



ARTICLE

Small-scale LNG market in Europe

Analysis of volumes, players and prices to 2025

FTI Consulting conducted a review of the small-scale LNG market in Europe that covered 14 countries and six market segments served by LNG trucks and ISO-containers. Based on multiple interviews and proprietary market modelling, we forecast a growing demand across Europe, supported by increased small-scale LNG availability, contractual standardization, as well as sustained price and environmental advantages against oil products.

Key findings of the study

Small-scale LNG segmentation

The small-scale LNG market is a collection of niche demand segments that serve either stationary energy end-user (industry & residential), or mobile energy end-use (transport), via two products: LNG or CNG from LNG (L-CNG).

Past demand and drivers for growth

The small-scale LNG market, as defined in our study, has grown by around 5% p.a. over the last decade, driven by both price advantage and environmental benefits when compared to alternative oil products.

Demand forecasts to 2025

We estimate that small-scale LNG demand could increase by 17% p.a. between 2020 and 2025, with LNG for heavy-duty trucks being the fastest growing segment.

Small-scale LNG contracts

The market remains bespoke and fragmented, with limited standardisation in contracts. Nevertheless, several patterns are emerging, with margin levels steadily declining as market maturity develops, and an increasing reliance on gas index pricing.

Competition

Competition is intensifying in the growing small-scale LNG market. Suppliers have entered from various adjacent industries with also some pure small-scale LNG players developing, without yet a consensus in the optimal footprint in terms of product and country mix.

What is the small-scale LNG industry?

Small-scale LNG (ssLNG) refers to the end-use of natural gas in its liquid form, as opposed to gaseous gas (distributed via pipelines).

It covers the value chain from the exit of the large-scale / bulk terminal¹ to the final consumption of LNG.

It is characterized by a specific logistics chain that relies mostly on **truck transport** to supply regasification satellite plants, fuelling stations or ships.

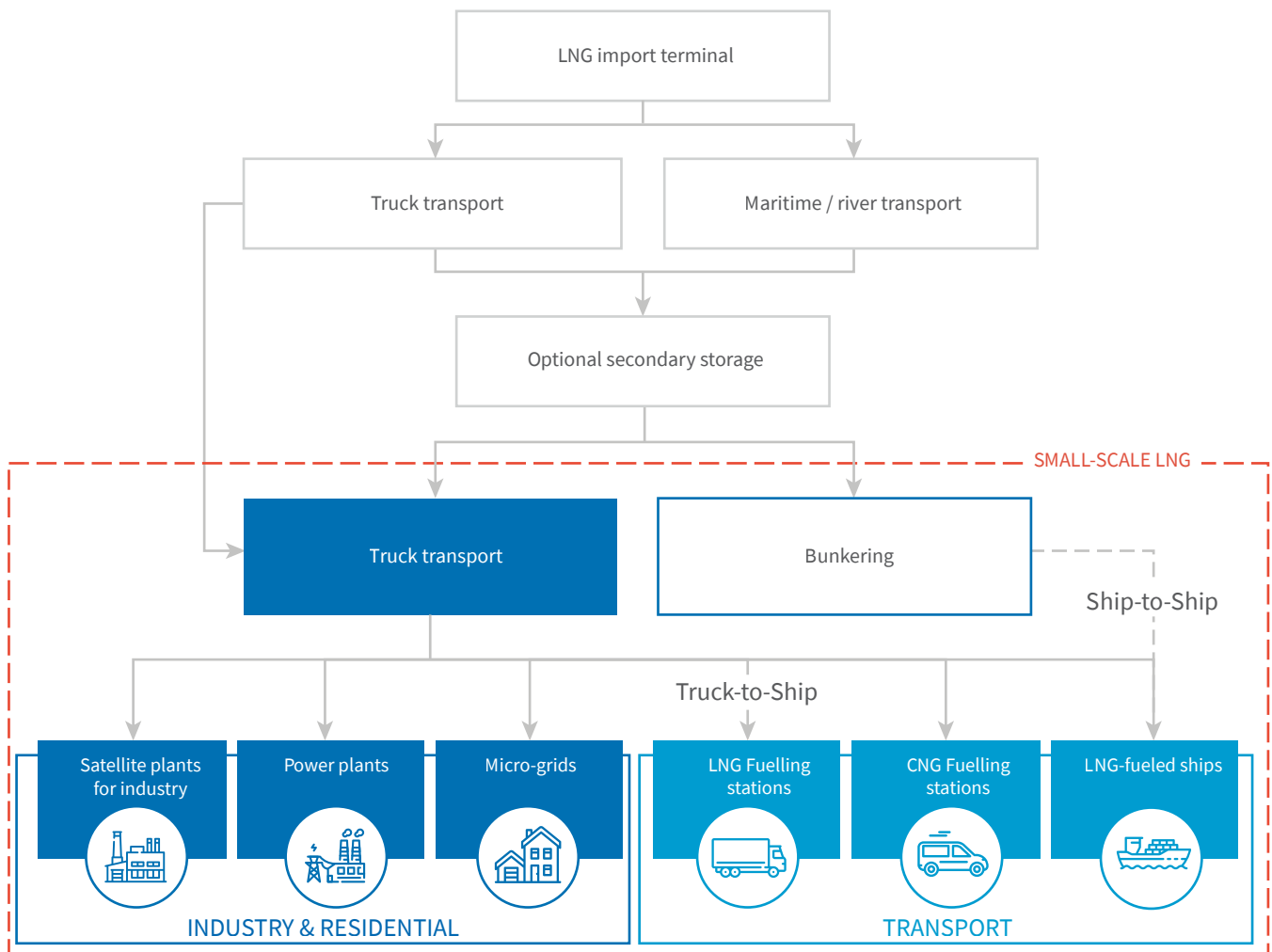
A. SCOPE: SMALL-SCALE LNG USES

We have identified **six main segments** of small-scale LNG in Europe, which can be regrouped into two macro-segments: Stationary or Mobile consumption.

(I) Stationary consumption: Industry and Residential

- LNG for industrial consumers not connected to the natural gas network.** Usually, LNG is used as a substitute to oil products (gasoil, liquified petroleum gas, heavy fuel oil) in industrial processes. It is supplied directly by trucks from LNG terminals equipped with truck loading bays, and then stored and re-gasified on consumer’s site by a satellite LNG plant.
- LNG for power generation in isolated areas** (notably islands). LNG is supplied from the exit of the bulk terminal to the power plant through a “virtual pipeline” of trucks and ISO containers.
- LNG as a supply source for isolated natural gas networks** (micro-grids). In this case, LNG is transported by trucks or ISO containers directly to a satellite plant that re-gasifies and injects natural gas into the local network.

FIGURE 1 – LNG LOGISTICS CHAIN AND SMALL-SCALE LNG USES (SCOPE OF THE STUDY)



1 Bulk terminals can be large-scale LNG import and regasification terminals or regional bulk distribution storage facilities

(II) Mobile consumption: Transport

- 4. **Liquefied natural gas (LNG) for heavy-duty trucks**, mainly road tractors > 40 T, distributed at LNG fuelling stations.
- 5. **Compressed Natural Gas from LNG (L-CNG) for light-duty vehicles, vans, buses and trucks**, distributed in Compressed Natural Gas fuelling stations supplied by LNG trucks.
- 6. **LNG as a marine fuel – or bunkering**, as a substitute to oil marine fuels, distributed either as truck-to-barge-to-ship (for large vessels) or truck-to-ship (for smaller vessels).²

B. SCOPE: SMALL-SCALE LNG GEOGRAPHY

FIGURE 2 – MAP OF LNG TERMINALS AND TRUCK LOADING SERVICES



Small-scale LNG refers to the end-uses for which Liquefied Natural Gas (LNG) is not regasified and injected into pipeline networks. It is characterised by a specific logistics chain.

+17%

Estimated CAGR for the period 2020-2025

Our study focuses on the **14 European countries** with the highest small-scale LNG demand: Austria (AT), Belgium (BE), Germany (DE), Estonia (EE), Spain (ES), France (FR), Ireland (IE), Italy (IT), Lithuania (LT), Latvia (LV), The Netherlands (NL), Poland (PL), Portugal (PT), The United Kingdom (UK)

Small-scale LNG supply via trucks is now largely available across Europe with most LNG import terminals equipped to supply LNG in its liquid form for downstream use. As of September 2020, 16 terminals offer truck loading services.³

² The nascent ship-to-ship segment is not included in the scope of our study, which focuses on truck logistics (including ISO-containers which are transported by trucks).

³ Source: Gas Infrastructure Europe; FTI research (September 2020)

Over the last decade (2011-2019), the small-scale LNG volumes grew by 5% p.a.

A. COMPETITIVE SPACE FOR SMALL-SCALE LNG

In Europe, small-scale LNG is generally not competitive against networked natural gas and electricity, but can be against oil products, which still represented 37% of final energy consumption in 2019⁴, with significant differences between countries.

B. EVOLUTION OF DEMAND

Over the last decade (2011-2019), small-scale LNG became increasingly available across Europe.

Before 2013, small-scale LNG was only available in three countries: Spain, Portugal and Belgium. From 2013, existing LNG terminals across Europe started opening truck loadings bays (France – 2013; Netherlands – 2014; UK – 2015; Poland – 2016; Lithuania – 2017), significantly increasing the availability of small-scale LNG across Europe and enabling the development of the market.

Furthermore, the LNG fuelling infrastructure, required to serve transport needs, grew strongly in several countries in Europe, with pan-european projects such as the “Blue Corridors” completed in 2018, which enabled the development of LNG fuelling stations on major routes for international road transport.

FIGURE 3 – EVOLUTION OF THE SMALL-SCALE LNG MARKET – TRUCK LOADINGS BY COUNTRIES

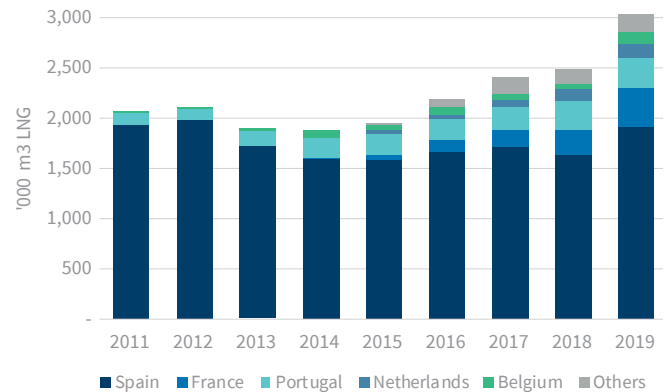
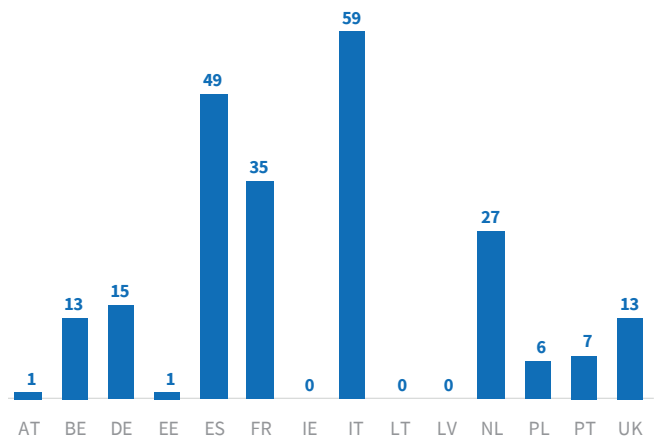


FIGURE 4 – NUMBER OF LNG STATIONS IN EUROPE (DEC. 2019)⁵



4 Source: Eurostat

5 Source: European Alternative Fuels Observatory

The growth is expected to accelerate in the next five years

A. GROWTH DRIVERS

We have identified three main growth drivers for the small-scale LNG market: (1) price competitiveness of LNG compared to other fuels, (2) availability of small-scale LNG infrastructure and (3) environmental advantages.

1. Price competitiveness

Price competitiveness of LNG compared to oil products is the main driver for market growth. Based on commodity forward prices as of September 2020, we estimate that the competitiveness of retail LNG vs. its alternatives (diesel or marine fuel for the transport macro-segment, and HFO or LPG for the industry & residential macro segment) will be sustained.

2. Availability and infrastructure

The pace of LNG and CNG fuelling infrastructure development is also accelerating, with multiple projects across Europe, supporting the growth in demand. In France for example, as of September 2020, a total of 57 stations projects were under development (LNG, CNG and both fuels), compared to only 120 stations currently opened.⁶

Besides, truck loading infrastructure at LNG terminals is expected to further develop in the years to come, with seven truck loading bays projects ongoing at European LNG terminals.⁷

3. Environmental advantages

Natural gas is the cleanest of fossil fuels, with significant advantages compared to oil products. Greenhouse gases emissions reductions are estimated between 15% and 25% in the transport segment (vs. diesel, marine gas oil or HFO). Moreover, natural gas does not emit sulphur oxides (SOx) and almost no particles.⁸

The environmental impact is an increasingly important concern for the European consumers, either individuals or companies, and a challenge for the European institutions, which have set ambitious targets and transition plans that, natural gas could contribute to achieve.

B. GROWTH FORECASTS

Our modelling of the future demand shows a significant acceleration of the growth between 2019 and 2025 (+17% p.a.).

This forecast stems from a proprietary FTI Consulting market model which intergrates the following elements:

- Underlying demand for energy in each segment;
- Competitiveness of LNG, measured as the relative price vs. the most relevant(s) alternative(s) for each segment;
- Accessibility of small-scale LNG in each country (including a “stickiness” factor to take into account the resistance to change of some consumers).

FIGURE 5 - DEMAND FORECASTS - SCENARIOS ('000S M3 LNG / Y)

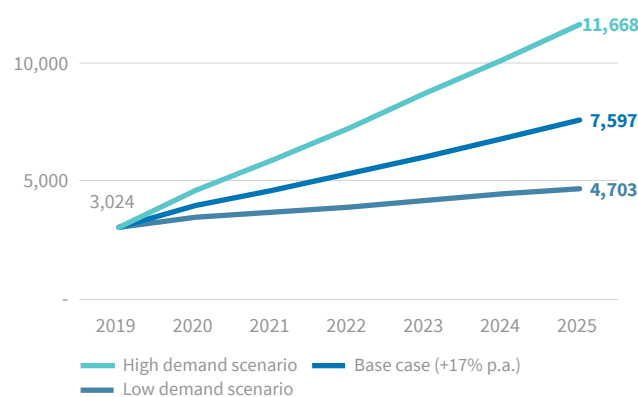
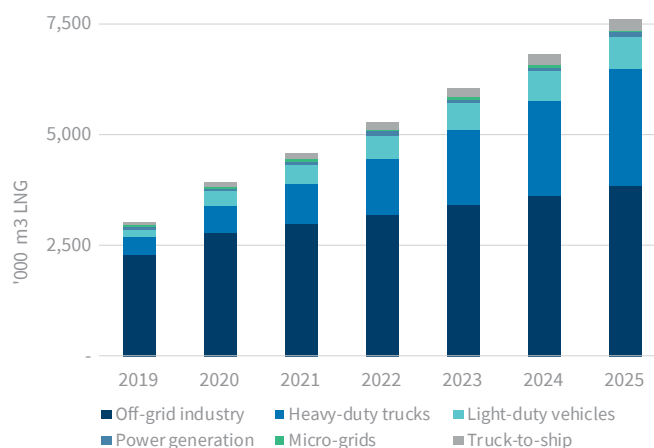


FIGURE 6 - DEMAND FORECASTS BY SEGMENTS ('000S M3 LNG / Y)



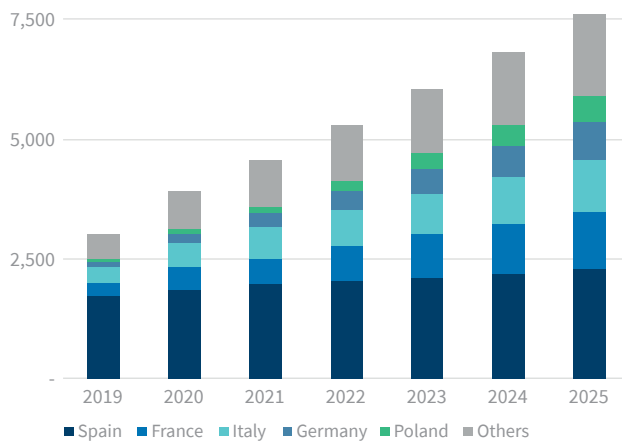
The LNG for heavy-duty trucks segment is expected to be the fastest growing in the next five years, followed by LNG for light-duty vehicles and buses.

CAGR 2019-2025 by country (Total = +17%)

Spain +5%	France +27%	Italy +21%
Germany +44%	Poland +40%	Others +22%

6 Source : AFGNV (Open Data Réseaux Energies)
 7 Source: Gas Infrastructure Europe; FTI research (September 2020)
 8 Source: Elengy

FIGURE 7 - DEMAND FORECASTS BY COUNTRIES ('000S M3 LNG/Y)



Spain, France and Italy are expected to be the three largest markets by 2025.

Contracts are getting more structured

A. MAIN CHARACTERISTICS OF SMALL-SCALE LNG RETAIL CONTRACTS

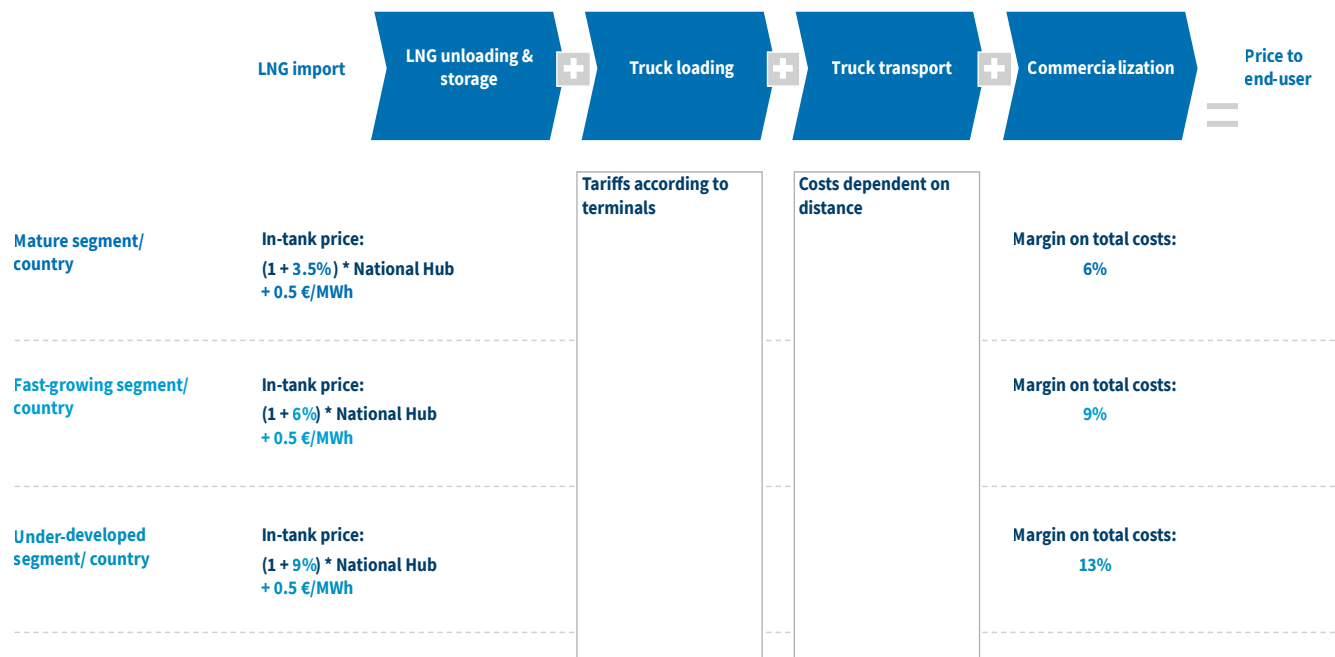
Sales and Purchase Agreements (SPAs) for small-scale LNG retailing and LNG bunkering are still far from being harmonized between players and regions. Based on a specialist broker's confidential records, we have identified the following main characteristics of small-scale LNG retail contracts.

1. Structure of contracts

References: small-scale LNG retail SPAs have been designed with clauses that are usually inspired from 4 types of existing and already more standardized sales contracts:

- Pipeline gas supply contracts – that are signed between downstream gas suppliers /distributors and final B2B clients;
- LPG and liquid fuel retail contracts – signed between propane/gasoil retailers and industrials;
- Conventional LNG trading SPAs – signed between midstream exporters, importers and traders;
- Bunker fuel supply contracts – signed between downstream marine fuel suppliers/bunkering providers and ship-operators/ship-owners.

FIGURE 8 – CURRENT TYPICAL COST STRUCTURE AND MARGIN LEVELS

**Usual clauses:**

- Conditions precedent to be lifted by buyer and/or seller;
- (Partial) Purchase exclusivity;
- Nominal (annual) contracted quantity and supply pattern (quarterly or monthly schedule);
- Scheduling process to (re-)nominate the off-take program;
- Supply and off-take flexibilities (operational dependent);
- Take-or-pay or take-or-resell commitments, with pre-agreed bandwidths;
- Clauses for failure to deliver (supply deficiency) and reciprocally failure to take (lifting deficiency).

2. Zoom on pricing arrangements**Price structure:**

- In general, LNG bunker pricing can be split between a ‘commodity’ component and a ‘logistic’ cost:

$$\text{LNG price} = \text{Commodity} + \text{Logistics}$$

- However, the commodity vs. logistic split is not always made transparent since some formulas are often simpler ‘black boxes’ with the following structure:

$$\text{LNG price} = \alpha \% * \text{INDEX} + \text{fee}$$

Indexation:

- Price formulas in the Baltic Sea tend to be the simplest ones, typically straight TTF indexations;
- Price formulas in the Iberian market are the most diversified and complex ones, sometimes combining oil-index (Brent, LSGO, HSFO) and gas-index (TTF, HH, MIBGAS);
- In the North-West European markets, suppliers typically offer both gas-index (TTF, PEG, ZTP) or oil-index (Brent, LSGO, HSFO) but oil-index tends to progressively disappear from new contracts.

Others:

- Flexible pricing based on published price benchmarks and indices;
- Price hedging options (float-to-fix), potentially price reopening clauses (fix-to-float) and other price swap options (change of index: oil-to-gas or reverse gas-to-oil);
- Price adjustment clauses (typically for third-party costs invoiced in pass-through, like terminal loading tariffs);
- Price reviews in case of structural change in the market.

B. MARGINS LEVELS FOR SMALL-SCALE LNG RETAILERS

Based on brokers’ pricing data, we have been able to estimate the current margin levels for LNG sellers (midstream) and LNG retailers (downstream), which are dependent on the level of maturity of the segment and country. As expected, margins tend to decrease as maturity increases due to more intense competition.

Successful players have adopted very different strategies to grow in these markets

Fuels retailing is a competitive market with few differentiation opportunities. Based on our review of multiple market entry cases in Europe, we have identified the timing of entry, a selective investments strategy and a strong financial backing as factors most correlated with success.

We have also identify four type of players, with distinctive characteristics and assets:

Specialists / pure players of LNG retail:

- Specialisation, usually with integrated logistics capabilities

- Active in all market segments or focus on niche markets (ex: bunkering; LNG fuelling stations)

LPG retailers which have diversified:

- Expertise in gas retail to industrial clients
- Clients portfolio

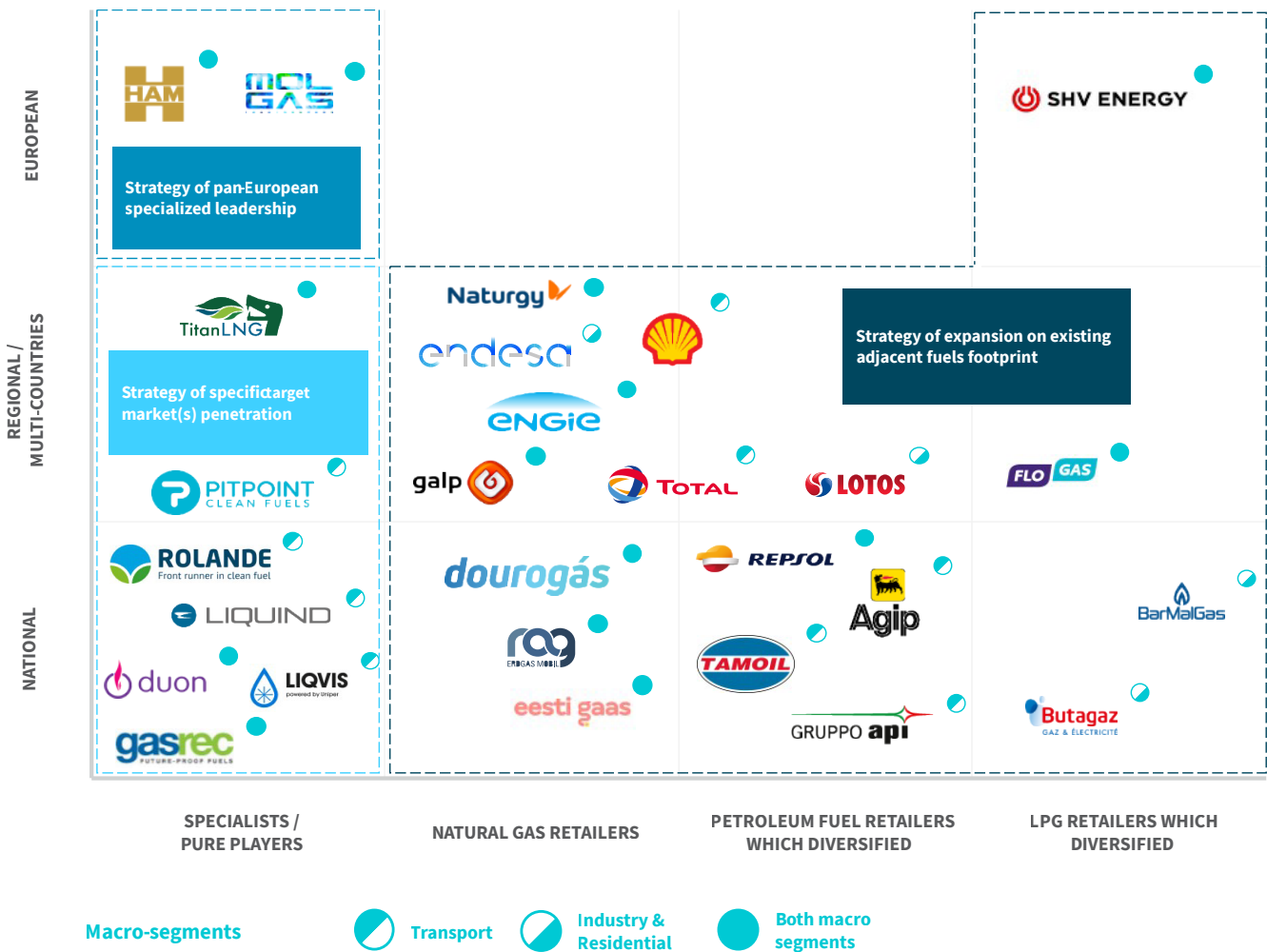
Petroleum fuel retailers which have diversified:

- Expertise in fuel retail
- Brand recognition
- Geographical footprint (existing network of stations)

Integrated gas players (majors):

- Integration with midstream and/or downstream gas activities (clients portfolio and expertise in natural gas retail)
- Brand recognition

FIGURE 9 – MAPPING OF MARKET PLAYERS (NON-EXHAUSTIVE)¹



1 FTI research

Conclusions

While expected to remain marginal compared to the total natural gas consumption in Europe, the small-scale natural gas market is forecasted to grow strongly in the next five years. Our analysis suggests that LNG for the transportation sector (and in particular for trucks) has the highest potential for growth. Western Europe is expected to be the main area for development of retail LNG, with France, Italy and Germany being the fastest growing markets until 2025 (in volumes).

The main challenge for the development of the market will be to overcome the resistance to change of most consumers (or stickiness) not yet willing to switch, despite

the discount and relatively low switching CAPEX. This will require (i) significant marketing efforts to promote and reassure consumers, while (ii) maintaining the fast pace of infrastructure development (both truck loading for LNG and fuelling stations) and (iii) increasing standardisation of contracts to simplify consumers' market understanding.

In the medium to long-term, small-scale LNG will have to confront the potential and yet-to-materialize competition from cleaner zero-carbon fuels, which is likely to intensify in the next decades, with potential developments of liquified biomethane, and also the growth of renewable electricity use (possibly converted into hydrogen) in some of small-scale LNG's targeted segments.

The views expressed in this article are those of the author(s) and not necessarily the views of FTI Consulting, its management, its subsidiaries, its affiliates, or its other professionals.

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