CHAPTER 4: Emergency response systems of individual IEA countries

The ability of the International Energy Agency (IEA) to co-ordinate a swift and effective international response to an oil supply disruption stems from the strategic efforts of member countries to maintain a state of preparedness at the national level. Energy security is more than just oil, as the role of natural gas continues to increase in the energy balances of IEA countries. The most recently completed cycle of Emergency Response Reviews (ERRs) reflected this change by assessing, for the first time, the member countries’ exposure to gas disruptions and their ability to respond to such crises. This chapter provides general profiles of the oil and natural gas infrastructure and emergency response mechanisms for 29 IEA member countries.

Each country profile is set out in the following sequence:

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- Key oil data, 1990-2018
- Key natural gas data, 1990-2018
- Total primary energy source (TPES) trend, 1973-2012

**Infrastructure map**

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- Oil demand
- Imports/exports and import dependency
- Oil company operations
- Oil supply infrastructure
- Refining
- Ports and pipelines
- Storage capacity
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- Gas demand
- Gas import dependency
- Gas company operations
- Gas supply infrastructure
- Ports and pipelines
- Storage

**Emergency policy**
- Emergency response measures
# Luxembourg

## Key data

**Table 4.17.1  Key oil data**

<table>
<thead>
<tr>
<th>Year</th>
<th>Production (kb/d)</th>
<th>Demand (kb/d)</th>
<th>Motor gasoline</th>
<th>Gas/diesel oil</th>
<th>Residual fuel oil</th>
<th>Others</th>
<th>Net imports (kb/d)</th>
<th>Import dependency (%)</th>
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* Forecast.

**Table 4.17.2  Key natural gas data**

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<th>Demand (mcm/y)</th>
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<th>Industry</th>
<th>Residential</th>
<th>Others</th>
<th>Net imports (mcm/y)</th>
<th>Import dependency (%)</th>
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* 2012 data are estimates.

**Note:** This section on the emergency response systems of individual member countries was written by the IEA. All countries provided valuable information and comments. All opinions, errors and omissions are solely the responsibility of the IEA.
Figure 4.17.1  Total primary energy source (TPES) trend, 1973-2012
Map 4.17.1 Oil infrastructure of Luxembourg

This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.
Map 4.17.2  Gas infrastructure of Luxembourg

This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.
Country overview

Oil and gas dominate Luxembourg’s total primary energy supply (TPES), accounting for 86% of the total. With no domestic oil or gas production, Luxembourg is fully dependent on imports. In the case of oil, this is entirely in the form of refined products as there are no refineries in the country. Oil consumption is concentrated in the transport sector (88%) and primarily in the form of diesel oil. Some 45% of total natural gas is used by the transformation sector, where gas accounts for over 90% of the country’s electricity generation.

A large majority of Luxembourg’s oil demand comes from cars and trucks crossing its borders to refuel, as lower VAT and excise duties on transport fuels compared to neighbouring countries make fuelling in Luxembourg more attractive. In addition, Luxembourg maintains a maximum price-setting mechanism which limits retailer’s abilities to set prices for oil products sold to consumers.

Luxembourg’s primary response measure in an oil supply disruption is the use of oil stocks. Oil importers are required to hold a minimum stock cover of 90 days of deliveries to the domestic market, and the Minister of Economic Affairs and Foreign Trade has the legal power to direct the drawdown of these stocks. However, more than 85% of Luxembourg’s International Energy Agency (IEA) minimum stockholding obligation is met by stocks held in neighbouring countries, primarily in the form of tickets, because of its limited domestic storage capacity. At the same time, the permits of several important storage depots, concentrating approximately two-thirds of the national storage capacity, will expire by 2019, requiring an even greater portion of stocks to be held abroad. Without action, the country faces a risk in its domestic oil supply chain, making normal fuel deliveries logistically difficult and becoming more vulnerable to disruptions caused by events such as labour strikes or weather conditions which hinder fuel deliveries by road or rail. The Luxembourg government is in the process of reviewing its oil stockholding regime in order to address this challenge and has announced its intention to encourage the building of new storage capacity of 480,000 m³.

As Luxembourg has no natural gas storage and no substantial linepack in its transmission grid, there is little supply flexibility within the country to compensate for lost gas supplies. Legislation places the responsibility on the industry for assuring the security of gas supplies through public service obligations. Network operators, suppliers and wholesale customers have the obligation to guarantee the security of supply to consumers and assure that networks are well maintained.

Oil

Market features and key issues

Domestic oil production

Luxembourg has no indigenous oil production and no domestic refinery. Thus it is fully import dependent, with all oil imports coming in the form of refined products.

Oil demand

Oil demand in 2012 was nearly 59 thousand barrels per day (kb/d). This is a decrease from the 64 kb/d in 2005, a year when oil demand peaked after a period of strong demand
growth. Transport diesel is the single largest component of the country’s oil demand, equating to over 42 kb/d in 2012.

Oil use has grown even more concentrated in the transport sector, representing 91% of total oil demand in 2011, compared to 62% in 1990 and 73% in 1995.

Figure 4.17.2  Oil consumption by sector, 1973–2011

A large portion of Luxembourg’s demand for oil is attributed to cars and trucks coming from across its borders. As transport fuels in Luxembourg cost less than in neighbouring countries because of lower taxes on gasoline and diesel fuel, foreign motorists and truckers often cross the border to fill their tanks. This group also includes commuters who enter the country daily from Belgium, France and Germany and represent around 46% of the country’s workforce.

Figure 4.17.3  Oil demand by product, 1998–2012
Imports/exports and import dependency

Luxembourg is 100% import dependent, as there is no domestic oil production. With no domestic refinery, all oil imports are in the form of refined products. These essentially come from refineries located in Antwerp, Belgium (roughly three-quarters of total imports), 255 km from Luxembourg City. The rest comes from Germany (8%), France (7%) and the Netherlands (6%). Although the most common method of transport is by road (nearly 40%), a significant proportion of oil products reaches Luxembourg by rail and barge. Only aviation kerosene supplied to the country's airport at Findel is transported by pipeline.

Figure 4.17.4 Oil product imports by origin, 2012

<table>
<thead>
<tr>
<th>Origin</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>79%</td>
</tr>
<tr>
<td>Germany</td>
<td>8%</td>
</tr>
<tr>
<td>France</td>
<td>7%</td>
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<tr>
<td>Netherlands</td>
<td>6%</td>
</tr>
</tbody>
</table>

Oil company operations

There are 11 companies operating in Luxembourg's oil market, including three distributors – Q8-Calpam, Petro-Center (selling under the Esso and Mobil brands) and Gulf – and eight retailers (Aral, BP, Q8, Delek, Chevron, Esso, Shell, Lukoil and Total), which operate a total of 240 filling stations in Luxembourg.

Oil supply infrastructure

Refining

There are no refineries in Luxembourg.

Ports and pipelines

The only pipeline in the country is a branch of the Central Europe Pipeline System (CEPS) which supplies aviation kerosene to the country's airport at Findel. The portion of the CEPS in Luxembourg runs a length of 36 km and is constantly filled with about 700 m$^3$ of fuel. There are no pumps installed along the line in Luxembourg, which has a theoretical flow capacity of 96 m$^3$ per hour, or some 15 kb/d, with an average flow of around 9.4 kb/d.

Storage capacity

Luxembourg's six main storage facilities are used by oil companies to supply the domestic market. These have a total combined capacity of just over 196 000 m$^3$, or 1.23 million barrels. The storage sites are: Bertrange, Findel, Mertert, Hollerich, Dippach and Leudelange. The permits of several important depots, concentrating approximately
two-thirds of the national storage capacity, will expire by 2019. The expiry of these permits might result in a further reduction of the storage capacity on national territory. Therefore, the government has publicly announced its intention to encourage the building of new storage infrastructure. A total of 480,000 m³ of new capacity is planned, with the extension of the Mertert site (by an additional 90,000 m³) and two new storage sites – Bascharage (90,000 m³) and Luxembourg-Ouest (300,000 m³).

**Decision-making structure**

Emergency response policy is under the responsibility of the Ministry of Economic Affairs and Foreign Trade. Within the ministry, the Directorate for Energy is responsible for maintaining and implementing emergency response measures in the event of an oil supply disruption. It also supervises the guidelines companies are required to follow to ensure the security of natural gas supplies. Its responsibilities include collecting data and monitoring the domestic oil and gas markets, the maximum oil price mechanism and industry’s compulsory oil stockholding.

In the event of an oil supply emergency, the Minister for Economic Affairs and Foreign Trade has the legal authority to take a decision on emergency measures “if oil products supply is endangered”. This can be either by means of decrees or by notification to individual companies, which could regulate imports, trade and consumption of oil products.

**Stocks**

**Stockholding structure**

All oil stocks in Luxembourg are held by oil companies and are typically commingled with commercial stocks.

All oil importers are obliged to maintain stocks of petroleum products equivalent to at least 90 days of deliveries to domestic consumption during the previous calendar year. This applies to each of the three categories covered by the European Union’s compulsory stockholding obligations (gasoline, distillates and fuel oil).

**Crude or products**

Since the country has no refining capacity, all compulsory stock obligations must be held in the form of finished products.

**Location and availability**

Over 85% of Luxembourg’s IEA minimum stockholding obligation is met by stocks held in other EU countries with which Luxembourg has a bilateral agreement. Luxembourg has bilateral agreements with Belgium, France, Germany and the Netherlands.

Most of these stocks are held in the ARA (Amsterdam, Rotterdam and Antwerp) area. For the most part, these stocks are held in the form of short-term ticket agreements.

**Monitoring and non-compliance**

Oil importers are required to submit reports to the authorities every month. In verifying the accuracy of a company’s reported stock levels, police and customs authorities are entitled to check levels at any time, on request of the Minister for Economic Affairs and Foreign Trade. Infringements are punishable by either imprisonment of up to two years or a fine, or both.
Stocks held outside Luxembourg must be certified by the government of the country in which they are held in order to be counted towards meeting the company’s stockholding obligation.

**Stock drawdown and timeframe**

In the event of an oil supply disruption, the Minister for Economic Affairs and Foreign Trade has the legal authority to draw down compulsory industry stocks. The minister is empowered to authorise participation in an IEA response and the law does not fix a threshold for activating emergency measures. A decision to draw down stocks is expected to take two or three days. This would be organised by means of ministerial decrees as a general measure, or by individual notification to stockholding companies.

The release and pricing of compulsory stocks onto the market would be implemented by an emergency committee, set up at the time, consisting of government officials, oil company executives and consumer representatives.

The physical delivery of stocks to market after the decision for release is expected to take one week. The monitoring mechanism to ensure that companies draw down sufficient stocks to meet IEA requirements would be the standard oil market statistics, completed by companies on a weekly basis instead of the usual monthly basis. For further verification, customs officers could monitor the physical drawdown of oil stocks.

**Financing and fees**

Importers subject to stockholding obligations recover the costs of compulsory oil stocks by passing them on to consumers through market prices. The government of Luxembourg sets a maximum price on gasoline, automotive diesel, heating oil and liquefied petroleum gas (LPG). The pricing formula includes a fee to cover the cost of compulsory storage, amounting to EUR 5.95 per kilolitre (kl) for gasoline and EUR 6.45 per kl for distillates.

**Other measures**

**Demand restraint**

Current Luxembourg legislation allows for the regulation of oil product sales, purchases, transportation and consumption in times of supply disruption and empowers the Minister for Economic Affairs and Foreign Trade to decree the measures which can be applied to the general population or targeted to specific sectors or companies.

As the transport sector makes up the vast majority of oil consumption in Luxembourg, most demand restraint measures would be targeted at the use of transport fuels. Given the size and location of Luxembourg, such measures must take account of regional concerns.

Common Benelux guidelines exist for oil demand restraint which the Luxembourg government could rely upon for co-ordinating measures such as reducing speed limits or restricting driving. These common Benelux guidelines provide four levels of co-operation in an emergency situation implying demand restraint measures:

**Information:**

- information campaigns in order to promote reduced heating, illumination and car use
- speed limitation in residential areas and reinforced control and regulations.
Consultation:
- decision to set standards for heating and illumination
- speed limitations on country roads.

Co-ordination:
- speed limitations on motorways
- driving bans
- limiting opening hours for filling stations
- limiting deliveries to consumers
- limiting deliveries to retailers
- introduction of tickets for consumers.

Uniformity:
- closing filling stations on determined days.

An information campaign could be started immediately after an ad hoc decision. Other light-handed measures, such as limiting speed on roads and reducing home heating, could be implemented within two days after consultation with other Benelux countries.

More severe measures, such as speed limitations on motorways, driving bans and reduced deliveries, would need to be co-ordinated at the Benelux level and eventually with other neighbouring countries. In this case, administrative preparations and decisions would take about one week. The timetable from implementation of decisions to full operation would be rather brief and the first volumetric effects would be measurable after two weeks.

Fuel switching
There is no scope for short-term switching away from oil use as an emergency response measure.

Other
With no domestic crude oil production, surge production is not an available response measure.

Gas

Market features and key issues

Gas production and reserves
Luxembourg has no indigenous gas production and therefore relies on imports to supply all its domestic requirements.

Gas demand
From 1990 to 2006, demand for natural gas increased from just less than 500 million cubic metres (mcm) to just over 1.4 billion cubic metres (bcm), an average annual increase of 6.8%. The 350 megawatt (MW) combined-cycle gas turbine (CCGT) plant in Twinerg consumes one-third of all natural gas in Luxembourg. Since the plant was commissioned in 2002, the transformation sector has accounted for some 40% to 45% of all gas used in
the country. Manufacturing represents around 35% and households 20%. Roughly half of all households are supplied with natural gas.

Natural gas is the principal source of fuel for the electricity generated in Luxembourg, providing over 90% of total inputs to electricity generation.

**Gas import dependency**

Norway is the main natural gas supplier, representing roughly half of all natural gas imports, while imports from the Russian Federation account for around a quarter of the total.

**Figure 4.17.5** Natural gas imports by source, 2011

![Natural gas imports by source, 2011](image)

Norway 52%

Belgium 12%

Russian Federation 24%

Other 11%

**Gas company operations**

Eight companies are authorised to supply natural gas to end customers in Luxembourg, including four integrated distribution system operators (DSOs).

The company SOTEG owns and operates the transmission system and supplies the majority of the market. It purchases most of its gas under long-term contracts, but also

**Figure 4.17.6** Natural gas consumption by sector, 1973-2011

![Natural gas consumption by sector, 1973-2011](image)
buys on the spot market of the Zeebrugge hub in Belgium. At present, there is no real wholesale market for gas in Luxembourg, and SOTEG supplies all gas to the country’s four DSOs. The transmission system operator (TSO) is owned by the state (21%), E.ON (20%), ArcelorMittal (20%), Cegedel (19%), Saar Ferngas (10%) and the state-owned SNCI fund (10%).

Since 2004, SOTEG is also involved in electricity. In a move to consolidate Luxembourg’s energy sector, in 2009 SOTEG merged with Cegedel, the electricity incumbent, and the German gas supplier Saar Ferngas to form a new cross-regional energy player, Enovos International SA.

Gas supply infrastructure

Ports and pipelines
Luxembourg’s natural gas pipeline network is not designed for transit for other countries; it does not have a compressor station and thus depends on the compressors of Belgium and Germany and has no substantial linepack. It consists of 380 km of transmission system network and some 2 300 km of distribution system network. The transmission network interfaces with four distribution systems and directly with some large industrial customers.

There are four entry points to the gas network with a total theoretical maximum capacity of 10.3 mcm per day; two from Belgium (Petange, with a maximum capacity of 3.8 mcm/d and Bras with 1.4 mcm/d), one from France (Audun with 0.5 mcm/d) and one from Germany (Remich with 4.6 mcm/d).

Storage
There is no natural gas storage in Luxembourg.

Emergency policy

The country’s natural gas supply security measures are stipulated in guidelines for companies operating on its domestic gas market. These guidelines are required under the Law on the Organisation of the Natural Gas Market of 1 August 2007 and are also described in the emergency plan established according to the EU Regulation 994/2010 on the security of gas supply. The Ministry of Economic Affairs and Foreign Trade is responsible for monitoring the general state of the networks and interconnections as well as the security of supply.

Suppliers must guarantee supply to end-users in times of supply disruptions and under extreme weather conditions, including exceptionally high demand for gas during very cold periods (statistically recorded every 20 years). The law also obliges the system operators to invest in grids in order to ensure their security and safety, and to guarantee transport and distribution of gas in extreme weather conditions.

The law sets a public service obligation on gas suppliers, requiring them to contribute to the overall supply of the domestic market during a disruption. This also requires active co-operation with the other suppliers to maintain a steady supply to network operators. In this way, spare supply from the other suppliers may be utilised when any one of the four suppliers to the national market faces difficulties during defined periods of extreme circumstances.
A load-shedding plan, developed by the TSO Creos in co-operation with distributors and other stakeholders, defines four categories of customers with different priorities of supply protection. Each category represents around 25% of total gas use.

The single largest gas user, the Twinerg CCGT plant, is not interruptible, although it accounts for one-third of the country’s gas use. The plant is fully integrated into the Belgian power production park and the plant’s capacity of 350 MW is divided between Belgium’s Electrabel for the Belgian grid (150 MW), and Luxembourg’s two electricity providers, Enovos and Sotel (100 MW each). Luxembourg contractually receives close to 40% of its electricity from the Twinerg CCGT plant. If the plant’s natural gas supply is cut off, Electrabel is obliged to provide backup electricity.

As Luxembourg has no natural gas storage and no substantial linepack in its transmission grid, there is little supply flexibility within the country to compensate for lost gas supplies. With four entry points, the country could compensate for reduced flows through one of these by increasing supply through the others. However, with roughly half of the country’s gas supplied through the German entry point, a significant reduction to capacity at this point would be difficult to compensate from the other directions.

**Emergency response measures**

There is no natural gas storage in Luxembourg and therefore no possibility for emergency release of natural gas.

Luxembourg has no demand restraint programme in order to rapidly reduce gas use in the short term during a gas supply disruption.

There is no policy to encourage users of natural gas to switch to other fuel sources in the event of a gas supply disruption.