydrogen industries are likely to be covered under this mandate. The mandate is likely to have little or no impact on the propane industry because a substantial portion of the industry's fleet has already converted to alternative fuels. On the other hand, many of the large petroleum refiners, natural gas and electric utilities, and few of the large crude oil producing companies are likely to be regulated by this mandate. Table 1 presents the percentages of alternative fuel providers that are likely to be covered under Section 501. Given the average replacement cycle of utility and business light-duty vehicles, we project that future AFV acquisition as a result of Section 501 will increase from 3,600 in 1996 to about 14,000 by the year 2000.

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