

2012

OIL & GAS SECURITY

Emergency Response of IEA Countries

SWITZERLAND

Key Figures	2
Overview	3
1. Energy Outlook	4
2. Oil	5
2.1 Market Features and Key Issues	5
2.2 Oil Supply Infrastructure	7
2.3 Decision-making Structure for Oil Emergencies	9
2.4 Stocks	10
3. Other Measures	14
3.1 Demand Restraint	14
3.2 Fuel Switching	15
3.3 Others	15
4. Natural Gas	16
4.1 Market Features and Key Issues	16
4.2 Natural gas supply infrastructure	17
4.3 Emergency Policy for Natural Gas	19

List of Figures

Total Primary Energy Supply	4
Electricity Generation, by Fuel Source	4
Oil Consumption, by Product	5
Oil Demand (kb/d)	5
Crude Oil Imports, by Source	6
Refinery Output vs. Demand	7
Oil Infrastructure Map	8
Switzerland's stockholding obligations	11
Oil Consumption by Sector	14
Natural Gas Consumption, by Sector	16
Natural Gas Infrastructure Map	18
Information flow of gas supply	19



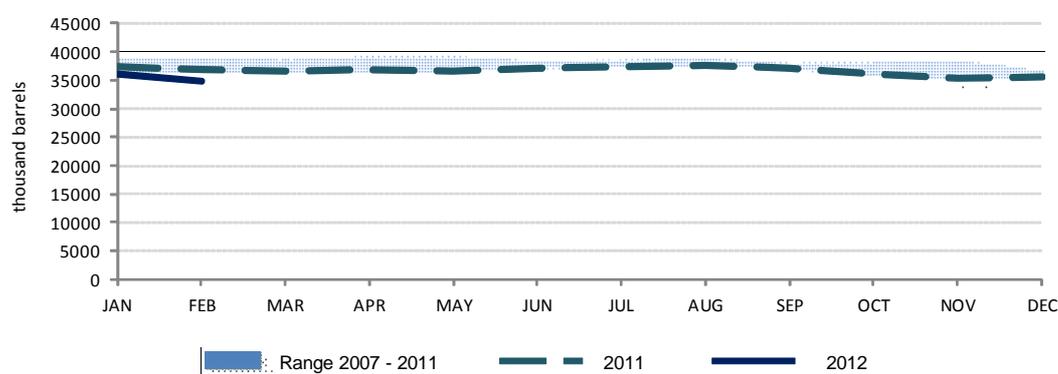
International
Energy Agency

Switzerland

Key Oil Data

	1985	1990	1995	2000	2005	2009	2010	2011
Production (kb/d)	-	-	-	-	-	-	-	-
Demand (kb/d)	270.5	268.1	267.0	274.2	271.7	259.9	242.7	236.1
<i>Motor gasoline</i>	70.8	86.2	83.1	92.0	83.2	76.0	73.3	70.5
<i>Gas/diesel oil</i>	152.7	131.1	130.5	125.3	139.4	133.0	116.4	110.6
<i>Residual fuel oil</i>	11.6	9.3	7.9	3.6	2.5	1.5	1.3	1.0
<i>Others</i>	35.4	41.6	45.5	53.3	46.6	49.4	51.6	54.0
Net imports (kb/d)	270.5	268.1	267.0	274.2	271.7	259.9	242.7	236.1
Import dependency	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Refining capacity (kb/d)	127	132	132	132	132	132	135	135
Oil in TPES	51.0%	50.0%	44.9%	43.0%	45.1%	42.4%	39.5%	-

End-Month Total Oil Stock Levels¹ - Five Year Range

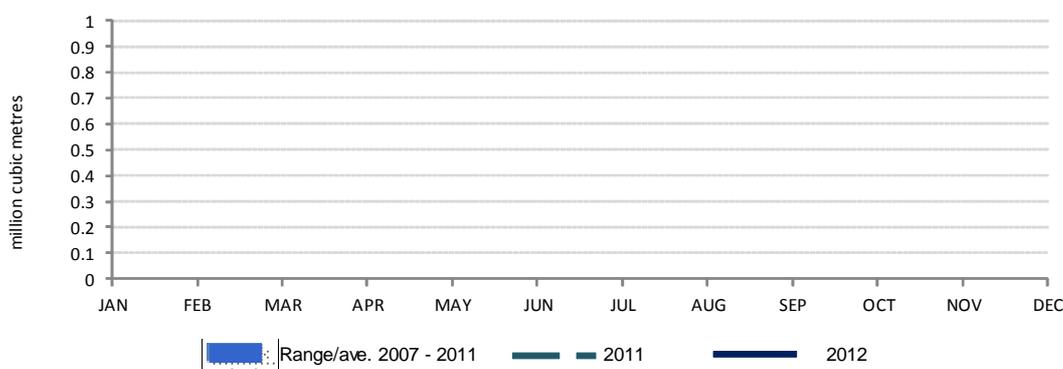


Key Natural Gas Data

	1985	1990	1995	2000	2005	2009	2010	2011 *
Production (mcm/y)	18	4	-	-	-	-	-	-
Demand (mcm/y)	1 549	1 994	2 682	2 972	3 399	3 295	3 682	3 165
<i>Transformation</i>	118	150	230	274	295	236	286	-
<i>Industry</i>	618	710	1 029	894	992	1 004	1 040	-
<i>Residential</i>	525	735	958	1 019	1 209	1 217	1 412	-
<i>Others</i>	288	399	465	785	903	838	944	-
Net imports (mcm/y)	1 531	1 990	2 682	2 972	3 399	3 295	3 682	3 165
Import dependency	98.8%	99.8%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Natural Gas in TPES	5.6%	6.7%	8.9%	9.5%	11.0%	9.9%	11.5%	-

* based on monthly data submissions to the IEA.

End-Month Natural Gas Stock Levels² - Five Year Range



1 -Primary oil stocks on national territory; these exclude utility stocks and including pipeline and entrepot stocks where known.

2 -Stocks held on national territory, as reported to the IEA in monthly data submissions.

OVERVIEW

Oil has been a dominant energy source in Switzerland, accounting for around 40% of the country's total primary energy supply (TPES) in 2010. Switzerland's oil demand has decreased from 274 kb/d in 2000 to 236 kb/d in 2011. The transport sector accounted for about 56% of the total oil consumption in 2010.

As Switzerland has no domestic oil production, it is entirely dependent upon crude oil and oil products imports. In 2011, its oil imports were around 236 kb/d, consisting of 88 kb/d of crude oil, 2 kb/d of NGLs and feedstock, and 149 kb/d of refined products. More than 60% of the total crude oil imports came from countries of the Former Soviet Union in 2011. In the country, there are two refineries with a total crude distillation capacity of around 125 kb/d.

Switzerland meets its stockholding obligation to the 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. Switzerland held 35 mb of oil stocks at the end of February 2012, equating to 149 days of 2010 net-imports. All oil stocks are held in the form of oil products, and 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 coordinated action, the Administration would participate with the release of compulsory stocks.

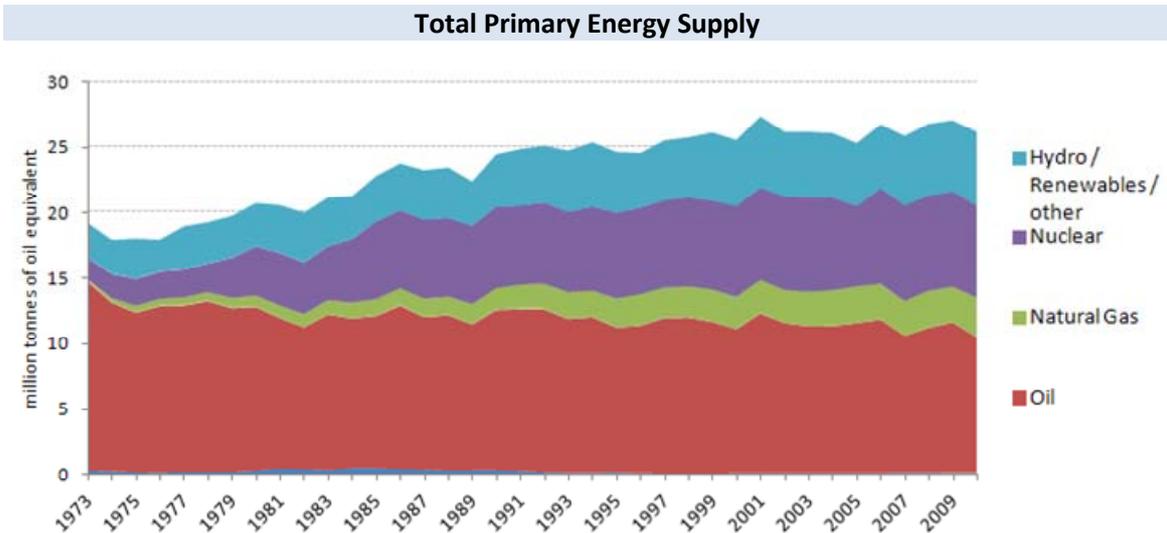
The share of natural gas in the country's TPES stood at 12% in 2010. Switzerland's gas demand increased from 3.0 bcm (8.1 mcm/d) in 2000 to 3.7 bcm (10.1 mcm/d) in 2010. As Switzerland has no natural gas production, all of the gas demand is met by imports through pipelines. Switzerland's total natural gas imports in 2010 amounted to 3.7 bcm.

The key elements of Switzerland's overall gas security policy are compulsory stocks in the form of heating oil for fuel switching, an allocation scheme for large consumers (as of 2013) 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 is held in the form of heating oil stocks.

In the event of gas supply disruption, the Swiss Federal Council can oblige dual-fuel gas consumers to switch gas to fuel oils. The dual-fuel gas installations account for around 40% of the total natural gas consumption in Switzerland. To prepare for the situation where fuel switching is not sufficient to compensate for a gas supply shortfall, the Administration will implement an allocation scheme for non-switchable large consumers.

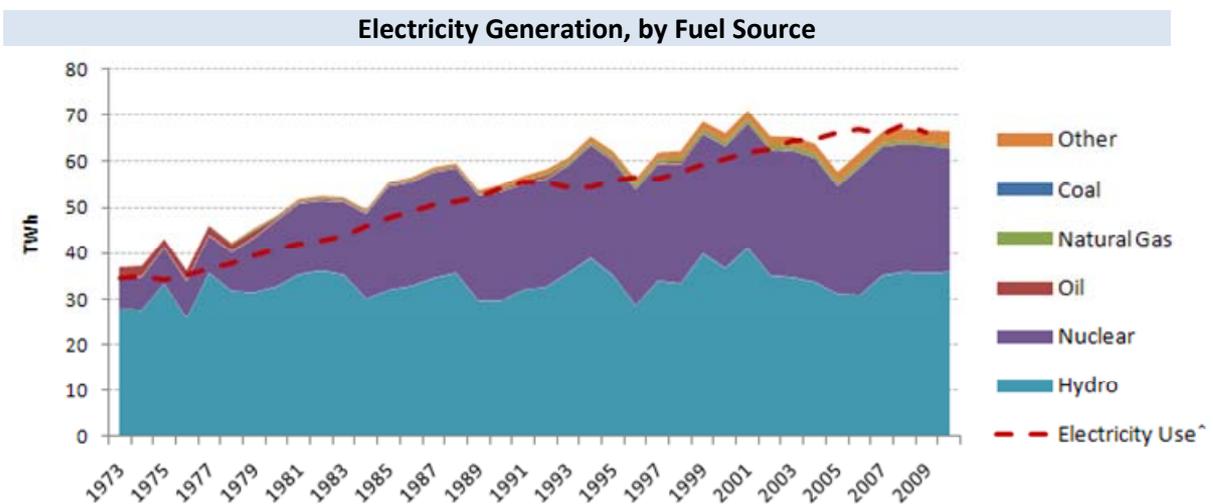
1. Energy Outlook

Oil has been the dominant energy source in Switzerland, accounting for around 40% of the country's total primary energy supply (TPES) in 2010. Nuclear energy stands as the second biggest energy source in Switzerland, whose share in the country's TPES stood at 26% in 2010. The share of natural gas in the country's TPES steadily increased from 1% in 1973 to 12% in 2010.



Source: Energy Balances of OECD Countries, IEA

After the Fukushima incident, the Federal Council and the Parliament decided to phase out nuclear power by the end of the operating life of the reactors, which is expected to be between 2019 and 2034. The Administration developed two forecast scenarios to phase out nuclear energy: an “Up to now” scenario which can be achieved with existing measures and technologies and a “New Energy Policy” scenario which requires new instruments and technologies. In the “Up to now” scenario, the Swiss government forecasts that the TPES will rise by 4% in 2020 and then decrease by 8.5% in 2050 compared to 2009. In the “New Energy Policy” scenario, the TPES is projected to decrease by 6.2% in 2020 and by 40% in 2050. When nuclear power plants are largely replaced by CCGTs, the share of natural gas will gradually increase.

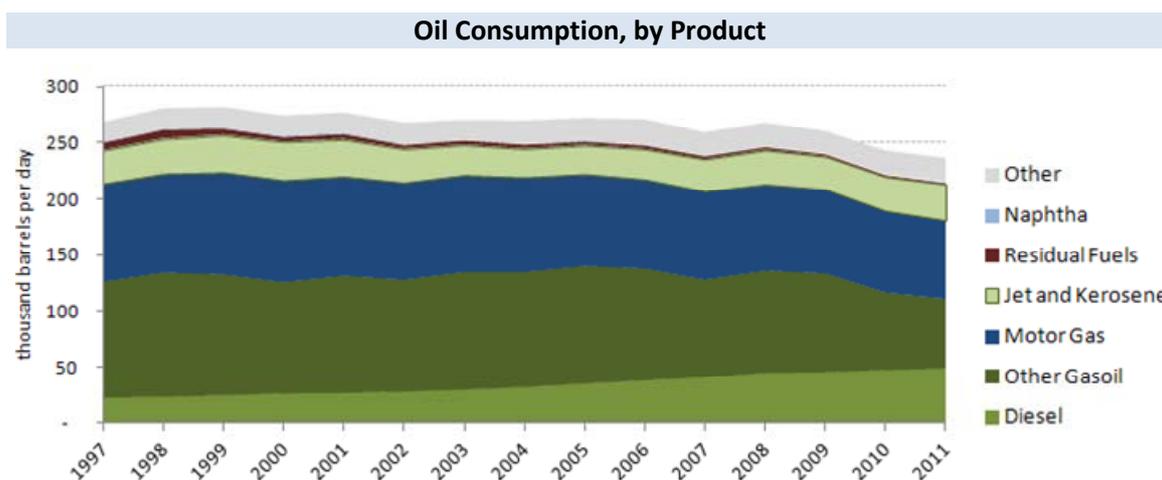


Source: Energy Balances of OECD Countries, IEA

2. Oil

2.1 Market Features and Key Issues

Switzerland does not have domestic production of crude oil. Swiss oil demand is fully covered by imports. Its oil demand has decreased by 11.5% from 274 kb/d in 2000 to 243 kb/d in 2010 and to 236 kb/d in 2011.



Source: Monthly Oil Statistics, IEA

In 2010, 56% of Swiss total oil demand was consumed in the transport sector, while the residential sector and the industry sector accounted for 22% and 10% respectively. In terms of oil demand by product, demand for diesel substantially has increased by around 80% between 2001 and 2011, whereas demand for gasoline has decreased by 21% during the same period. Demand for heating oil/other gasoil and residential fuels dropped by 40% and 77% respectively. Demand for jet and kerosene has remained relatively flat during the last 5 years, standing at about 33 kb/d in 2011.

Oil Demand (kb/d)				
kb/d	2001	2011	% change	% change p.a.
LPG and Ethane	6	6	-7.8%	-0.8%
Naphtha	1	1	-53.6%	-7.4%
Gasoline	90	70	-21.4%	-2.4%
Kerosene	33	33	-0.2%	0.0%
Diesel	27	49	79.6%	6.0%
Heating/other Gasoil	104	62	-40.4%	-5.0%
Residual Fuels	4	1	-76.5%	-13.5%
Other Products	12	15	24.8%	2.2%
Total Products	277	236	-14.8%	-1.6%

Source: IEA Monthly Oil Statistics

According to the “Up to now” scenario of the Administration, Switzerland’s total oil demand is forecasted to gradually decrease by 10% in 2020 and by 39% in 2050 compared to 2009, whereas in the “New Energy policy” scenario, its declining rate is more significant: around 18% in 2020 and 74% in 2050.

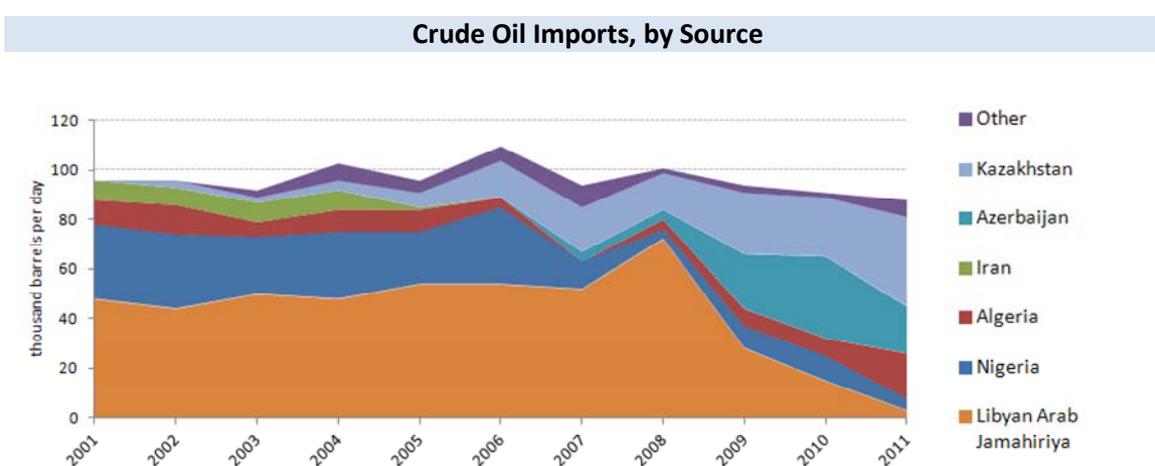
The 5-year Outlook of CARBURA, Switzerland’s stockholding organisation, indicates that the total demand for oil products will decrease by 4% in 2016 compared to 2011, although demand for transport diesel and jet fuel will increase by 11% and 7% respectively. The decline of the total demand stems from gradual decrease of motor gasoline and heating oil.

Imports/exports and import dependency

Switzerland's oil imports in 2011 were some 236 kb/d, consisting of about 88 kb/d of crude oil, 2 kb/d NGLs and feedstock, and some 149 kb/d refined products.

Concerning crude import sources, Switzerland is highly dependent on countries of the Former Soviet Union, which account for more than 60% of the total crude oil imports in 2011. By country, Kazakhstan (41% of the total) was the biggest supply source of crude oil in 2011, followed by Azerbaijan (22%), Algeria (20%) and Nigeria (6%). Although Libya's share was dominant before 2008, efforts for diversification of supply sources have been made since, resulting in reductions of oil imports from Libya.

In 2011, all refined product imports came from European countries, namely from Germany (51% of the total), Italy (13%), France (13%), the Netherlands (12%) and Belgium (10%).



Source: Monthly Oil Statistics, IEA

Oil Company Operations

The number of importers significantly decreased from 1990 (88 importers) to 2011 (60 importers). Among the 60 importers, the 7 major importers (BP Switzerland, Total Suisse, ESSO Schweiz GmbH, Shell, Tamoil, Eni Suisse and Petroplus) supplied 67% of total imports in 2010.

The retail market is fully open to competition, and 19 oil retail companies operate 3,626 filling stations in Switzerland as of January 2011. The largest are Avia (690 stations), Agrola (427), BP (400), Shell (324), Tamoil (318) and Ruedi Rüssel (305).

There are 17 small producers of bio diesel in Switzerland, although their share in oil supply is below 0.1%.

Taxes and maximum price mechanism

The oil products market is fully liberalized. Wholesale and retail prices are mainly influenced by the relevant quotation prices and exchange rates, which are driven by the global market fundamentals and expectations. Government interference is limited to determining the level of the excise tax and VAT. In addition, contributions to the so-called Guarantee Fund ("Emergency Fund") are levied on imports of oil-products in order to finance the stockpiling system. As of 2Q2011, the share of all tax components in the price is nearly 50% for both unleaded gasoline and automotive diesel prices (for non-commercial purposes), and about 17% for light fuel oil.

As the price for unleaded gasoline is relatively lower in Switzerland (2.061 USD/litre in 2Q2011) than in neighbouring countries like France (2.195 USD/litre), Italy (2.217 USD/litre) and Germany (2.255 USD/ litre), tank tourism influences gasoline consumption in Switzerland.

2.2 Oil Supply Infrastructure

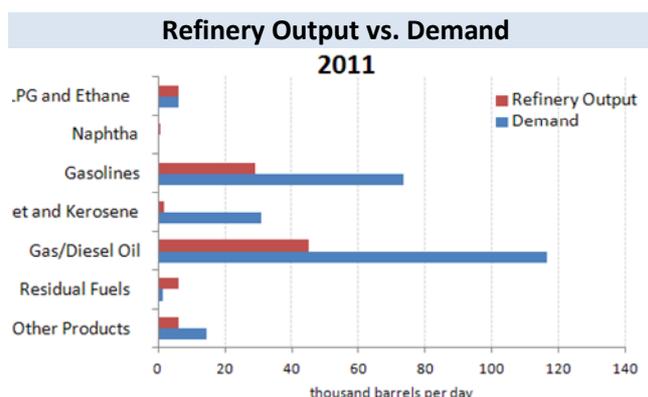
Refining

There are two refineries in Switzerland, with a total crude distillation capacity of around 125 kb/d.

The Cressier refinery, operated by Petroplus Refining, has a crude distillation capacity of 68 kb/d. Crude oil supply arrives via the SPSE pipeline 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, by a pipeline crossing the Alps.

In 2010, total crude throughputs averaged 93 kb/d, which indicates that the overall capacity utilisation rate was about 74%. In the same year, the refined product output from the two domestic refineries totalled 96.7 kb/d. The composition of production from these refineries was gas/diesel oil (48%), gasoline (32%), residual fuel oil (7%) and LPG (6%).



With the exception of residual fuels, domestic refinery production is not sufficient for meeting demand in the country. In 2011, domestic production of gas/diesel oil was able to meet 40% of domestic demand, while gasoline amounted to some 39%, requiring imports to meet the remaining share. Domestic refinery gross output has gradually decreased from 108 kb/d in 2008 to 95 kb/d in 2011.

In December 2011, Petroplus announced to temporarily shut down the Cressier refinery in January 2012 because of its limited credit availability to ensure proper operations of the refinery. Not being able to reopen credit lines needed to maintain its operations and to meet its financial obligations, Petroplus Refining has meanwhile been forced into a debt restructuring moratorium (composition agreement with assignment of assets).

Ports and Pipelines

The imports of crude oil and petroleum products are mainly undertaken by pipelines, rail tank cars and Rhine barges. Among these transport means, pipelines play the most important role, sharing over 43% of the total oil imports in 2010.

SWITZERLAND

In Switzerland there is 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 million tons per year), connects with the French SPMR pipeline coming from Fos-Lavera at Saint-Julien-en Genevois. The utilization rate of this pipeline was around 42.7% in 2010. This pipeline supplies diesel, heating oil, gasoline and kerosene to the terminal and tank farms in Geneva. The network runs around 12km in Switzerland.

Concerning crude oil pipelines, the Oléoduc du Rhône runs from Genoa, Italy, to the Collombey refinery. This pipeline's capacity is approximately 61 kb/d (3 million tons per year) and the utilization rate in 2010 was 79%.

Another crude pipeline is the Oléoduc du Jura Neuchâtelais, branched off from the Société du Pipeline Sud Européen (SPSE) pipeline at Gennes in France. This pipeline, with a capacity of around 91 kb/d or 4.5 million tons per year, is connected to the Cressier refinery. The utilization rate of this pipeline was 54.4% in 2010.

There is no oil sea port in Switzerland, but there are three oil ports in Basel to ship oil products to on the Rhine by barges. Rhytank AG, Petroplus Tankstorage AG, TAU Tanklager Auhafen AG and Satram AG own these oil terminals, where 2.5 million tons (around 50.5 kb/d) of oil products were unloaded in 2011.

Oil Infrastructure Map



The boundaries and names shown and the designations used on maps included in this publication do not imply official endorsement or acceptance by the IEA.

Storage Capacity

Switzerland possesses a total storage capacity of about 49.7 million barrels (7.9 million cubic metres), which is mostly used for industry compulsory stocks (34.6 mb or 5.5 million cubic metres). 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 during the past 15 years because of the lowered level of compulsory stocks, as well as the decline in oil consumption.

As Switzerland has no public stockholding, all storage capacity is held within the supply chain. Crude oil is stored only in the refineries for commercial purpose as there is no compulsory obligation to hold crude oil.

2.3 Decision-making Structure for Oil Emergencies

The Federal Department of Economic Affairs (FDEA), 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 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 coordination of all activities regarding Switzerland's security of supply. While the Delegate reports to the Head of FDEA, the Delegate must be chosen from the private sector and is also required to continue its work in the private sector to guarantee a strong cooperation between industry and governmental authorities.

The main body of the Swiss NESO is the Basic Supply Unit "Energy". In this unit, the Administration works very closely with external experts designated by the Delegate of National Economic Supply. While the FONES acts as a permanent secretariat of the NESO in providing necessary assistance to manage legal issues and to facilitate works of external experts, the experts work for the NESO on a part-time and honorary basis in maximizing the accumulated know-how and networks. Active participation from the industry is assured to arrange for smooth and efficient coordination during a supply disruption, as demonstrated during the interruption of jet fuels flow from France to the Geneva Airport in October and November 2010.

During oil supply disruptions, the Oil Products Division of the Energy Unit has the leading role in coordinating the NESO, maintaining liaison with industry regarding emergency response, while emergency response to a natural gas crisis is under control of the Natural Gas Division of the Energy Unit.

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

2.4 Stocks

Stockholding Structure

Switzerland meets its stockholding obligation to the IEA by placing a stockholding obligation on industry, which dates back prior to the IEP Agreement of 1974. Switzerland does not have public stocks or a public stockholding agency. In the event of an emergency, the Head of FDEA has the power to allow oil importers to release their obligated stocks to the market, based on a recommendation of the Delegate of National Economic Supply.

According to the Federal Act on National Economic Supply (1982), the Ordinance 531.211 of 6 July 1983 on the Main Principles of Stockholding (amended in 2006) and the Ordinance 531.215.41 of 6 July 1983 on Establishing Compulsory Stocks on Fuel Oils and Transport Fuels (amended in 2011), all oil importers are required to hold a certain amount of stocks according to its 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. These obligatory stocks are usually co-mingled with operating and commercial stocks. The levels of stock obligation are set by a directive of the FDEA.

All oil importers are also required to become a member of a stockholding organisation, CARBURA. CARBURA is an industry organisation which coordinates importers and other stockholders to implement their obligation. 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 statistic data. On behalf of the FONES, CARBURA is tasked to verify physical stock levels of each stockholder. The FONES has a legal authority to penalise non-compliant companies.

Crude or Products

Switzerland held some 35 mb of industry stocks at the end of February 2012, equating to 149 days of 2010 net-imports. About 64% of the total industry stocks were stored as middle distillates, while the shares of motor gasoline and residential fuel oil were 32% and 2% respectively. All oil stocks are held in the form of oil products, as there is no crude oil stockholding obligation in Switzerland. Obligatory industry stocks may be commingled with operational and commercial stocks.

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.

All importers are obliged to hold a total of at least 4.5 months of stocks for motor gasoline, diesel and heating oils according to their import/sales share. Every importer has an individual target of 4.5 months of its import/sales share, but is allowed to deviate from this target in a range of 2.2 months (minimum) to 9 months (maximum) of individual coverage. They can

delegate up to 50% of their individual obligation to a substitute stockholder. In 2012 there is one substitute stockholder which is owned by 6 oil importers as a joint stock company.

Switzerland's stockholding obligations

Product	Overall (industry)	Individual (importer)	Individual (min)	Individual (max)
Motor gasoline	Domestic sales 4.5 months (=deliveries observed)	Import share 4.5 months	2.2 months	9 months
Transport diesel		Sales share 4.5 months		
Heating oil		Import share 4.5 months		9 months (12 m. incl. natural gas)
Kerosene Jet fuel (A1)	Sales to airlines 3 months	Sales share 3 months	2.75 months	6 months

Source: CARBURA

As oil importers have flexibility in the size of their stocks, a Common Stockholder, which is owned by CARBURA, fills the difference between the overall obligation on industry and the sum of stocks held by individual importers and substitute stockholders.

Around 90% of the total compulsory stocks are held by individual importers, while both the substitute stockholder and the common stockholder each hold about 5%.

Compulsory stocks are held in accordance with stockholding contracts which stipulate that the full delivery of the volumes must be guaranteed. As they are commingled with commercial stocks and they should 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 of the country.

Monitoring and Non-compliance

Since the previous review in 2006, Switzerland has consistently met its minimum IEA stockholding obligation, with total stock coverage ranging between 144 and 160 days. Stock levels necessary to cover the 90 days of net imports required by the I.E.P. Agreement range between 19 mb to 24 mb, depending on the mix of product stocks held.

CARBURA conducts regular on-site audits to monitor the physical availability and quality of compulsory stocks. In cases there is a failure to comply with stock obligations in terms of quality, quantity and location of oil products, the FONES has a number of powers to help ensure compliance. These powers include fines up to 83,000 euro and prison sentences. In the event of material violations, oil import licence can be withdrawn.

Stock Drawdown and Timeframe

The Switzerland's emergency system considers that in case of a supply disruption the oil companies operating in Switzerland could be differently affected, depending on their supply sources and their supply flexibility. Therefore, compulsory stocks would be released company by

company, taking into account their respective supply and delivery obligations. Oil companies would be entitled to make a request for stock release by each product. Based on such a request, the compulsory stock release would be calculated according to concrete supply loss of the concerned company. In case of a supply shortage which affects the Switzerland's domestic market, the following steps would be taken:

- a) Supply shortfall calculation per company and per period by CARBURA
- b) Release application by company: product and quantity
- c) Release permission per company by the Basic Supply Unit "Energy" following the authorisation by the Head of FDEA
- d) Repayment of credit (to bank) and stock revaluation (to CARBURA) by company
- e) Stock release
- f) Sales by company to the market
- g) Stock monitoring (by CARBURA)

Less than 10 or 15 days are required to make compulsory stocks available to the market. Price tenders or loans are not allowed.

In October 2009, the Administration developed an additional "2 step-procedure" to ensure that the country would be able to commit to its international obligations, even when the domestic market is not influenced by international supply disruptions.

In Step 1, the FONES would offer all oil importers the opportunity to draw down stocks voluntarily. If oil importers volunteer to draw down the stocks, the above-mentioned steps from b) to f) will then be followed.

In case oil importers don't take the opportunity to draw down their stocks voluntarily, Step 2 would be activated. In this step, the Administration assigns quota per company based on its import share and then the above-mentioned steps from c) to f) will be taken. In step c) the Administration will unilaterally change the stockholding contract and reduce the amount of compulsory stocks of the company, thereby withdrawing financial compensation to hold that amount of emergency stocks. The company thus immediately will have more commercial stocks available, which could contribute to importing less oil into Switzerland and thereby easing a potential tightness on the international market.

Financing and Stockholding Costs

The 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 collection of import fees amounted to 65 million Euro in 2010. Oil companies can recover these levies through the selling price to consumers. One of the important functions of CARBURA is to manage the Guarantee Fund and to pay compensations for the costs of compulsory stockholding to oil stockholders.

In 2010, the costs for stockholding amounted to 83 million Euro, of which investments in tank farms accounted for 12 million Euro and operating and maintenance of tank farms accounted for 33 million Euro.

The purchase of oil products stored as compulsory stocks is financed through the CARBURA Guarantee Fund by means of an amortization system. This means that in case of putting oil on stock, the Guarantee Fund pays the difference between the prevailing market price and a target

“pool price” (devaluation amount) to the importer. Thus, the stockholder only needs to finance the pool price (75 CHF/m³ in 2011).

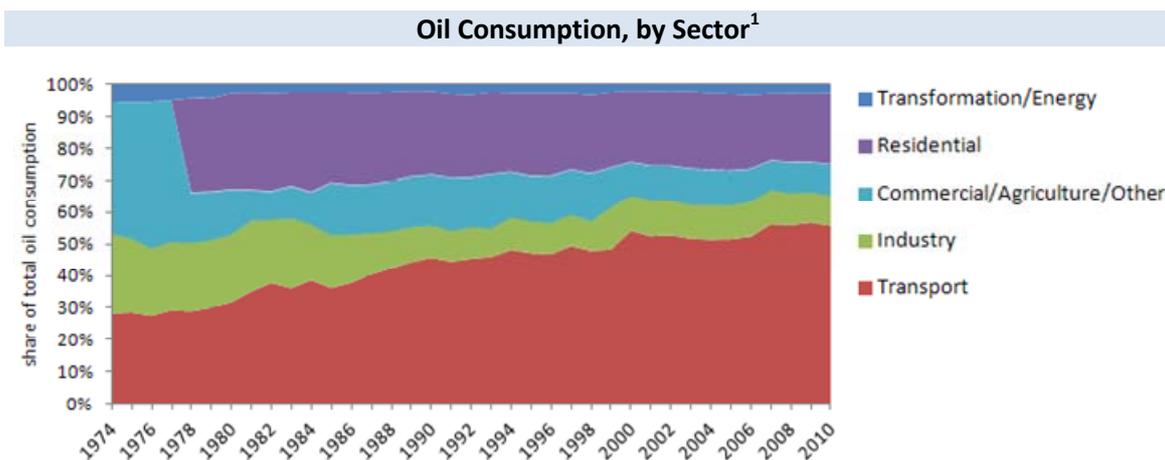
In case of releasing compulsory oil stocks, the stockholder should pay back the revaluation amount which is the difference between prevailing market price and pool price to the Guarantee Fund. While 30 million Euro was paid to stockholders from the Fund for the purchase of oil products under the compulsory system in 2010, 65 million Euro was paid to the Fund for the expense of released oil products.

The compulsory stockholding costs averaged about 2.4 Euro per barrel in 2010 (or 1.5 Eurocent per litre), as compulsory stock storage capacity accounted for 34.6 mb.

3. Other Measures

3.1 Demand Restraint

Oil consumption in Switzerland is primarily in the transport and residential sectors, which respectively represented 56% (dominantly gasoline) and 22% (heating oil) of all oil use. Industry and commercial/agriculture accounted for 10% each.



Source: Oil Information, IEA

Demand restraint is regarded as the secondary emergency response measure to complement the release of compulsory stocks in case of severe oil supply disruptions which might last longer than six months. With this approach, enough time (six months) would be available 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 like speed limits and Sunday driving bans can be introduced in combination with a stock release.

The Federal Act on National Economic Supply (1982) forms the legal basis for oil demand restraint measures. Related Ordinances govern the implementation of the demand restraint measures. The Federal Council will make a decision on demand restraint measures, based on recommendation by the Delegate of National Energy Supply. This will be prepared by the Basic Unit "Energy" in cooperation with government authorities such as SECO and SFOE, according to the gravity of an oil supply disruption.

Switzerland's demand restraint measures would range from light-handed measures (e.g. appeals for self-restraint, speed limits, promotion of car-pooling, 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).

a) Rationing of gasoline and diesel

The Administration can activate a coupon system for fuel allocation for two months. Cantons would distribute coupons according to the licensed car number plates, which allow the owners

¹ Total Consumption (including refinery consumption), does not include international marine bunkers.

of licensed car to buy a uniform quantity of fuel depending on the types of vehicle. Special regulations are foreseen for public transportation, the agricultural sector and emergency services. The coupons are transferable between consumers.

b) Allocation for heating oil

In case of activation of the allocation scheme for heating oil, consumers would be required to have a non-transferable purchase certificate, issued by municipal authorities. The quantity of allocation is decided based on the individual average consumption in the previous two years. Special consideration would be given to hospitals and nursing homes. Consumers can be supplied only when their tank is filled less than half. This allocation scheme would be effective for one year.

c) Allocation for jet fuel

The allocation scheme for jet fuel aims at reducing jet fuel demand by limiting amounts of jet fuels at the Swiss airports. There is no preferential treatment for certain airlines. Airlines would be supplied based on their purchase volume in the previous month. This allocation scheme would remain in force for one month.

d) Light-handed measures

Light-handed demand restraint measures like speed limits, Sunday driving ban and odd/even license number plate schemes, would be implemented to support the effectiveness of a compulsory stock release and the above-mentioned more heavy handed demand restraint measures.

The Administration can also prohibit hoarding and filling canisters, based on related ordinances.

3.2 Fuel Switching

Short-term fuel switching from oil to other fuels is not regarded as an emergency response measure in Switzerland, as the ratio of oil used for power generation to Switzerland's total oil consumption was only 0.11% in 2010, amounting to 70 GWh. There is little potential to switch away from oil to other energy sources.

3.3 Others

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

4. Natural Gas

4.1 Market Features and Key Issues

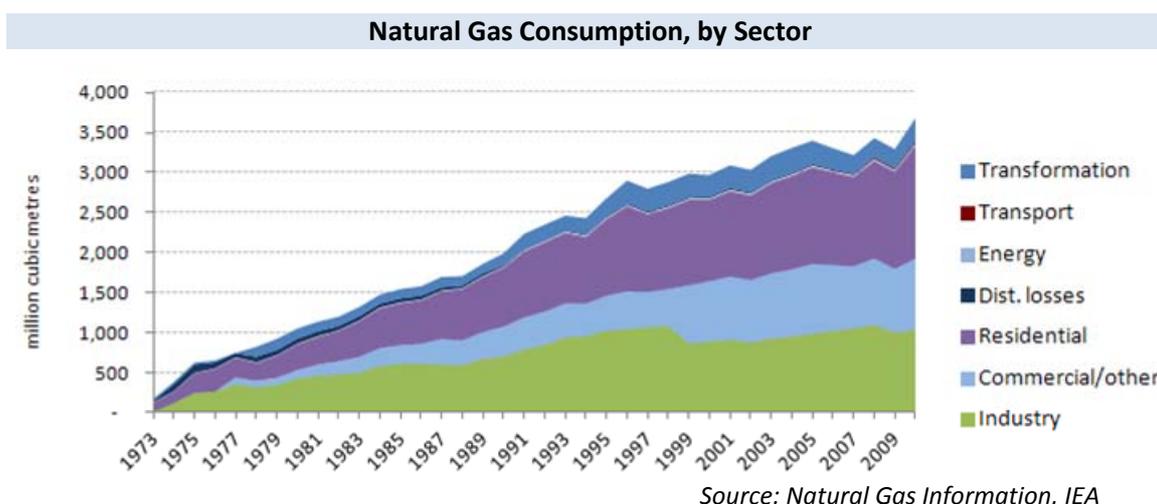
Gas production and reserves

Switzerland does not have domestic production of natural gas. Demand for natural gas is fully covered by imports. Switzerland had little natural gas production in the past. Some exploration is underway in the Lake Geneva and at Hermrigen (Swiss midlands). Drilling at Hermrigen is planned in 2012, with an estimated reservoir of 15 billion cubic metres. In Switzerland, the cantons are responsible for issuing oil and gas explorations licenses. Shale gas exploration licences granted by the cantons of Vaud and of Fribourg were suspended in 2011 due to environmental concerns.

Gas demand

Switzerland's demand for natural gas has increased from 2.9 billion cubic metres (8.1 million cubic metres per day) in 2000 to 3.7 bcm (10.1 mcm/d) in 2010. The demand has been relatively stable due to weather conditions since 2005 in which Switzerland consumed 3.4 bcm (9.3 mcm/d).

The residential sector is the largest consumer of natural gas in Switzerland, representing about 38% of the country's total gas consumption in 2010. 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. Gas demand in Switzerland peaks in winter when gas consumption significantly increases for heating. Daily peak gas demand in 2010 stood at some 17.5 mcm/d, which occurred in January. Equally important, the industry sector represented 28% of gas demand in 2010. The commercial sector accounted for 24%. The total amount of those three sectors represented over 90% of the total gas consumption in Switzerland.



Future natural gas demand in Switzerland faces considerable uncertainty, as the Federal Council and the Parliament 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 2010, nuclear power was the second largest source for electricity generation, accounting for some 40% of the total, while the share of natural gas as fuel for electricity generation represented only 1% of the total.

Gas import dependency

Due to the absence of natural gas production, Swiss gas demand is entirely supplied by imports, all of which arrive by pipelines. According to the Swiss Government, Switzerland's total natural gas imports in 2010 amounted to some 3.7 bcm.

Switzerland has diversified its supply sources. By country of origin, the Netherlands was the largest supplier, representing 26.6% of the total imports in 2010. Russia (24%), Norway (23%) and Germany (13.1%) are other key gas supply sources for Switzerland. This is compiled from the long-term contracts of Swiss importers with EU-based suppliers and a Swissgas stake in Norwegian production acreage². By country of contracts, Germany was the biggest gas supplier, representing 68% of the total imports. The share of imports by long-term contracts accounted for around 75% of the total. Most of the increased imports are covered through spot markets.

Gas Companies

In 2010, Swissgas AG supplied 67% of total gas imports, followed by Gasverbund Mittelland AG (GVM: 9%), Erdgas Ostschweiz AG (EGO: 10%), Gaznat SA(11%) and AIL (3%). Swissgas is also responsible for representing common interests of the Switzerland's gas industry abroad. Main shareholders of Swissgas are GVM, EGO and Gaznat (25.98% for each), followed by Swiss Gas Association (VSG: 16.45%) and Erdgas Zentralschweiz (EGZ: 5.61%).

Concerning the retail market for gas in Switzerland, there are 106 local distributors (mostly public companies) and a few industrial customers. In 2010, the 9 largest utilities sold half the amount of total gas, while the 42 smallest utilities dealt with only 10% of the total sales. As around 40% of the total gas consumption is covered by interruptible contracts with dual-fired consumers, those amount could be saved in a gas supply disruption.

4.2 Natural gas supply infrastructure

Ports, LNG Terminals and Pipelines

Given that Switzerland is a landlocked country, there is no LNG terminal in Switzerland.

Switzerland's gas pipelines network accounts for about 18,432 km, which includes 2,240 km of high pressure grid (more than 5 and up to 70 bar), 4,134 km of middle-range pressure grids and 12,058 km of low pressure grids. The natural gas grid network covers 69% of the Swiss population.

Although Switzerland has 12 active cross-border feeding points with the European gas pipeline network, some 70% of Switzerland's gas import (around 2.6 bcm/y or 7 mcm/d) comes through

² As there are no direct supply contracts with Russia, the Russian supply share has been calculated from the share of Russian supplies in the portfolios of Switzerland's foreign long-term contract partners.

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% of total share), Fluxys (46%) and Eon Ruhrgas (3%).

The Transitgas pipeline is used to transport natural gas for consumption in Switzerland and for transit from Germany and France to Italy. While the annual capacity of this pipeline accounted for 185 TWh (or around 16.7 bcm) in 2010, only some 13.5 % was used for domestic consumption. The compressor station in Ruswil has a compression capacity of 60 MW and is the operational centre to maintain and control necessary transporting pressure in Switzerland.

Preparations are underway to enable reversal flow of the Transitgas pipeline from South (Italy) to North (Germany and France), which will provide a strong degree of resilience in the event of a gas supply disruption north of the country. This project is supposed to be completed in 2015 (partial) and 2018 respectively (full).

Storage

As Switzerland’s gas importers are not required to have a storage capacity in terms of natural gas, all natural gas storage facilities in Switzerland are in the form of pipelines and spherical storages for daily balancing. However, in 2011 gas utilities had three projects for exploration of potential underground storage sites.

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

Natural Gas Infrastructure Map



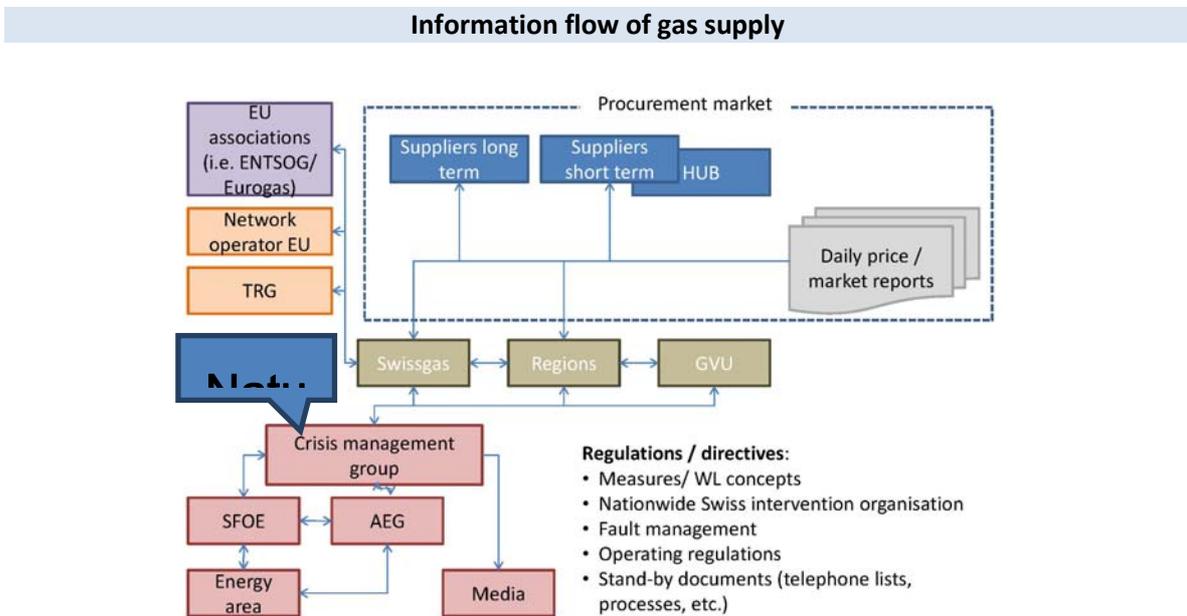
4.3 Emergency Policy for Natural Gas

The key elements of the Swiss gas security policy are a diversified long-term supply contract portfolio for Swiss gas companies, diversified cross-border intake points with connection to the three largest natural gas markets, compulsory stocks in the form of heating oil for fuel switching, an allocation scheme for large consumers, and demand restraint measures. The Federal Act on National Economic Supply (1982) and the Ordinance 531.215.42 on stock obligation of natural gas (2003) set the standard of gas supply security for suppliers. All gas importers are requested 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 (instead of gas) to a convenient third party; or
- participating financially in an existing heating oil compulsory stockholding, in proportion to its individual gas stockholding obligation.

As a result, the equivalent of 4.5 months of natural gas consumption is held in the form of heating oil stocks. These heating oil stocks are not categorized 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 coordinating 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 Energy Supply in cooperation with concerned authorities and gas industry.



Source: Swissgas

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. Switzerland strengthens diversification of gas supply resources and 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 fuel oils, based on a recommendation of the Delegate of National Energy Supply. Switzerland has around 7,000 dual-fuel gas installations mostly used in the industry sector. These dual fuel units accounted for around 41% of total natural gas consumption.

This fuel-switching measure may be implemented together with the release of compulsory stocks in the form of heating oil, as most of dual-fuel gas plants in Switzerland can be run with heating oil. The amount of heating oil stocks for gas emergency is around 500,000 cubic metres (or about 3.1 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, would apply light-handed demand restraint measures such as appeals to lowering heating temperatures and saving warm water. These measures aim at reducing gas consumption of small consumers such as households who would not be affected by the above mentioned measures.

INTERNATIONAL ENERGY AGENCY

The International Energy Agency (IEA), an autonomous agency, was established in November 1974. Its primary mandate was – and is – two-fold: to promote energy security amongst its member countries through collective response to physical disruptions in oil supply, and provide authoritative research and analysis on ways to ensure reliable, affordable and clean energy for its 28 member countries and beyond. The IEA carries out a comprehensive programme of energy co-operation among its member countries, each of which is obliged to hold oil stocks equivalent to 90 days of its net imports. The Agency's aims include the following objectives:

- Secure member countries' access to reliable and ample supplies of all forms of energy; in particular, through maintaining effective emergency response capabilities in case of oil supply disruptions.
- Promote sustainable energy policies that spur economic growth and environmental protection in a global context – particularly in terms of reducing greenhouse-gas emissions that contribute to climate change.
 - Improve transparency of international markets through collection and analysis of energy data.
 - Support global collaboration on energy technology to secure future energy supplies and mitigate their environmental impact, including through improved energy efficiency and development and deployment of low-carbon technologies.
 - Find solutions to global energy challenges through engagement and dialogue with non-member countries, industry, international organisations and other stakeholders.

IEA member countries:

Australia
Austria
Belgium
Canada
Czech Republic
Denmark
Finland
France
Germany
Greece
Hungary
Ireland
Italy
Japan
Korea (Republic of)
Luxembourg
Netherlands
New Zealand
Norway
Poland
Portugal
Slovak Republic
Spain
Sweden
Switzerland
Turkey
United Kingdom
United States



International
Energy Agency

© OECD/IEA, 2012

International Energy Agency
9 rue de la Fédération
75739 Paris Cedex 15, France

www.iea.org

Please note that this publication is subject to specific restrictions that limit its use and distribution. The terms and conditions are available online at www.iea.org/about/copyright.asp

The European Commission also participates in the work of the IEA.