

Fossil fuels and renewables incur similar future costs

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Whether Switzerland opts for fossil fuels, renewable energy or nuclear power, the cost will be about the same in 2050. As shown by an energy calculator developed at EPFL. Credit: Thinkstock

Are renewable energies coupled with energy efficiency too expensive? Regardless of whether the Swiss people choose a future based largely on fossil fuels, nuclear power or a combination of renewable energy sources, the cost of our future energy system is not likely to vary much.



At least that's what Energyscope.ch, the energy calculator developed by EPFL, has determined.

Between now and 2050, the Swiss <u>energy system</u> is going to undergo fundamental changes in view of the decision of the Federal Council and Parliament to forgo nuclear power and their commitment to reduce <u>greenhouse gas emissions</u>. Switzerland's <u>future energy</u> system will have to fulfill these objectives. The Energy Center and the IPESE lab have developed a calculator to assess various alternatives for this <u>energy</u> <u>transition</u>. It can be used to compare their impact in terms of CO2 emissions, energy independence, the balance of energy payments, and costs. This last indicator includes the cost of importing energy-related agents (petroleum products, electricity, uranium, etc.) and infrastructure costs (power grids, production units, etc.).

It turns out that an energy system based largely on fossil fuels, nuclear power or a combination of <u>renewable energy sources</u> and <u>energy</u> <u>efficiency</u> will all cost about the same. The differences are less than 10% (see first graph), which is within the estimates' margin of uncertainty. "This result is not really surprising," according to François Vuille, director of development at the Energy Center. "This is mainly because <u>renewable energy</u> (especially photovoltaic solar power) and energyefficiency solutions (electric vehicles, for example) will be increasingly competitive. The cost of these technologies will continue to decline, while the cost of conventional solutions are likely to increase, in part because of the high cost of new nuclear technologies and the long-term rise in the price of finite resources (petroleum, gas, etc.)."

If the scenario of renewable energy combined with energy efficiency is eventually selected, it would certainly lead to a rise in investments. But that rise would be offset by a decrease in the amount paid to import fuels (graph 1). If the nuclear scenario is chosen, replacing our <u>nuclear power</u> plants with new, safer, more efficient and more expensive ones would



lead to a significantly higher production cost than today, even if the amount of the increase is difficult to estimate.



The total bill will go up but remain flat per capita

It should also be noted that, given the volatility of market prices, the costs associated with scenarios that depend on non-renewable resources are the least predictable. On the other hand, solar and wind energy are free resources and their operating costs are very low and largely



predictable. That said, the extent to which the cost of renewable-energy equipment will decline by 2050, especially for photovoltaic and deep geothermal technologies, is difficult to quantify today.

Energyscope.ch, the online calculator, also shows that the future energy system, whichever one is chosen, will cost between 24 and 26 billion francs per year (excluding taxes), versus 22 billion francs today. This increase is related mainly to the growing population, which should rise from around 8 million today to some 9 million in 2050. Looking at percapita figures, however, the annual cost will be about the same as today: between 2,700 and 2,900 francs in 2050 versus 2,700 francs today. This figure includes the cost of energy (gas, oil, electricity, etc.), equipment (heat pumps, etc.) and infrastructure (grids, power plants, etc.).

All the other indicators vary

While the economic parameter is relatively unaffected by the selected scenario, the same is not true for the other indicators: in the future scenarios, all the other indicators vary significantly depending on the energy choices. The selected system will have a major impact in terms of CO2 emissions, the environmental footprint, supply security and the balance of energy payments. The CO2 impact, for example, could vary by nearly 70% between a highly renewable scenario and a scenario based largely on fossil fuels (see second graph). The level of energy independence varies to the same degree, while end consumption and the environmental impact of our waste vary by around 30% among the different scenarios.





Annual impact of the energy system

Provided by Ecole Polytechnique Federale de Lausanne

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