

## **Dr T. O'Donnell**

### **on gas and nuclear energy treated as a “green” source**

*“Commission may recognize nuclear as ‘green’- New openness to its experts’ views belays falling confidence in the ‘100% renewables’ German model”, Hertie School of Governance, Berlin (17.09.2021)*

The commission sees both sources as a-means-to “facilitate the transition towards a predominantly renewable-based future.” However, critics, such as Austrian officials and environmental activists have argued that these should not receive a green label, even temporarily.

This could be spun two ways: as a victory for science over Green fundamentalists’ capture of climate policies, or as a tipping point in Brussels angst at the growing complexities and costs of the “100% renewables and no nuclear” model.

According to international energy expert based in Berlin Dr. Tom O'Donnell in reality, it's some and some. On the one hand, in March 2021, the Commission received reports solicited from the Joint Research Centre (JRC), its scientific expert arm, finding that nuclear waste is “manageable”, posing no “significant” harm to the environment, and that nuclear energy has been demonstrated to be eminently safe. On the other hand Commission is realistic – no cheap and solid energy supply may come from traditional renewable sector. Wind, solar and water cannot provide European industrial sector with enough cheap energy. Consider that decarbonization of EU electricity has progressed beyond its initial phases, many net-zero policy targets are in place, huge investments are now at stake, and of course many climate-change effects are manifesting themselves. Perhaps the bureaucracy is finally feeling constrained to put achieving results – which requires facing scientific-technical realities -- before ideological convenience?

The results of 2020, of Germany's official Eighth Annual Independent Monitors' Report on the Energy Transition (Energiewende) show that renewables-only program will miss many targets, as usual, it made the rather stunning finding that it will not be possible to produce sufficient domestic renewable electricity in future to meet domestic demand. It goes on to propose German firms investment in renewables abroad, writing “ ... the establishment of transnational projects at the European level should be considered here.” The German daily newspaper *Die Welt* explains this to mean that the EU should allow German firms to develop renewables abroad and take the credit for these projects back home in order to satisfy Germany's own national EU-mandated decarbonization responsibilities. Could it be renewable colonialism?

To be more precise here, the three biggest problems with embracing a renewables-only model are as follows:

- First, this eliminates nuclear power, even though nuclear produces no carbon or air pollution. In the German case, its “Atom Exit” wipes out 17 plants which had 20.47 Gw installed capacity in 2010, running with 9597% capacity factors, delivering about 170 Twh gross in electricity annually. In addition, a 2019 National Bureau of Economic Research (USA) study found, “The

phase-out resulted in more than 1,100 additional deaths per year from increased concentrations of SO<sub>2</sub>, NO<sub>x</sub>, and (particulate matter),” most of which is due to increased hard-coal use. In contrast, by 2019, Germany had installed 109.9 Gw of solar and wind, which, because of the fickleness of wind and sunshine produced 298 Gwh gross supplies.

Comparing these data shows that the lost gross production from closing all the nuclear plants closings will be equivalent to 60% of gross wind and solar electricity produced in 2019, the last pre-pandemic year. This is a huge self-inflicted setback for German decarbonization.

- Second, renewables-only adherents militate to immediately kill natural gas use, rejecting it as a transitional, least-damaging fossil fuel. However, there is hard evidence that natural gas can oust coal from the market when it is cheap and plentiful. This has been amply demonstrated in the USA, where 290 coal plants were shut between 2010 to May 2019, amounting to 40% of the country’s coal-generating capacity. Of these shut between 2011 and 2019, “... 121 U.S. coal-fired power plants were repurposed ...,103 of which were converted to or replaced by natural gas-fired plants.” This, of course, was all made possible by the USA’s “fracking revolution,” a matter addressed, unfortunately, only in dismissive terms in Europe, most especially in Germany.

“According to data from the U.S. Energy Information Administration (EIA), 121 U.S. coal-fired power plants were repurposed to burn other types of fuels between 2011 and 2019, 103 of which were converted to or replaced by natural gas-fired plants. At the end of 2010, 316.8 gigawatts (GW) of coal-fired capacity existed in the United States, but by the end of 2019, 49.2 GW of that amount was retired, 14.3 GW had the boiler converted to burn natural gas, and 15.3 GW was replaced with natural gas combined cycle. The decision for plants to switch from coal to natural gas was driven by stricter emission standards, low natural gas prices, and more efficient new natural gas turbine technology.” In contrast, however, Germany was forced to increase its coal use in 2021 by 35% due to an over-25% drop of wind early this year versus last, such that coal is again the top source of its electricity, at 27%. If this happens again next year, after the last nuclear plants are gone, there will be another 11% (2020 12) of electricity production that coal will have to make up.

-Third, big reductions in the installation costs of wind turbines and solar cells are often cited, and quite correctly. However, what lurks here is the inescapable unreliability of wind velocities and sunshine. Because of this fact of nature, over-reliance on renewables will always require a costly “reinvention” and rebuilding of a country’s transmission and distribution grids, plus expensive installation of massive “grid scale” storage – the technology for which is not yet adequately developed. Then there is the logistics of time-domain control, of balancing both erratic and ever more massive renewables generation in sync with also-time-varying demand, all of which requires what are termed “smart grids.”

Even in uniquely wealthy and engineering-capable Germany, annual Monitors Reports repeatedly show progress on these grid-and-storage “reinvention” tasks to be very disappointing, with ministers habitually using the “crisis” word. Central Eastern European experts often remark that if Germany still isn’t accomplishing these expensive, high-tech networks, “... how are we supposed to do it” often starting with soviet-era grids? In contrast, a new nuclear plant – or for that matter a gas-fired power plant – can be simply “dropped”

into the existing grid, at the location of a shuttered coal-fired power plant, achieving respectively either complete or about 20% reduction in carbon dioxide emissions, and also total or near-total elimination, respectively, of air pollutants, with no expensive rebuilds and “smart” reinventions of grids and storage required.

Wind and solar yield diminishing returns when used beyond a certain fraction of a country’s electricity generation. That fraction is primarily determined by the country’s wind and solar resources, its wealth, technical level and institutional capacities. Here, one should be honest enough not to count long-ago developed hydro and dubious bio-energies in the new “renewable” tally.

In Brussels, the energy-transition orthodoxy, over several years, has been that “all the necessary technology already exists,” that wind and solar installation prices are falling, and so “all that is needed is political will,” simply “more ambition.” However, this is official optimism. The reality is there are fundamental problems to address under the dominant “100% renewables and no nuclear” transition-model championed by all major German parties and the state.

Seven EU Member states, on France’s initiative, recently petitioned the Commission, demanding it respect the judgements of its own scientific bodies, and recognize nuclear as green. Poland is especially interested in this decision, planning to construct six-to-nine large nuclear plants, the first by 2033, and has insisted the Commission should support this financially, as it would any other “green” energy.

For Warsaw, building these nuclear plants alongside a manageable reliance on variable wind and solar, is a rational alternative to its high coal dependencies, and the irrationality of otherwise having to “revolutionize” its grid.

If Brussels is not finally ready to invigorate a massive “green” expansion of nuclear, alongside a rational level of dependence on variable renewables, it will principally be because the Commission is facing a strong ideological push-back from Austria and Italy, but overwhelmingly from EU-heavyweight Germany, now actively lobbying the Commission against a “green” label for nuclear.

Unfortunately, the Commission was waiting till the German elections are over to announce nuclear as part of its green financial taxonomy, reportedly so as not to embarrass any of the German parties in contention, all of which support the 2022 phase out. If the Commission is to truly lead the Europe’s energy transition, here is an opportunity. It needs to begin to say what voters need to hear, in a timely manner, while they can still act on the information.