

# ENERGY SECURITY IN SWITZERLAND



## Policy Solutions for Prosperity and Innovation

*Written by:*

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# Abstract

Switzerland's diverse and stable energy sector, affordability, and energy security are increasingly at risk of being jeopardized by prescribed 'roadmaps' to decarbonize its economy. The recently adopted "[Climate and Innovation](#)" referendum indicates that Swiss consumers and industry must brace for higher costs and less competitiveness. Germany's controversial energy policy towards decarbonization and denuclearization should be a warning to Swiss policymakers.

The Consumer Choice Center has analyzed the Swiss Confederation's energy market and accompanying policies in this report. Our recommendations will help decision-makers and consumers secure a regulatory framework capable of adapting to emerging challenges, whether they are external problems (the supply shocks caused by the illegal Russian invasion of Ukraine and subsequent sanctions) or internal demands (increasing calls for measures designed to combat climate change). The ultimate goal is to ensure consumers benefit from cheap electricity bills and diverse choices brought about by product differentiation and reap the benefits of future innovation.

Our study begins with background information on Switzerland's recent and current energy situation before discussing the prevailing policy mentalities in the country and why they do not square up to the realities of the Swiss market. In doing so, we

illustrate the continuing importance of imported oil and natural gas to Switzerland, covering half of all Swiss needs, and why general imports of fossil fuels are crucial to any energy transition plan. The report then discusses the Swiss energy market in more depth. It stresses the essential role of nuclear energy and the importance of technology neutrality in vehicle regulations.

We urge policymakers to open markets to competition and progress via market-based price signals, technological innovation, and resilience through more choices, not fixed targets. In practical terms, the Consumer Choice Center recognizes the importance of energy imports, tech neutrality, and nuclear energy. Energy transition timelines should not be legally mandated but driven by technological and economic feasibility. We recommend keeping a diversified import portfolio, scrapping the nuclear power ban, and practicing non-discrimination between different technologies.



# Introduction

Swiss consumers and policymakers should embrace and continue the country's impressive record of generating, importing, and providing energy for businesses and households, making its renowned prosperity possible. Switzerland has the [cleanest electricity production system](#) of all 31 International Energy Agency (IEA) countries, with the least carbon dioxide emitted for every kilowatt of generated power.

Moreover, Swiss energy consumption is already 'decoupled' from population and economic growth, putting to rest the idea that economic growth is intrinsically tied to more pollution (and refuting the empirical claims of [degrowth](#) advocates). Although the country's population [has grown by 15%](#) and the economy has experienced a GDP growth of close to 32% measured in purchasing power parity since 2000, Switzerland's total carbon emissions [have declined by 18.3% from 1990 to 2020](#).

However, long-term complications are darkening its horizon; on the one hand, demands for climate change action have only grown over time. The Swiss federal government had already passed climate targets under the Kyoto Protocol and nationally determined contributions under the Paris Agreement, committing itself to [reduce greenhouse gas emissions by 20% by 2020 and 50% by 2030](#) to amounts last seen in 1990. Nevertheless, on the 21st of May 2017, Swiss voters [adopted the revised Federal](#)

[Energy Act](#) based on the [Energy Strategy \(ES\) 2050 plan](#), which aims to reduce carbon emissions per capita by 1.00 to 1.5 tonnes by 2050 via the use of renewable energy, further restricting the use of imported fossil fuels. The Energy Strategy also involves shutting down all four of Switzerland's active nuclear power stations, providing investment aid for renewable industries, and elevating renewables to the status of sectors of national interest. On the 18th of June 2023, [the Climate and Innovation Act](#) was accepted through referendum, enshrining the goal of carbon neutrality by 2050 into law, alongside financial compensation for consumers to reduce fossil fuel energy consumption and subsidies for companies to promote climate-friendly technologies.

On the other hand, Russia's invasion of Ukraine and Western sanctions have upended the European energy market, with significant knock-on effects for Switzerland. Before the 24th of February 2022, 43% of all its gas imports came indirectly from Russia through French and German intermediaries. The government [has responded](#) by ramping up its procurement of liquified natural gas from third-party countries, aiming to increase storage capacity, and waiving antitrust laws to allow companies to strike mutual agreements on supply. In 2024, consumer electricity prices could spike to [0.3 Swiss francs per kilowatt-hour for every household](#) due to the ongoing cost-of-living crisis across Europe and increasing procurement plus storage challenges.

Cheap and abundant energy is a core precondition for industrial competitiveness and allows consumers to spend money on other

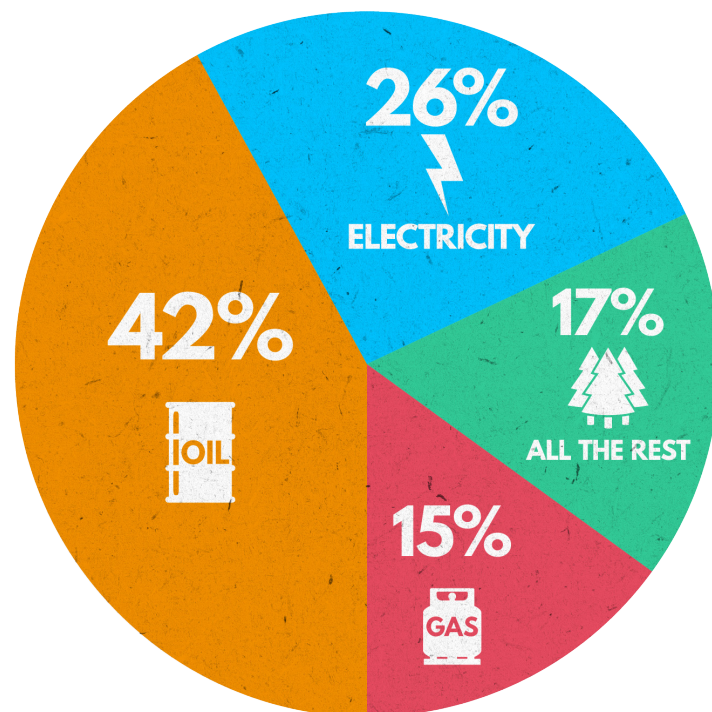
goods. The bi-annual “[Country Index Family-owned Businesses](#)” ranked Switzerland 4th among energy competitiveness in 2008 but only 15th in 2022. In the same period, Germany dropped from rank 11 to 18.

So far, [Swiss regulators’ thinking](#) has been driven by the [standard natural monopoly model](#), with a single provider supplying electricity at a decreasing cost once the provider has paid the upfront fees of installing power lines and building generators. The Swiss energy industry is overwhelmingly (90%) government-owned, with high barriers to entry and captive consumers alongside vast subsidies. The [June 18th referendum’s result](#) further paves the way for prescriptive energy policy mandating timelines by when certain areas of the economy must be carbon-neutral.

The ES 2050 recommends phasing out nuclear energy in favor of other carbon-neutral energy sources when wind, solar, or hydropower can only act as partial substitutes for nuclear power at best. We recommend abandoning old ideas in favor of dynamic regulatory thinking based on open competition and market signals, technological neutrality, resilience, and progress through choice and discovery. Regarding public policy, it recognizes the importance of fossil fuel imports for the Swiss economy, keeping nuclear power online, non-discrimination of tech alternatives, and international integration as the path to readily available, cheap, abundant, innovative, and diverse energy for all.

# Swiss energy policy and fossil fuel imports

Fossil fuels from abroad are essential to Swiss energy needs. The country uses up around 225 terawatts-hours of energy in total. Finished petroleum products used in transportation and heating provide the largest share of total final consumption at 95.81 terawatt-hours or 42% of final consumption. By comparison, gas only represents 33.97 terawatt-hours or 15% of the total consumption. As of 2022, Switzerland's gas is imported through platforms in the EU.



The same energy sources play an integral part in bridging energy transitions. According to the state's data, Switzerland has already turned from a net exporter of electricity in summer to a net importer of electricity in winter throughout its transition to the ES 2050 target, with net 5.7 billion kilowatt-hours imports in the first and fourth quarters (due to the low capacity of hydropower in the winter period, detailed in the section on nuclear power below). The government is even prepared to introduce gas or oil-fired combined-cycle plants (responsible for 9% of energy production currently but set to rise if no other options are available). Despite

the ES 2050's lofty ambitions of 'clean power,' at least [one IEA report](#) anticipates Switzerland importing more fossil fuels, not less, due to its climate targets.

Thus, any plan for self-sufficiency is doomed to failure from the start. Producing all of one's needs domestically would need to fill the large 95.81 terawatt-hour energy gap, costing ordinary consumers tens of billions of Swiss francs only to generate inefficient and more polluting power than buying affordable, higher-quality products abroad.



# Swiss domestic production

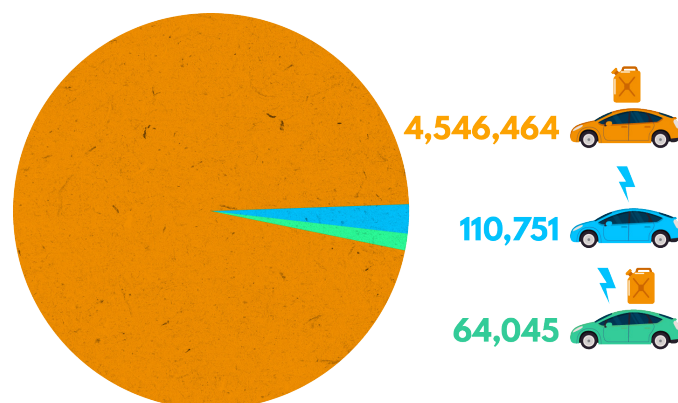
The remaining total energy consumed comes from domestic production. 56.8% of all domestic energy generation comes from the country's 682 hydropower stations and 220 dams (Switzerland has the highest density of dams worldwide), with nuclear power accounting for 34%. The rest comprises a mix of renewables (solid wood fuel, biofuels for transportation, wind, and solar installations) and an assortment of conventional thermal power plants. [90% of all these services](#) are owned by the government either wholly or as a majority shareholder stake in the company, with the infrastructure supported by vast subsidies (such as the 1.3 billion Swiss francs awarded to renewable heat supplies, building systems, construction of grids, and so on). Instead of promoting a diversity of options, regular consumers are not allowed to choose anything other than their local supplier.

Supply and demand do not determine prices alone, as they should. They function more as electricity tariffs that municipalities charge based on energy, transmission, royalties, carbon taxes, and price ceilings. Producers must pay high royalties to the cantons and communes. There is also a carbon levy on stationary fuels such as heating oil and natural gas, minus their use for transport, meant to discourage the use of fossil fuels. The levy features an automatic upward adjustment if Switzerland does not reach its climate goals on time. The high royalties and carbon levy are intended to aid its cost-recovery efforts, partially covering expensive subsidies. All consumers are legally guaranteed access to the network, with the government promising minimum quantities of electricity and “fair prices.”

# Energy in Mobility

One area that perfectly illustrates the shortcomings of this mentality is that of car and transport policy. True to its commitments, the Swiss state has done its best to encourage the adoption of electric vehicles (EVs), reckoning that markets have undervalued the technology despite its vast environmental potential. Local authorities [have waived](#) the motor vehicle tax for EVs altogether, exempting them from [7.7% VAT](#), with cantons like Bern offering [infrastructure subsidies](#) (20,000 Swiss francs per charging station and 60,000 for every location) and Basel-Stadt reimbursing 20% off the purchase of pure EVs. Conversely, the government imposes [excise taxes of](#) 76.82 Swiss cents per liter for unleaded petrol and 79.57 per liter for diesel.

Even with this effort, consumers have been slow to pick up electric vehicles or to give up on their old cars. Only [110,751](#) passenger cars in 2022 were EVs and 64,045 hybrids, a small number compared to the total pool of 4,721,280 automobiles.



Novel fuel-efficient technologies have kept Swiss pollution lower than any government-driven plan. One instance is the growth of biofuels (such as bioethanol, biodiesel, vegetable, and animal oil), used independently or mixed with fossil fuels, to a total of

[3.2% of transport energy consumption](#). Yet another case is the increased efficiency of conventional engines. Diesel engines can now convert [42% of the combustion generated by the fuel](#) into engine power (compared to 36% of power in the 1960s), while gasoline motors can reach [35% efficiency](#). Together, these technologies have helped reduce the country's share of global carbon emissions to a [mere 0.09%](#).

By contrast, subsidizing electric vehicles for climate targets will create unintended negative consequences. For one, encouraging companies to produce more cars than would be the case under normal market conditions leads to energy inefficiencies and vulnerabilities. After all, the charging stations behind plug-in EVs need regular fuel sources too. Ironically, the artificial mass adoption of EVs would drastically increase Swiss consumer demand for natural gas past the current system's storage capacity or available imports (comparable to the 20% surge in natural gas demand in the United States, highlighted in [a 2018 McKinsey report](#)). Faced with a sudden and severe gas shortage at the end of 2022, the Swiss government even [planned to limit](#) the use of electric vehicles unless urgently needed. Instead of creating abundant clean energy, subsidies leave consumers energy-poor and vulnerable.

Of course, none of these points deny electric vehicles' positive side, like eliminating all active emissions. Relying solely on EVs as part of national transport policy is misguided. Swiss federal authorities should respect consumers' wishes as the more efficient energy-balanced path and refrain from promoting a particular technology.

# Keep nuclear on

The Energy Strategy plans to phase out all nuclear capacity completely. Switzerland had already deactivated [one of its nuclear reactors in 2019](#). Following the adoption of ES 2050, no new stations will receive licenses to operate, and the country will shut down the remaining four reactors - two pressurized water stations at [Beznau](#), another one at [Gosgen](#), and a boiling water reactor at [Leibstadt](#) - at the end of their working life. Assuming an average operating duration of 60 years ([the IEA's estimate](#) based on similar US plants), all stations will be offline by 2044.

Contrary to common fears, nuclear energy in Switzerland has a spotless safety track record, with the country's reactors passing all stress tests for natural disaster scenarios under the [EU's Nuclear Safety Regulators Group](#).

Nuclear power also represents much of the country's energy generation. Average electricity generated hovered around [28.8%](#) of the total figure in 2021. Nuclear power further constitutes [45% of all domestic energy](#) during winter (when consumer demand is at its highest). The plants consume between [250 to 350 tonnes](#) of uranium annually, representing about a third of total operating costs. Even assuming the unrealistic scenario in which demand for electricity stays the same, the IEA suggests that disconnecting the nuclear reactors leaves an annual gap in energy production of twenty terawatt-hour. This supply gap will have



to be replaced by a source of energy that is equal in power.

Supposedly, the answer comes from more investment in renewables. The [ES 2050 provides](#) feed-in tariffs, a guaranteed above-market price for renewable producers, and investment aids for small photovoltaics to encourage the switch to green alternatives.

Nevertheless, the plan is unfeasible and highly pricey. Switzerland does rank [fourteenth worldwide](#) in terms of renewable energy thanks to hydropower. As such, policymakers believe that hydroelectric plants are more than enough to cover the absence of nuclear. Yet hydropower is less effective during winter and realistically can [only increase by one additional TWh/year](#).

Other renewable systems are woefully lacking as well. On the one hand, they are in a much lower supply than hydropower. Hence, Switzerland is second last in terms of wind energy among IEA members. The output from solar is even less impressive. Unsurprisingly, renewables have consistently not lived up to their estimated targets – policymakers hoped that renewables minus hydropower would generate 11.4 terawatt-hour by 2035. Still, they barely put out a measly [3.2 terawatt-hour \(1.2 terawatts lower than the 2020 target\)](#).

If nothing else, the case of Germany serves as a real-life reminder that atomic energy provides a baseload renewables cannot hope to match. [On the 15th of April 2023](#), Germany decided to

close down its three remaining nuclear reactors at Emsland, Neckarwestheim 2, and Isar 2. Far from ushering in a greener outcome, the closures allowed coal to jump to [a third of German electricity generation](#). At the same time, renewables continued to [lag behind](#) the German government's supremely optimistic target of generating 80% of all electricity from green sources. The decision has left German households more exposed to energy woes than they could have been, with each home paying [0.3279 euros per kilowatt-hour](#). Further spikes in German energy prices have not entirely made it to consumers yet due to price caps on household gas and temporary fuel price discounts paid by the taxpayer. Swiss policymakers should learn from Germany's lesson and not make the same mistake themselves.

# Conclusion: Technology Neutrality is Key

In the current debate, decarbonizing the energy supply is too often cited as the priority. As the report has helped illustrate, policymakers should pay more attention to the costs to consumers and the oppressive impact their policy model has on the competitiveness of domestic industries. Germany should be the canary in the coal mine for decision-makers in Switzerland: Its narrow approach to hand-pick ‘future’ and ‘transitioning’ energy sources was not fit to absorb and adjust to external shocks as the current Russian invasion in Ukraine. Germany’s industrial competitiveness has massively suffered from its prescriptive energy policy. In 2022 alone, chemical production outputs [decreased by 10%](#), and large companies such as BASF plan to move more and more factories to China and the US. Switzerland should take a different route than Germany and foster industrial competitiveness, which could attract more investments instead of losing production sites to China and the US.

Instead of the rigid old model, the Consumer Choice Center recommends that Swiss policymakers adopt a dynamic mentality centered around the market process of prices and profit and loss, tech openness, resilience, and progress through consumer choice.

**Technology neutrality and openness are essential guidelines for successful policy. The failures noted in this text show that it is presumptuous to set concrete planned targets by which date a particular energy source will be “phased out” in the first place. Technological innova-**

**tion and consumer choice through market-based price signals are the solutions for a) energy security and b) adapting both promising and economical energy sources.**



- In practice, decision-makers should avoid trying to remove fossil fuel-powered cars, heating, and nuclear energy. They should reverse the decision to shut down all four remaining atomic reactors, begin granting licenses to new stations, and embrace and support developing promising breakthroughs in nuclear power, like small modular reactors. Moreover, they should scrap consumption-level distortionary taxes like fuel excise duties and electric vehicle subsidies on automobiles. This plan includes the non-discrimination of individual technologies moving forward as the best solution for Switzerland.
- Regarding imports, the policy course of action we recommend is diversifying energy procurement, leaving Switzerland more resilient to external supply shocks. This way, the importance of oil suppliers like the United States, Libya, or Kazakhstan can rise or decline based on geopolitical factors and their domestic policies (OPEC output, accidents at significant refineries, and electoral changes) without affecting Switzerland.



We are confident that such market openness will produce cheaper, cleaner, and more abundant energy in the medium to long term. The history of advancement has shown that such revolutions cannot be planned, and timelines cannot and should not be clearly defined. Just as there was no timetable for how long the car would take to replace the horse-drawn carriage or email to replace the letter, there will be no timetable to make Switzerland pollution-free; consumers, not self-described natural monopolies, can make that change.

# ABOUT THE AUTHORS

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Emil is Research Manager at the Consumer Choice Center. He successfully defended his PhD in Political Economy (Research) at King's College London in 2022.

Prior to working at the Center, Emil was a Teaching Assistant at King's College London, where he taught students on contemporary issues at the intersection of philosophy, politics and economics. He was also a Frederic Bastiat Fellow/Research Fellow at George Mason University's Mercatus Center. In the past, he has published and helped publish academic research on incentives, knowledge problems and public policy.

## Frédéric Jollien



Frédéric Jollien, is a Swiss Policy Fellow with the Consumer Choice Center. He has spent the last fifteen years promoting free market and individual liberty in Switzerland through different organizations.

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## Frederik Roeder



Fred Roeder is a consumer advocate at heart. He has been working in the field of grassroots activism for over ten years. He is a Health Economist from Germany and has worked in healthcare reform in North America and Europe. One of his passions is to analyze how disruptive industries and technologies allow consumers more choice at a lower cost. He also loves researching how innovation makes our lives better.

Fred is very interested in consumer choice and regulatory trends in the following industries: Consumer Goods, Healthcare, Sharing Economy, Airlines.

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## Luca Bertoletti



Luca graduated with a degree in Political Science from the University of Milan in December 2014. He worked as a Business Economics Analyst for the Italian magazine TheFielder in Milan and as Think Thank Coordinator for a think tank in Vienna (Austria).

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