

HOW VULNERABLE IS SWITZERLAND'S ENERGY SUPPLY?

THE WAR IN UKRAINE MAY JEOPARDIZE GAS AND ELECTRICITY SUPPLY

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SUMMARY

- › With no fossil or nuclear fuel resources of its own, Switzerland imports around 80% of its primary energy supply.
- › Petroleum products, electricity and natural gas account for the bulk (84%) of Swiss final energy consumption.
- › We do not expect the upcoming embargo on Russian oil to induce shortages in Switzerland, although it poses an additional constraint on an already tense market.
- › Switzerland is highly dependent on France for electricity imports during winter. This may become an issue should the state-owned French utility EDF struggle to bring nuclear reactors back online that have been shut for a variety of reasons.
- › Domestic nuclear production is less problematic; Swiss inventories of uranium are ample, and the country can source nuclear fuel from other producers if it needs to.
- › Natural gas is the energy source most exposed to supply risk in the months to come due to Switzerland's high reliance on Russian imports and lack of storage capacity.
- › Swiss authorities have taken steps to increase storage capacity, secure additional supplies and encourage energy saving, on top of drafting contingency plans
- › For the first time in decades, Europe's fate may be out of its hands to some extent as far as energy supply is concerned. The hope must be that we have a mild winter.

Switzerland is highly reliant on energy imports

Assessing Switzerland's energy vulnerability in the wake of the Ukrainian conflict needs to start with an overview of energy supply and consumption in the Alpine state. Swiss primary energy¹ supply in 2021 amounted to approximately 1 million Terajoule (TJ), and is dominated by petroleum products (26%), followed by nuclear fuel (20%), hydroelectric power (14%), natural gas (13%) and crude oil (10%). By way of comparison, Switzerland consumes a similar proportion of oil and oil products to the EU (36%) but is less dependent on natural gas and coal.

Since Switzerland does not have significant fossil or nuclear-fuel resources of its own, **around 80% of its primary energy is imported**, leaving it vulnerable to supply disruptions that may arise for geological, meteorological, logistical or geopolitical reasons.

¹ Primary energy includes all energy products not transformed, directly exploited or imported. It mainly includes crude oil, oil shale, natural gas, solid mineral fuels, biomass, solar radiation, hydraulic energy, wind energy, geothermic energy and the energy taken from uranium fission (source: INSEE)

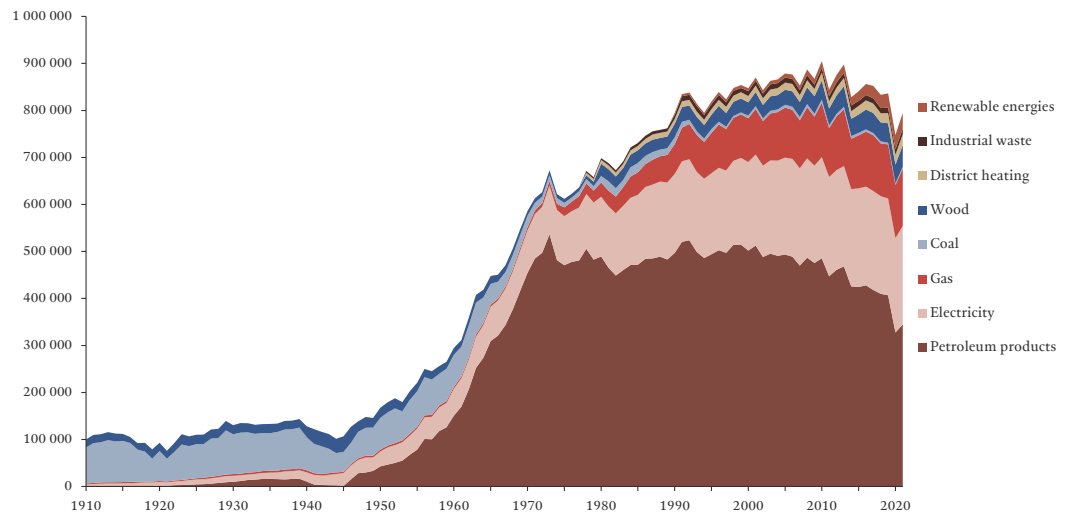
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CHART 1: FINAL ENERGY CONSUMPTION IN SWITZERLAND (1910-2021)



Source: Pictet WM-CIO Office & Macro Research, Office Fédéral de l'Énergie. August 2022

After transformation (e.g. refining crude oil into gasoline or hydro conversion into electricity), **petroleum products, electricity and natural gas account for the bulk (84%) of Swiss final energy consumption**, and are hence the focus of this Flash Note.

Already one of the least energy-intensive developed economies, Switzerland's energy consumption has been decreasing on an absolute basis by about 1% per annum since its 2010 peak.

Oil supply is unlikely to be a major concern over the winter

In Switzerland, petroleum is mainly consumed as a motor fuel or in the form of heating oil. Put another way, two-thirds of petroleum is used for transport and about 20% for residential heating.

Two issues could disrupt Swiss petroleum imports: the international sanctions imposed on Russian oil and the low level of the Rhine river, which has restricted barge traffic.

By following EU sanctions, Switzerland has pledged to ban imports of Russian crude oil and some refined petroleum products by the beginning of 2023. Since Switzerland does not directly import petroleum from Russia, this measure looks easy to implement in theory. Nonetheless, Swiss oil supply is indirectly exposed to Russia via its imports of petroleum products from EU countries (Germany in particular), which themselves source crude oil in Russia. Overall, we estimate that up to 18% of Swiss petroleum consumption could ultimately originate in Russia, with the actual figure likely in the 10-12% vicinity.

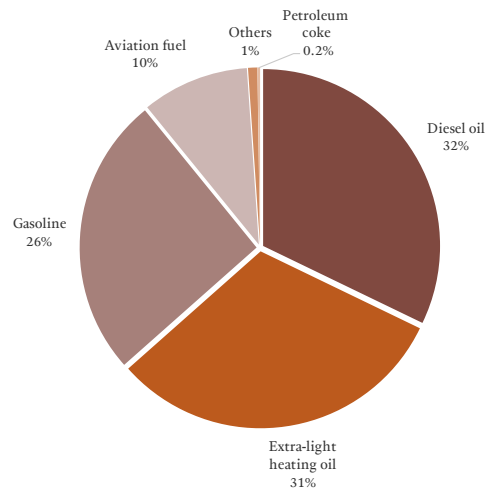
As the oil market is a large, liquid and globalised one, we do not expect the upcoming embargo to induce petroleum shortages for Switzerland, although it does add to existing tensions in the commodity market.

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CHART 2: CONSUMPTION OF PETROLEUM PRODUCTS (%)



Source: Office Fédéral de l'Énergie. August 2022

CHART 3: SWITZERLAND PETROLEUM IMPORTS (MIO USD)



Source: UN Comtrade. August 2022

The very low level of the Rhine this summer posed logistical challenges since 27% of Swiss oil imports travel through waterways. **However, this issue should sort itself out** — at least temporarily — as temperatures recede and water levels rise again in autumn and winter.

The fate of Switzerland's electricity supply is closely tied to France's

Electricity, which accounts for 26% of Switzerland's final energy consumption, is used in roughly even amounts by households, industry and services, and is therefore critical for all sectors of the economy.

Often dubbed "the reservoir of Europe", Switzerland is able to leverage its water resources to meet around 60% of its electricity needs. The rest is largely accounted for by nuclear energy (about 30%, but the Swiss voted in 2017 to phase out domestic nuclear plants), renewables and thermal energy.

Once again, Switzerland's Achilles' heel may be its reliance on imports. Although imports only cover a net 3% of its energy needs, Switzerland alternates between periods of significant energy imports and periods of significant exports. The country typically exports electricity in the summer, when domestic hydro-energy production is high, but imports up to 40% of its needs in the coldest months of the year. In addition to seasonality, Switzerland has also operated a day/night pattern for years, meaning it imports cheap surplus electricity at night from elsewhere in Europe, stores it in pumped storage facilities, and then consumers or re-exports it during the day when prices are high.

As Switzerland is particularly dependent on France for its electricity imports, supply may be affected this winter if French utility company EDF finds it difficult to bring

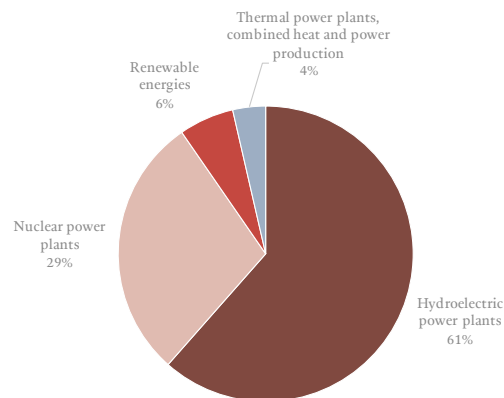
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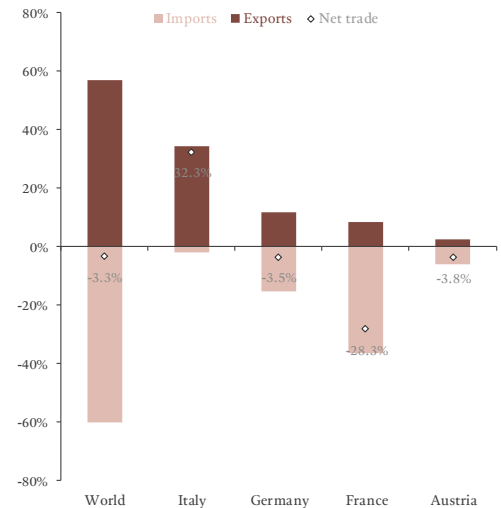
closed nuclear reactors back onto the grid. At the time of writing, 32 of France's 56 reactors were offline, 12 because of corrosion issues and the rest for regular maintenance.

CHART 4: SWISS ELECTRICITY PRODUCTION BREAKDOWN



Source: Office Fédéral de l'Énergie. August 2022

CHART 5: SWISS ELECTRICITY TRADE (% CONSUMPTION)



Source: UN Comtrade. August 2022

Domestic nuclear production appears less at risk at this stage. We estimate that up to 45% of the uranium used in Switzerland's four nuclear reactors may originate from Russia, but it should be possible to source alternative suppliers, at least in the medium-term. In addition, significant stores of both enriched and natural uranium abroad and on-site should compensate for any short-term shortage of Russian uranium.

A lack of storage capacity raises the risk of gas shortages

Switzerland relies a bit less than EU countries on natural gas (15% vs 22% of energy consumption) but **this is the source of energy that appears most exposed to supply risk in the months to come.** Households and services, which use natural gas as a heating source, are among the largest consumers in Switzerland (44% and 22% respectively), whereas the rest mostly corresponds to industry usage (32%). This implies that gas consumption is highly concentrated during winter months; 3/4 of annual consumption takes place from October to end March.

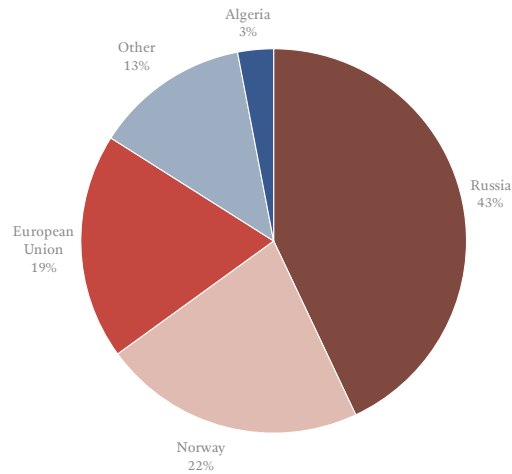
Switzerland's first source of vulnerability in gas supplies stems from its high dependence on Russian imports (it is estimated around **43% of natural gas consumed in Switzerland ultimately originates from Russia**). A shortage of natural gas in other European countries, for instance in Germany, would likely impact Switzerland since all its natural gas transits through Germany, France and Italy.

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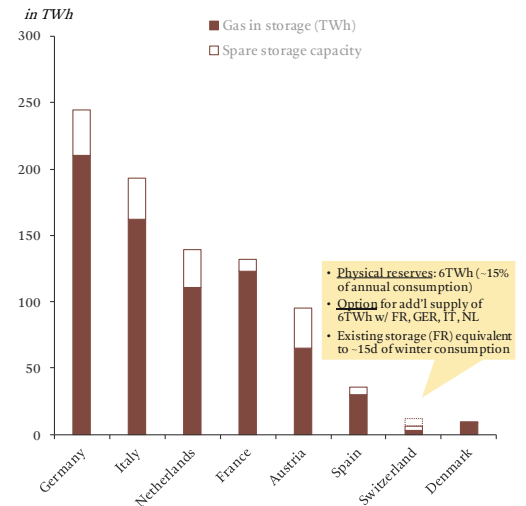
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CHART 6: ORIGIN OF SWISS GAS IMPORTS (2021)



Source: Association Suisse de l'Industrie Gazière (ASIG)

CHART 7: GAS STORAGE CAPACITY



Source: PWM - AA&MR, ASIG. 2 September 2022

Second, **Switzerland is enormously exposed to storage capacity issues.** Switzerland's physical reserves of natural gas, mostly stored in France, account for 6 TWh, or 15% of annual consumption, but this amounts to only about 15 days of winter consumption. The Swiss authorities are currently trying to double this capacity through options to acquire non-Russian gas from France, Germany, Italy and Netherlands. It is nonetheless clear that current gas storage capacity is insufficient and makes Switzerland reliant on its neighbours at a time when they themselves are facing gas shortages.

The Swiss Federal Council's decision to aim for a 15% voluntary gas consumption reduction in the winter months, which is in line with the EU target, should therefore be analysed in context of this tight interdependency.

Winter is coming

The war in Ukraine has triggered a worldwide energy crisis that is being most acutely felt in Europe, including Switzerland. As yet, it is not fully guaranteed that energy needs will be fully met this winter, particularly when it comes to natural gas and electricity.

The Swiss authorities have taken a number of measures to maximise gas storage, secure additional supplies where possible and reduce consumption as a precaution. Contingency plans and cross-border solidarity mechanisms with neighbouring countries are also being put in place to minimise the fall-out from possible energy shortages.

Nonetheless, and for the first time in decades, Europe's fate may be out of its hand to some extent as far as energy is concerned. The hope must be that we have a mild winter.

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