

Is a "100% Renewables" Power System Really Feasible?

On Wednesday January 27, 2021 RTE (Electricity Transmission System Operator for France) officially presented at a press conference a study done jointly with the IEA (International Energy Agency) entitled: "*Conditions and requirements for the technical feasibility of a power system with a high share of renewables in France towards 2050.*"

Is it possible to conclude from this study that a "100% renewables" power system is feasible? Far from it because, according to the study, "*four sets of strict and cumulative conditions*" would have to be met to allow the integration of a very high share of renewable energies. This means that if one of these conditions is not met, the system is not viable. These conditions are all very difficult to satisfy, especially two of them:

* An imperative technical condition is to maintain the stability of the power system. In the current situation, this stability is achieved automatically by synchronous alternators. With a 100% renewable system, there will be much fewer of these; the coupling to the grid of wind turbines and photovoltaic panels will be done in a profoundly different way through inverters i.e., power electronic devices. However, the necessary expertise is currently at the stage of R&D and experiments on microgrids, which are far removed from the reality of large operational grids. Thus, as the study points out, it is impossible to conclude: "*[...] given that there is no proof of concept regarding the integration of high shares of variable renewables –such as wind and solar PV– in large power systems, technical challenges are bound to come up.*"

* Another critical condition is the social acceptability of a grid based on massive wind and solar PV production. Such production would be so variable that it would become essential, according to the terms of the study, to develop means of "demand-side flexibility". In other words, it would be necessary to frequently adapt demand to match wind and solar PV generation, rather than having electricity available at all times to meet needs. Will domestic and professional consumers be able and willing to accept this? Will they also accept the environmental impacts of the proliferation of wind turbines and the necessary massive extensions of the electricity networks?

Why undertake this extremely uncertain conversion to a 100% renewable electricity generation, whose technical viability cannot be guaranteed at the current level of expertise and which entails serious societal regressions, such as less availability and security of supply? To quote the metaphor put forward by Yves Bréchet, member of the French Academy of Sciences and former High Commissioner for Atomic Energy, playing dice with the future of a system as vital for the country as its power system would be like "jumping out of an airplane having planned to weave the parachute during the descent".

It would be so much safer to extend the current electricity mix based on nuclear power and hydroelectricity, supplementing it with wind power and solar PV to replace residual fossil fuel production. This low-carbon mix would perfectly meet the objective of carbon neutrality in 2050, with no technological adventure.

This is the logical conclusion that follows from the RTE-IEA study.

Link to the full study by Georges Sapy : [Is a "100% Renewables" Power System Really Feasible?](#)