Net electricity flows in 2022:

France rushed down from net export to net import

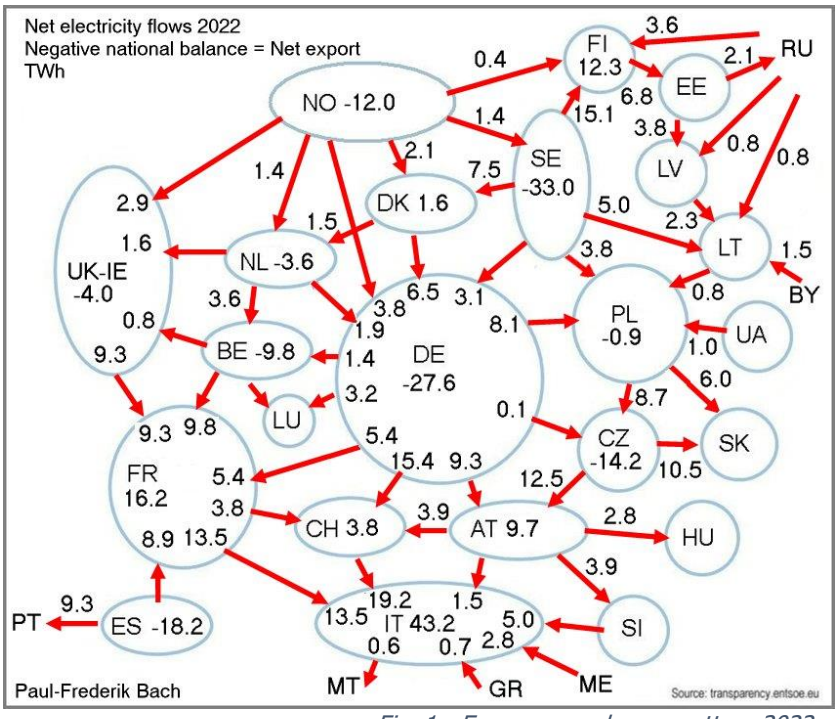

Fig. 1 - European exchange pattern 2022

Net import TWh			
	2022	2021	Change
SE	-33,0	-25,2	-7,8
DE	-27,6	-19,6	-8,0
ES	-18,2	0,8	-18,9
CZ	-14,2	-11,2	-3,1
NO	-12,0	-17,1	5,0
BE	-6,3	-7,6	1,3
NL	-4,2	0,4	-4,5
UK-IE	-4,0	26,4	-30,4
PL	-0,9	1,0	-2,0
EE	1,0	2,6	-1,7
DK	1,6	5,0	-3,4
LV	2,3	9,2	-6,9
CH	3,8	3,6	0,3
LT	8,8	9,2	-0,4
AT	9,7	8,3	1,4
FI	12,3	17,5	-5,2
FR	16,2	-43,0	59,2
IT	43,2	43,4	-0,3

The European electricity exchange patterns changed significantly from 2021 to 2022.

Most remarkable is the French change from being the largest European exporter of electricity in 2021 to being the second largest importer in 2022. The gap between the two positions is 59.2 TWh.

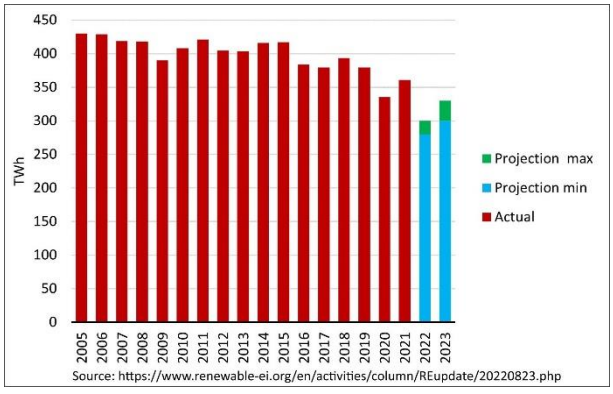

Fig. 2 - The declining French nuclear generation

The French nuclear generation has been steadily decreasing for several years. The reduction from 2021 to 2022 was 81 TWh or 23% from 360 TWh to 278 TWh. The French electricity consumption decreased at the same time 4.6% from 466 TWh. The combined effect was a 60 TWh loss of energy.

Main reasons for the French decline[1]:

1. The “Grand Carénage”, a program focusing on safety upgrades and reactor lifetime extensions taking place from 2014 to 2025
2. The COVID-19 pandemic has derailed the maintenance of reactors which is usually tuned like clockwork

[1] Source: https://www.renewable-ei.org/en/activities/column/REupdate/20220823.php

3. Discoveries of cracks in pipes resulting from stress corrosion have led to the temporary shutdowns of 12 reactors of the most recent reactors for inspections
4. Unfavourably dry and warm weather conditions make it more complicated to cool reactors which must either reduce their output or temporary shut down
5. The endless delays to start operating Flamanville-3 under construction since 2007 results in a lack of 1,630 MW

The largest replacement came surprisingly from Great Britain and Ireland with 30 TWh. Even Spain made a remarkable contribution by improving its balance by 19 TWh.

The British surplus and the French deficit have made the flow from north to south in Europe even more striking. The overloaded German grid was relieved by a western and an eastern corridor (fig. 3). The case demonstrates that the European grids must have the capacity to handle very different flow patterns.

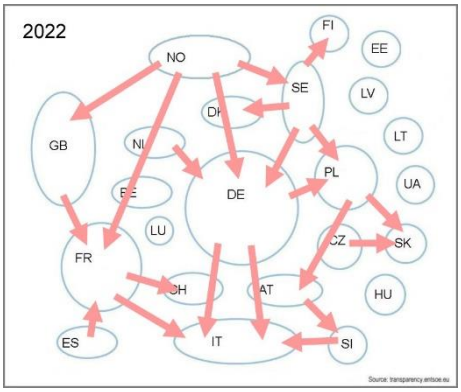

Fig. 3 - European transit corridors 2022

Impact on carbon emission

80 TWh French nuclear energy and the Russian natural gas have been replaced by European backup units and alternative fuel sources. The replacement must have influenced the carbon emission from European electricity production in 2022.

This issue deserves attention. Most countries have set ambitious targets for their carbon emission, but the weather dependent electricity production has made the power systems less robust and larger variations from year to year must be anticipated. Weather variations, forced outages and political instability among fuel suppliers will also in the future affect electricity prices and security of supply.

A later article will specify the generation per production type in 2021 and 2022 in order to assess the available European reserves for typical variations.