FRANCE'S ENERGY DILEMMA

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Introduction

On December 30, 2017, France adopted a law banning the exploration and exploitation of fossil fuels as of 2040 even though domestic hydrocarbons represent at best only one day of the country's yearly consumption.[1] Therefore, the move is essentially symbolic. Indeed, France's energy dilemma does not reside in its fossil fuel production. It sits in the necessary buildup of a stronger renewable capacity and in the gradual scaling down of its unique nuclear electricity production capacity.

Today, about two-thirds of France's electricity is supplied by nuclear reactors (71.6% in 2017) with 58 reactors operated at 19 sites. In 2017, the balance broke down as follows: fossil fuel (10.3%), hydraulic (10.1%), wind (4.5%), solar (1.7%), and biogas (1.7%) thus making about 90 percent of the country's electricity production already low carbon.[2]

Pursuant to the Energy Transition for Green Growth Law adopted in 2015, France must now tilt the scale toward renewables in the next decade or so.[3] On the one hand, by 2025 the production of nuclear electricity must be brought down to 50 percent.[4] On the other, in line with the EU's renewables objective of 27 percent by 2030, France contemplates reaching 23 percent of its final consumption from renewables in 2020 and 32 percent by 2030. If it goes as planned, by 2030, renewables should represent 40 percent of the electricity production, 38 percent of the final heat consumption, 15 percent of the final fuels consumption, and 10 percent of the natural gas consumption.

The Challenge of "Denuclearization"

France is already off schedule with its renewables program. Critics argue that "the nuclear lobby" is strongly at play in delaying any significant progress in the R&D, financing, and development of a meaningful solar and wind capacity. At the same time, ageing nuclear reactors must undergo the retrofit and modernization necessary to carry them another 50 to 60 years forward (the so-called *Grand carénage* program). The price tag estimated by *Electricité de France* (EDF) is €55 bn worth of maintenance investments (2014–2025). The choice between maintaining the country's nuclear capacity and curtailing its installed nuclear fleet while boosting renewables can hardly be delayed any longer.

As of today, 13 of the reactors built since 1955 have been permanently stopped, nine of which are currently being dismantled. Bringing nuclear electricity production down to 50 percent in 2025 would mean shutting down no less than an additional 17 units. In 2017, a parliamentary report reviewed potential decommissioning costs estimated by EDF.[5] Lawmakers found discrepancies between costs already registered in real-life decommissioning operations and EDF figures. Other European nuclear reactor operators estimate decommissioning costs at between €900 million and €1.3 bn per reactor while EDF estimates €350 million per reactor. The end of the debate is nowhere in sight. On November 7, 2017, Nicolas Hulot, the current Environment Minister announced that the 2025 objective would be "difficult" to comply with and that it might entail delaying the closure of coal-fired production plants and restarting certain fossil fuel thermal plants. The Minister further indicated that the government was going to work on a 2030–2035 postponement. This announcement triggered a barrage of criticism from environmental nongovernmental organizations pointing to the repeated blows that such backtracking inflicts on the development of renewables.

France's Defiance vis-à-vis Renewables

In a country with virtually no energy resources, French households have nevertheless gotten used to a plentiful electricity supply. For these consumers,

the average cost per kilowatt is about half that of their German neighbors (€0.171 vs. €0.298 in 2016), while industrial consumers pay about the same price (€0.089 vs. €0.094).

However, the formation of the price for a portion of the electricity supply in France is far from being market driven. Indeed, residential and small business consumers (a mere 26.5 million households and 3.3 million small businesses representing 82 percent of the whole segment of such consumers) still benefit from the so-called EDF blue rate (*Tarif Bleu*). This tariff is administered by the government, which maintains it at artificially low levels based on social considerations. While access to energy for vulnerable low-income customers is now secured via ad hoc schemes, it will become increasingly difficult to uphold the blue rate which is further incompatible with EU competition principles.

The tariff situation and the relatively low price of the nuclear MWh (€59.6 in 2013) are consistent with the limited development of an affordable renewables offer. The difficult balance between the need to develop renewables and the presence of such a massive nuclear electricity production tool is illustrated by the steady increase of the blue rate over the last 15 years. On the one hand, this increase is due to the passing on to the consumer of the cost of modernization of nuclear power plants. On the other, since 2003, it reflects the gradual increase in the so-called Contribution to the Public Service of Energy fee (CSPE) levied on each electricity bill which finances the development of renewables (an estimated €100 per capita/year).

From a marketing perspective, conscious of a more ethical and greener demand, existing operators have diversified the range of options for green electricity while mounting competition now presents a range of offers (including green electricity) at tariffs 3 to 15 percent lower than EDF's.

Yet, compared with Germany in particular, renewables have somewhat remained anecdotal in France. In 2016, renewable sources secured only 19.6 percent of France's electricity consumption (4.3% wind, 1.7% solar, and 12.2% hydro) while France is easily outranked by its neighbors: Spain 38.7 percent, Germany 33.8 percent, and Italy 33.4 percent. Germany has an installed wind capacity of 50 GW and solar capacity of 40 GW while France's capacities from these sources are, respectively, 11.7 GW and 6.8 GW. With 360,000 installations and longer sunlight hours annually, France stands behind the UK, which has 900,000 installations representing 11 GW. In 2016, France's renewables-connected load even stagnated at its 2010 level.

France's weak development of renewable energy capacity is the combined result of poor tax incentives, burdensome administrative procedures, and legislative uncertainties. For the country to meet its target of 32 percent renewables in 2030, it would need to install an additional 14,000 wind turbines while only 5000 are in operation today. France still has no offshore wind turbine despite its 4700-kilometer coastline, one of Europe's longest. The development of onshore wind turbines continues to be hampered by military and civil aviation obstacles while 70 percent of the permits are crippled by legal action. The development of a wind farm in France requires 7 to 9 years contrasted with 3 to 4 years in Germany. Solar projects suffer too. In the 0–9 kWp segment, the installation of roof-mounted residential installations dropped from 28,900 in 2012 to 14,500 units in 2015. The decline is attributable to decreasing repurchase prices since 2011, the removal of these installations from a tax credit scheme in 2013 and, sadly, to massive sales of defective equipment on the market that discouraged homeowners from solar installations.

A Government Plan to Boost Renewables

The government announced in early January 2018 a package of measures designed to boost the development of renewables. The plan vows to simplify procedures, increase production, and foster innovation to accelerate the energy transition.

Major simplification measures are contemplated for offshore wind farms. "Envelope permits" will be created to allow projects to evolve and be modified within defined limits in terms of installation and connection to the grid (as the current permit system is too rigid to allow departures from the original submission). Earlier and improved public consultation procedures will be enforced to secure greater project awareness and social acceptability. The legal framework governing the connection of these projects to the grid will be adapted to anticipate the connection and limit risks of delays that too often hamper the financing of offshore wind projects today.

Developing the production of solar electricity is a key item of the plan. With more competitive production costs, the share of solar in France's energy mix is expected to increase. Ambitious targets have been set for 2023: 18.2 to 20.2 GW of installed capacity (vs. only 7.7 GW as of Sept. 30, 2017, up 0.9 GW from the end of 2016). In the context of the Multiannual Energy Plan (*Programmation Pluriannuelle de l'Energie* or PPE), a nationwide energy investments scheduling tool, the Energy Regulation Commission launches tenders for the installation of renewable projects.[6] Hence, to achieve the above target, one of the measures will include boosting the volume of such tenders from 1.5 to 2.5 GW per year. This increase was already in place for the March 2018 tender for building-mounted PVs (200 MW) and will apply to the June 2018 tender for ground solar farms. In parallel, the average repurchase price of electricity continued to drop to €85/MWh during the third tender period that closed on December 1, 2017 (9% less than the second period that closed on Sept. 1, 2017).

In the meantime, efforts are, for example, being made to promote the self-use of electricity generated by PVs (building-mounted installations with an installed capacity of up to 100 kWp. In this respect, a Ministerial Order of May 9, 2017, sets repurchase tariffs for 20-year contracts in cases where one's PV production is injected in full on the grid.[7] For PVs where production is in-part self-used with surplus injected on the grid, producers are eligible for premiums paid over a five-year period. Some positive results have already been recorded. The self-use market has moved upward: 8000 projects in 2016 and 6000 during the first half-year of 2017 alone.

Promoting innovation is the last leg of the plan. R&D programs in the renewables sector will receive financial support from the *Programme des investissements d'avenir* (government's Invest in the Future Program). In December 2017, the government also launched an Innovation Contest dedicated to innovative projects initiated by medium-sized businesses. This contest is organized in the framework of a larger €57-billion investment plan announced in 2017, which prioritizes carbon neutrality and competitiveness through innovation. Finally, on February 9, 2018, a call for proposals was also launched by the French Environment and Energy Management Agency (ADEME) for eight demonstrations in the field of renewables, which should receive €300 million worth of financial support in 2018 and 2019.

Conclusion

Aware of France's untenable 2025, 50 percent denuclearization objective, the then-candidate Macron was cautious enough to avoid advocating for the objective during his 2017 bid for the presidency. Since March 2018, the official PPE public debate has shifted to defining the objectives of the country's energy policy for 2018–2023 and 2024–2028. Decisions on whether to close or extend the operating permits of certain nuclear reactors beyond their fourth ten-year inspection should be based on the priorities of ensuring the security of supply, reducing the consumption of electricity, the development of renewable energies, and the findings of the Nuclear Safety Authority. According to the various scenarios envisaged, the reduction in annual nuclear energy generation by 2023 will range between 10 and 65 Terawatt Hours (TWh) (out of a 2017 production of 379 TWh). With Europe's growth back on track at last after sluggish years, chances are the government will err on the safe side and not hasten the move toward

the 50 percent target, at the expense of renewables, again.

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Endnotes

1 Loi n°2017-1839 du 30 décembre 2017 mettant fin à la recherche ainsi qu'à l'exploitation des hydrocarbures et portant diverses dispositions relatives à l'énergie et à l'environnement.
2 *See* RTE website at http://bilan-electrique-2017.rte-france.com/production/le-parc-de-production-national.
3 Loi n°2015-992 du 17 août 2015 relative à la transition énergétique pour la croissance verte.
4 *See* Energy Code, article L.100-4 I 5°.
5 Rapport AN n°4428, MISSION D'INFORMATION relative à la faisabilité technique et financière du démantèlement des installations nucléaires de base, 1er février 2017.
6 *See* MultiAnnual Energy Plan abstract in English on the Ministry of the Environment's website at www.ecologique-solidaire.gouv.fr/sites/default/files/4pages_PPE_GB_DEF_Web.pdf.
7 *See* Arrêté du 9 mai 2017 fixant les conditions d'achat de l'électricité produite par les installations implantées sur bâtiment utilisant l'énergie solaire photovoltaïque, d'une puissance crête installée inférieure ou égale à 100 kilowatts telles que visées au 3° de l'article D. 314-15 du code de l'énergie et situées en métropole continentale.

DRIVING DISTRIBUTED GENERATION IN DIFFERENT DIRECTIONS FROM THE SHORES OF LAKE MICHIGAN: A LOOK BACK AT PIVOTAL 2016 ENERGY LEGISLATION IN MICHIGAN AND ILLINOIS.

Robert Weinstock

To begin with a truly hot take: 2016 was a strange year in politics. Among the lesser-covered political oddities in the waning months of that year was the surprising passage of sweeping energy bills in two Midwestern states led by beleaguered Republican governors. Illinois and Michigan had (and still have) very different political landscapes and energy markets. As such, each piece of legislation focused on modernizing energy regulation and markets along the different dimensions that were salient and feasible in the particular political context. The laws dealt with a myriad of energy issues—from subsidizing nuclear power, to reforming renewable portfolio standards, to smoothing the transition from closing coal-fired plants—but this article will focus on the aspects of each that represent a significant step on the particular questions of how quickly and equitably distributed generation (or "DG") resources will develop in each state.

The Future Energy Jobs Act in Illinois (FEJA) was the product of significant and multifaceted negotiations that resulted in developed provisions that aim to increase and expand access to distributed generation resources by building upon defined stakeholder processes within specific legislative policy priorities. The Michigan legislation, by contrast, punted entirely on the key question of compensating distributed generation providers to a vaguely conceived and time-limited administrative proceeding before the Public Service Commission. The Michigan legislation lacked the sort of targeted policy provisions that could incubate and democratize distributed generation capacity.

With over a year of implementation in the rearview mirror, it is becoming apparent that from these different starting lines that Illinois and Michigan