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

**Infrastructure map**

**Country overview**

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  - Oil demand
  - Imports/exports and import dependency
  - Oil company operations
- Oil supply infrastructure
  - Refining
  - Ports and pipelines
  - Storage capacity
- Decision-making structure
- Stocks
  - Stockholding structure
  - Crude or products
  - Location and availability
  - Monitoring and non-compliance
  - Stock drawdown and timeframe
- Financing and fees
- Other measures
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  - Gas demand
  - Gas import dependency
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- Gas supply infrastructure
  - Ports and pipelines
  - Storage
- Emergency policy
  - Emergency response measures
Switzerland

Key data

Table 4.26.1  Key oil data

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<td>274.0</td>
<td>271.3</td>
<td>265.6</td>
<td>246.6</td>
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<td>83.2</td>
<td>73.3</td>
<td>70.5</td>
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<td>Gas/diesel oil</td>
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<td>125.1</td>
<td>139.0</td>
<td>139.5</td>
<td>121.9</td>
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<td>2.5</td>
<td>1.4</td>
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<td>Others</td>
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<td>46.6</td>
<td>51.5</td>
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<td>265.6</td>
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<td>Refining capacity (kb/d)</td>
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<td>132.0</td>
<td>134.7</td>
<td>134.7</td>
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<td>Oil in TPES** (%)</td>
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<td>43</td>
<td>45</td>
<td>40</td>
<td>39</td>
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* Forecast.  
** TPES data for 2012 are estimates.

Table 4.26.2  Key natural gas data

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<td>Demand (mcm/y)</td>
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<td>3 584</td>
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<td>Transformation</td>
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<td>1 001</td>
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<td>1 242</td>
<td>1 410</td>
<td>1 188</td>
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<tr>
<td>Others</td>
<td>411</td>
<td>806</td>
<td>925</td>
<td>944</td>
<td>838</td>
<td>0</td>
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<tr>
<td>Net imports (mcm/y)</td>
<td>1 990</td>
<td>2 972</td>
<td>3 399</td>
<td>3 682</td>
<td>3 269</td>
<td>3 584</td>
<td>3 333</td>
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<td>Import dependency (%)</td>
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<td>Natural gas in TPES (%)</td>
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<td>11</td>
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* 2012 data are estimates.  
** Forecast.

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 4.26.1  Total primary energy source (TPES) trend, 1973-2012
Map 4.26.1 Oil infrastructure of Switzerland

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 4.26.2
Gas infrastructure of Switzerland

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 has been a dominant energy source in Switzerland, accounting for 39% of the country’s total primary energy supply (TPES) in 2012. Switzerland’s oil demand has decreased from 277 thousand barrels per day (kb/d) in 2000 to 250 kb/d in 2012. The transport sector accounted for about 60% of total oil consumption in 2011.

As Switzerland has no domestic oil production, it is entirely dependent upon crude oil and oil product imports. In 2012, its oil imports were around 244 kb/d, consisting of 68 kb/d of crude oil, 1 kb/d of natural gas liquids (NGLs) and feedstock and 174 kb/d of refined products. While half of total crude oil imports came from Libya in 2012, almost all refined product imports came from OECD Europe countries, primarily from Germany (50% of the total).

Switzerland meets its stockholding obligation to the International Energy Agency (IEA) by placing a stockholding obligation on industry. Oil product importers are obliged to hold at least 4.5 months of stocks for motor gasoline, diesel and heating oils and 3 months for jet fuels, based on their 3-year average share in imports or sales, depending on products.

Switzerland held 36 million barrels (mb) of industry stocks at the end of April 2013, equal to 156 days of 2012 net imports. All oil stocks are held in the form of oil products, and are commingled with commercial stocks.

The use of emergency oil stocks is central to Switzerland’s emergency response policy, which can be complemented by demand restraint measures. In an IEA co-ordinated action, the government would participate with the release of compulsory stocks.

The share of natural gas in the country’s TPES stood at 11.5% in 2012. Switzerland’s gas demand increased from 3.0 bcm in 2000 to 3.6 bcm, or 9.8 million cubic metres per day (mcm/d), in 2012. As Switzerland has no natural gas production, all its gas demand is met by imports through pipelines.

The key elements of Switzerland’s overall gas security policy are compulsory stocks for dual-fuel gas installations in the form of heating oil for fuel switching, an allocation scheme for large consumers and demand restraint measures. Switzerland obliges all gas importers to hold compulsory stocks in the form of natural gas or heating oil, or to participate in building such stocks. The equivalent of 4.5 months of natural gas consumption of dual-fuel gas installations is held in the form of heating oil stocks.

In the event of a gas supply disruption, the Swiss Federal Council can oblige dual-fuel gas consumers to switch gas to fuel oils. Dual-fuel gas installations account for roughly one-third of total natural gas consumption in Switzerland. To prepare for a situation in which fuel switching is not sufficient to compensate for a gas supply shortfall, the government will implement an allocation scheme for non-switchable large consumers.

Oil

Market features and key issues

Domestic oil production

Switzerland has no domestic production of crude oil and Swiss oil demand is fully covered by imports.
Oil demand

The country’s oil demand has decreased by around 10% from 277 kb/d in 2001 to 250 kb/d in 2012. In 2011, 60% of total Swiss oil demand was consumed in the transport sector, while the residential sector accounted for 19% and the industry sector accounted for 10%.

**Figure 4.26.2** Oil consumption by sector, 1973-2011

In terms of oil demand by product, between 2003 and 2012 demand for diesel increased substantially by some 72%, whereas demand for gasoline decreased by 23% during the same period. Demand for heating oil/other gasoil also dropped by 25%. Demand for jet and kerosene increased from 25 kb/d in 2005 to 34 kb/d in 2012 and, according to the government, this upward trend is estimated to continue.
The 5-year forecast of CARBURA, Switzerland’s stockholding organisation, indicates that total demand for oil products will decrease by 4% in 2016 compared to 2011, although demand for transport diesel and jet fuel will increase by 11% and 7% respectively. The decline of total demand stems from the gradual decrease in demand for motor gasoline and heating oil.

Imports/exports and import dependency
Switzerland’s oil imports in 2012 were some 244 kb/d, consisting of about 68 kb/d of crude oil, 1 kb/d of NGLs and feedstock, and some 174 kb/d of refined products.

Figure 4.26.4 Oil products imports by origin, 2012

Libya was Switzerland’s largest supply source of crude oil in 2012, amounting to half of total crude oil imports, followed by Kazakhstan (21%), Nigeria (19%) and Algeria (6%). In the same year, almost all refined product imports came from OECD Europe countries, namely from Germany (50% of the total), the Netherlands (17%), Italy (11%), France (10%) and Belgium (10%).

Oil company operations
The number of importers significantly decreased from 1990 (88 importers) to 2012 (60 importers). Among the 60 importers, the seven major importers (BP Switzerland, Total Suisse, Socar Energy Switzerland, Shell Switzerland, Tamoil, Migrol and Varo Energy) supplied around two-thirds of total imports in 2012.

Oil supply infrastructure

Refining
There are two refineries in Switzerland, with a total crude distillation capacity of around 125 kb/d. The Cressier refinery, operated by Varo Energy, has a crude distillation capacity of 68 kb/d. Crude oil supply arrives through the South European Pipeline System (SPSE) from the marine shipping terminal in Fos-sur-Mer in the south of France. The other refinery is the Collombey refinery operated by Tamoil, whose crude distillation capacity is 57 kb/d. Crude oil arrives from the Port of Genoa, Italy, through a pipeline crossing the Alps.

In 2012, the refined product output from the two domestic refineries totalled 73.1 kb/d. This is considerably lower than the level of the previous year which amounted to 94.8 kb/d. This fall in output was because the Cressier refinery had been shut down
since January 2012 owing to the previous owner's (Petroplus) limited credit availability to ensure its proper operation. In May 2012, Varo Energy agreed to purchase the assets of Petroplus in Switzerland, and the transaction was completed in June 2012.

**Figure 4.26.5  Refinery output vs. demand, 2012**

In 2012, the composition of production from these refineries was gas/diesel oil (48%), gasoline (32%), residual fuel oil (7%) and liquefied petroleum gas (6%).

With the exception of residual fuels, domestic refinery production is not sufficient to meet demand in the country. In 2012, domestic production of gas/diesel oil was able to meet some 28% of domestic demand, while gasoline production amounted to around 34%, requiring imports to meet the remaining share.

**Ports and pipelines**

The imports of crude oil and petroleum products are mainly carried out by pipelines, rail tank cars and Rhine barges. Among these transport means, pipelines play the most important role, sharing over 35% of total oil imports in 2012.

Switzerland has one pipeline for oil products and two pipelines for crude oil. The SAPPRO pipeline, with an authorised capacity of around 30.3 kb/d (1.5 Mt per year), connects with the French SPMR pipeline coming from Fos-Lavera at Saint-Julien-en-Genevois. This pipeline supplies diesel, heating oil, gasoline and kerosene to terminals and tank farms in Geneva. The network runs around 12 km in Switzerland.

Concerning crude oil pipelines, the Oléoduc du Rhône runs from Genoa, Italy, to the Collombe...
Storage capacity

Switzerland has a total storage capacity of about 49.1 mb (or 7.8 mcm), which is mostly used for compulsory industry stocks (33.7 mb or 5.4 mcm). The oil industry has 72 above-ground tank farms, spread over the country, but mostly located around the areas of high population density between Geneva and Lake Constance. Storage capacity has been reduced over the past 15 years because of the lowered level of compulsory stocks, as well as the decline in oil consumption.

Decision-making structure

The Federal Department of Economic Affairs, Education and Research (EAER), comprising the Federal Office for National Economic Supply (FONES), is responsible for short-term energy security. The Swiss national emergency strategy organisation (NESO) is established on a stand-by basis and combines government authority for national oil and gas emergency management (mainly FONES) with expertise of domestic oil and gas industry experts. The federal government assigns a Delegate for National Economic Supply to manage the NESO which is responsible for strategic planning and co-ordination of all activities regarding Switzerland’s security of supply. While the Delegate reports to the head of the EAER, the delegate must be chosen from the private sector and is also required to continue their work in the private sector to guarantee a strong co-operation between industry and governmental authorities.

The main body of the Swiss NESO is the Basic Supply Unit “Energy”, in which the administration works closely with external experts designated by the Delegate for National Economic Supply. The FONES acts as a permanent secretariat of the NESO in providing necessary assistance to manage legal issues and to facilitate the work of external experts. Active participation from the industry is assured for smooth and efficient co-ordination during a supply disruption.

During oil supply disruptions, the Oil Products Division of the Energy Unit has the leading role in co-ordinating the NESO and maintaining liaison with industry regarding emergency response.

In practice, the Energy Unit assesses emergency situations in co-operation with CARBURA, the stockholding organisation, and government authorities such as the State Secretariat for Economic Affairs (SECO) and the Swiss Federal Office of Energy (SFOE). The assessment will be presented to the Delegate for National Economic Supply together with the necessary response plans to be implemented. The delegate will decide whether the plan should be put forward to senior authorities. Compulsory stock release will be decided by the head of EAER based on the report of the Delegate, while demand restraint measures will be decided by the Federal Council.

Stocks

Stockholding structure

Switzerland meets its stockholding obligation to the IEA by placing a stockholding obligation on industry, which dates back to 1938 and thus precedes the International Energy Program (IEP) Agreement of 1974. Switzerland has no public stocks or public stockholding agency. In the event of an emergency, the head of the EAER has the power to allow oil importers to release their obligated stocks into the market, based on a recommendation of the Delegate for National Economic Supply.

All oil importers are required to hold a certain amount of stocks according to their import/sales share. They are obliged to hold at least 4.5 months of stocks for motor
gasoline, diesel and heating oils and 3 months for jet fuels. Stocks of motor gasoline and of heating oil are calculated based on a 3-year average of import shares, while stocks of diesel and of jet fuel are based on a 3-year average of sales shares. The levels of stock obligation are set by a directive of the EAER.

All oil importers are also required to become a member of the stockholding organisation, CARBURA. CARBURA is an industry organisation which co-ordinates the implementation of the obligation of importers and other stockholders. CARBURA is mandated by the administration to issue import licences and by its members to manage guarantee funds, pay compensation to stockholders for stockpiling costs and collect statistical data. On behalf of the FONES, CARBURA is tasked to verify the physical stock levels of each stockholder. The FONES has legal authority to penalise non-compliant companies.

**Crude or products**

Switzerland held some 36 mb of industry stocks at the end of April 2013, equal to 156 days of 2012 net imports. About 64% of total industry stocks were stored as middle distillates, while the share of motor gasoline was 32%. All oil stocks are held in the form of oil products, as there is no crude oil stockholding obligation in Switzerland.

**Location and availability**

Switzerland has no bilateral agreements to hold stocks on foreign territory. Emergency oil stocks are held entirely on the national territory of Switzerland.

Although every importer has an individual target of 4.5 months of import/sales share (3 months for jet fuels), it is allowed to deviate from this target in a range between 2.2 to 9 months of individual coverage. Importers can delegate up to 50% of their individual obligation to a substitute stockholder. As oil importers have flexibility in the size of their stocks, a Common Stockholder, which is owned by CARBURA, makes up the difference between the overall obligation on industry and the sum of stocks held by importers and substitute stockholders.

As compulsory stocks are usually commingled with commercial stocks and they are obliged to be reported on top of minimum operating requirements (MOR), the issue of MOR is considered to have no impact on the level of emergency stocks in the country.

**Monitoring and non-compliance**

CARBURA conducts regular on-site audits to monitor the physical availability and quality of compulsory stocks. The FONES has the legal authority to penalise non-compliant companies, including fines up to EUR 83 000 and prison sentences. In the event of material violations, the oil import licence can be withdrawn.

**Stock drawdown and timeframe**

Swiss compulsory stocks will be released company by company, taking into account their respective supply and delivery obligations. Oil companies will be entitled to make a request for stock release by each product. Based on such a request, the compulsory stock release will be calculated according to the concrete loss of supply of the company concerned. Less than 10-15 days are required to make compulsory stocks available to the market. Price tenders or loans are not permitted.

If the country should commit to international obligation for international supply disruptions which do not influence the domestic market, the FONES will offer all oil importers the opportunity to draw down stocks voluntarily. In case no oil importer takes up this opportunity, the FONES assigns a quota per company based on its import share.
Financing and fees

Switzerland’s compulsory system is based on the notion that oil companies should not bear the financial burden resulting from their obligation to maintain stocks. Therefore, compulsory stock costs are financed by levies imposed on the import of oil products which CARBURA collects from oil companies and puts into the “Guarantee Fund”. The fund compensates for the stockholding expenses of stockholders. The purchase of oil products stored as compulsory stocks is financed through the CARBURA Guarantee Fund by means of an amortisation system. The collection of import fees amounts to about EUR 50 million per year.

Other measures

Demand restraint

Demand restraint is regarded as a secondary emergency response measure to complement the release of compulsory stocks in case of severe oil supply disruptions which last longer than six months. With this approach, there would be enough time to prepare, decide upon and implement demand restraint measures, such as a pro rata allocation system for heating oil (Ordinance on Heating Oil Regulation) and a rationing system for transport fuels (Ordinance on Rationing Transport Fuels). Light-handed measures such as speed limits and Sunday driving bans can be introduced in combination with a stock release.

The Federal Council will make a decision on demand restraint measures, based on a recommendation by the Delegate for National Economic Supply. Switzerland’s demand restraint measures would range from light-handed measures (e.g. appeals for self-restraint, speed limits, promotion of carpooling, and Sunday driving bans), to heavy-handed measures (e.g. a pro rata allocation scheme for heating oil and a rationing scheme for transport fuels such as gasoline and diesel).

The country has developed a coupon system for fuel allocation for a period of two months. Cantons will distribute coupons according to the licensed car number plates, which allow the owners of licensed cars to buy a uniform quantity of fuel depending on the type of vehicle.

In case of activation of the allocation scheme for heating oil, consumers will be required to have a non-transferable purchase certificate based on the individual average consumption in the previous two years.

The allocation scheme for jet fuel aims to reduce jet fuel demand by limiting the amounts of jet fuels at Swiss airports. Airlines will be supplied based on their purchase volume in M-2 month.

Fuel switching

Short-term fuel switching from oil to other fuels is not regarded as an emergency response measure in Switzerland, as the share of oil in power generation was estimated to be only 0.1% in 2012.

Other

As there is no oil production in Switzerland, surge production of oil is not considered an emergency response measure in the country.
Gas

Market features and key issues

Gas production and reserves
Switzerland has no domestic production of natural gas. Demand for natural gas is fully covered by imports, although the country had little natural gas production in the past.

Gas demand
Switzerland’s demand for natural gas has increased slightly from some 3 bcm in 2000 to 3.6 bcm (9.8 mcm/d) in 2012.

The residential sector is the largest consumer of natural gas in Switzerland, representing about 36% of the country’s total gas consumption in 2011. As such, the supplies of natural gas are of paramount importance in the cold winter months, as many homes depend on gas for residential use and heating. Daily peak gas demand in 2012 stood at some 17.9 mcm/d, which occurred in February. Equally important, the industry sector represented 31% of gas demand in 2011. The commercial and other sectors accounted for 24%.

Future natural gas demand in Switzerland faces uncertainty, as the country has decided to gradually phase out nuclear power plants by the end of their operating life, which is expected to be between 2019 and 2034. In 2012, nuclear power was the second largest source of electricity generation, accounting for 37% of the total, while the share of natural gas as fuel for electricity generation represented only 1.5% of the total.

Gas import dependency
Because of the absence of natural gas production, Swiss gas demand is entirely supplied by imports, all arriving by pipeline. Switzerland’s total natural gas imports in 2012 amounted to 3.6 bcm. By country, Germany was the largest supplier, representing 62% of
Switzerland’s total imports in 2012, followed by the Netherlands (19%), France (16%) and Italy (3%). The share of long-term contracts accounted for around 65% of total imports.

**Figure 4.26.7  Natural gas imports by source, 2012**

Gas company operations

In 2012, Swissgas AG supplied around 50% of total gas imports, followed by EGO (17%), GVM (14%), Gaznat SA (13%) and AIL (3%).

Within the retail market for gas in Switzerland there are 106 local distributors (mostly public companies) and a few industrial customers. In 2012, the nine largest utilities sold half the total amount of gas. As around 33% of the total gas consumption is covered by interruptible contracts with dual-fired consumers, this amount could be saved in a gas supply disruption.

**Gas supply infrastructure**

**Ports and pipelines**

Given that Switzerland is a landlocked country, there is no LNG terminal in Switzerland. Switzerland’s gas pipeline network accounts for about 18,432 km, which includes 2,240 km of high-pressure grid, 4,134 km of middle-range pressure grid and 12,058 km of low-pressure grid. The natural gas grid network covers 69% of the Swiss population.

Although Switzerland has 12 active cross-border feeding points in the European gas pipeline network, some 70% of Switzerland’s gas import (around 2.6 bcm/y or 7 mcm/d) comes through the two entry points of the Transitgas pipeline. The total length of this pipeline is 292 km in Switzerland, from Wallbach (51.5 mcm/d maximum technical capacity) on the German border and Oltingue (19.5 mcm/d) on the French border respectively, to Griespass (55.9 mcm/d) on the Italian border. The pipelines are looped from Wallbach to Ruswil. This pipeline is operated by Transitgas AG, which is owned by Swissgas (51%), FluxySwiss (46%) and E.ON Ruhrgas (3%).

The Transitgas pipeline is used to transport natural gas for consumption in Switzerland and for transit from Germany and France to Italy. The annual capacity of this pipeline accounted for 185 terawatt hours (TWh), or around 16.7 bcm. The compressor station in Ruswil has a compression capacity of 60 megawatt hours (MW) and is the operational centre for maintenance and control of the necessary transporting pressure in Switzerland.
Preparations are underway to enable reversal flow of the Transitgas pipeline from the south (Italy) to the north (Germany and France), which will provide a strong degree of resilience in the event of a gas supply disruption in the north of the country. This project is to be completed in 2015 (partially) and 2018 (fully).

Storage
As Switzerland’s gas importers are not required to have a natural gas storage capacity because of the country’s geological characteristics, all natural gas storage facilities in Switzerland are in the form of pipelines and spherical storage vessels for daily balancing.

Outside the country, Gaznat SA has a storage capacity in the French underground storage Etrez, which is directly connected to Switzerland’s system for the purpose of physically balancing Switzerland’s distribution network.

**Emergency policy**


All gas importers are required to fulfil their obligation by taking any one of following measures: holding natural gas stocks, holding heating oil stocks, delegating the obligation to hold heating oil stocks to a convenient third party, or participating financially in an existing compulsory stockholding of heating oil.

As a result, the equivalent of 4.5 months of natural gas consumption of dual-fuel gas installations (or roughly 1.5 months of total consumption) is held in the form of heating oil stocks. These heating oil stocks are not categorised as oil emergency stocks.

In case of a gas emergency, the Natural Gas Division in the Energy Unit of the Swiss NESO has the leading role in co-ordinating the necessary action and maintaining liaison with industry. This division will evaluate an emergency situation and propose necessary response measures to the Delegate for National Economic Supply in co-operation with concerned authorities and the gas industry.

**Emergency response measures**

In the initial stage of a gas emergency, when a shortage of gas supply is anticipated, the first priority is to increase imports from other sources and to switch gas transportation to other unaffected delivery routes.

In case the gas shortfall problem cannot be solved with these measures, the Federal Council can oblige dual-fuel gas consumers to switch from gas to heating oil, based on a recommendation of the Delegate for National Economic Supply. Switzerland has around 4 000 dual-fuel gas installations, mostly used in the industry sector. These dual-fuel units accounted for around one-third of total natural gas consumption.

The fuel-switching measure may be implemented together with the release of compulsory stocks in the form of heating oil, as most dual-fuel gas plants in Switzerland can be run with heating oil. The amount of heating oil stocks for gas emergency is around 400 000 m³ (or about 2.5 mb).
In case fuel switching is not sufficient to compensate for a gas supply shortfall, the Federal Council may implement an allocation scheme for non-switchable large consumers.

The Federal Council, supported by the gas industry, will apply light-handed demand restraint measures such as appeals to lowering heating temperatures and saving warm water. These measures aim at reducing the gas consumption of small consumers such as households who would not be affected by the abovementioned measures.