

Nuclear Power? Not Even 2 Percent of the World's Final Energy — Irrelevant!

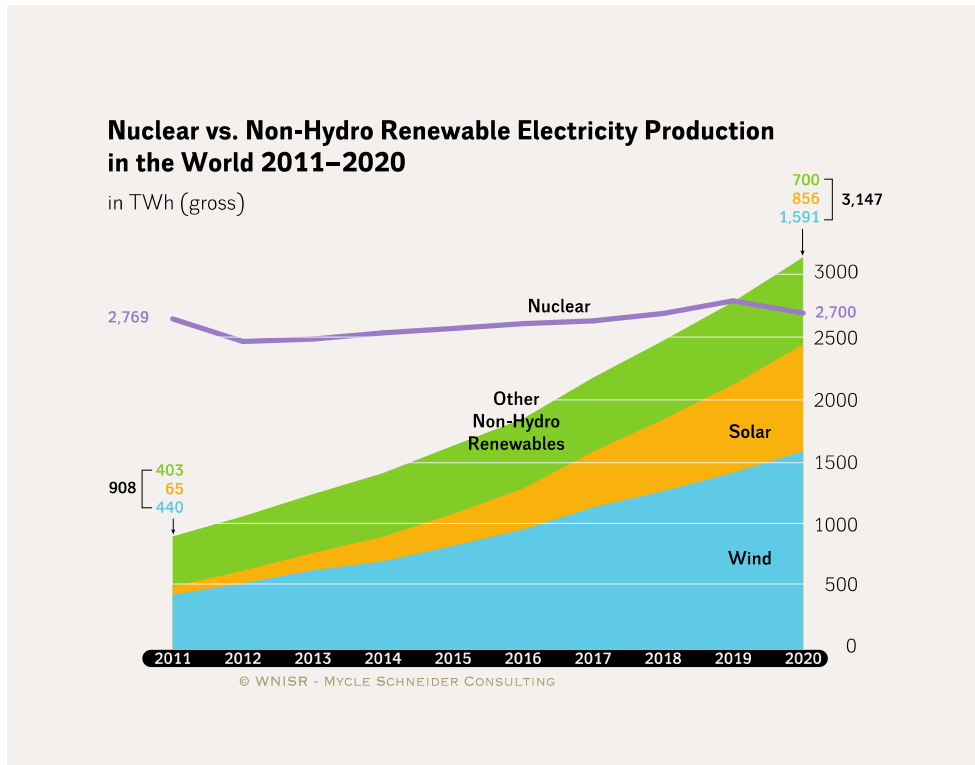
In 2019, for the first time in history, worldwide modern renewable energies produced more electricity than nuclear power plants. The latter contribute less than 2 percent of the energy available to consumers—a declining trend. Nuclear power is becoming irrelevant.

Nuclear power plays a marginal role in the global energy sector. Five out of six UN member states get their electricity entirely from other sources. Just a handful of countries account for three quarters of global nuclear electricity generation. The US and China, the top two alone, account for nearly half.

Nuclear power plants generate around ten percent of the world's commercial electricity. After 20 years of decline, their share – still at 17.5 percent in 1996 – has remained constant over recent years. But things will not stay as they are for long. There was another remarkable, if not historical, development in 2019: For the first time ever, electricity generation from 'new renewables' – which primarily include wind, solar and biomass – outstripped nuclear power. And this calculation does not even include large hydropower plants. These alone produced 60 percent more electricity than nuclear fission.¹

¹ 10.39% to 10.35%. BP, 'Statistical Review of World Energy 2020: a pivotal moment', 17 June 2020, see <https://www.bp.com/en/global/corporate/news-and-insights/press-releases/bp-statistical-review-of-world-energy-2020-published.html>, status 26 June 2020.

Figure 1: New renewables outpace nuclear power plants in global electricity production



Sources: Statistical Review of World Energy 2020 (BP), World Nuclear Industry Status Report (WNISR), 2020

After global nuclear electricity production slumped in the wake of the 2011 nuclear disaster in Fukushima, 2019 saw a return to previous levels, only to drop again, by 4 percent in 2020, below the level of 2011. In the meantime, new renewables managed to increase their electricity production by a factor of 3.5 (see Figure 1).

The electricity mix on the national level varies greatly from one country to another. Only three countries – France, Slovakia and Ukraine – generate more than half of their electricity with nuclear plants. The share is less than 20 percent in the US, and below 5 percent in China.² Austria has never had its own functional nuclear power plant; instead, renewable energy sources (including hydropower) contribute nearly three quarters of the electricity generated there today.

² The source for Germany is the German Association of Energy and Water Industries (BDEW): Net electricity generation in Germany, as of March 2020.

The terms electricity and energy are often confounded or incorrectly used as synonyms. When speaking of energy, it is important to distinguish between primary and final energy. Even in most industrialised countries, electricity makes up less than one quarter of final energy consumption, and at the global level, the power share is less than one fifth.³

Biomass, natural gas, coal, and oil are primary energy sources directly burnt for heat or electricity generation or for use in the transport sector. Solar, wind, water and uranium are mainly used to produce electricity. Nuclear power plants are very inefficient machines. Two thirds of the primary energy generated is lost as waste heat. Losses are also incurred in the transmission and distribution system. The 'final energy' ultimately made available to the consumer – the electricity from the sockets – is only a fraction of the 'primary energy' originally introduced.

The share of heat generated by fission in nuclear power plants makes up only about 4 percent of the world's commercial primary energy consumption.⁴ Its proportion in terms of global final energy can only be estimated, since a substantial share of energy sources are not commercialised, predominantly biomass in Africa and Asia, or the countless stand-alone solar systems around the world that generate their own electricity but are not included in any statistics.

With a share of over 40 percent of final energy, oil comes out on top by far in such estimates. Once natural gas and coal are factored in, fossil sources still account for two thirds. Nuclear power plants provide less than 2 percent of final energy.⁵

Even in France, a country touted as a shining example by the nuclear community, nuclear power only accounts for one sixth of final energy⁶ — and is continuing to decline. At 43 percent, oil remains the French market's dominant energy source. On that account, the

³ IEA, 'Key World Energy Statistics, 2020', 2020.

⁴ BP, 'Statistical Review of World Energy 2020: a pivotal moment', 17 June 2020, see <https://www.bp.com/en/global/corporate/news-and-insights/press-releases/bp-statistical-review-of-world-energy-2020-published.html>.

⁵ *Commercial* electricity accounts for 19% of final energy. Nuclear power accounts for one tenth of this 19%, i.e. 1.9%. Bearing in mind that *non-commercial* final energy is not included or included only in part, the real share of nuclear power is even smaller than that.

⁶ Electricity accounts for just under 25% of final energy in France. Nuclear power plants generated 70% of this 25% in 2019, i.e. around 17% of final energy.

oil share in the stronghold of nuclear power is as high as in Germany and higher than the global average.

The negligible share of final energy consumption begs the question why nuclear electricity is not being quickly replaced by energy efficiency or electricity from other, sustainable energy sources. As France demonstrates, even the biggest nuclear power programme does not lead to greater independence from climate-disrupting fossil fuels.

Many cities are no longer willing to wait for their reluctant governments. In South Korea, Seoul has demonstrated in less than two years how boosting energy efficiency and pushing renewable energy sources can replace the output of a nuclear power plant. Its programme was called “One Less Nuclear Power Plant”.⁷

⁷ 2 million-tonne reduction in oil equivalents; Seoul Metropolitan Government, 'One Less Nuclear Power Plant (OLNPP) – Reframing Urban Energy Policy – Challenges and Opportunities in the City Seoul', 2017, see <https://www.ieac.info/IMG/pdf/2017smg-olnpp-book-lr-c.pdf>.