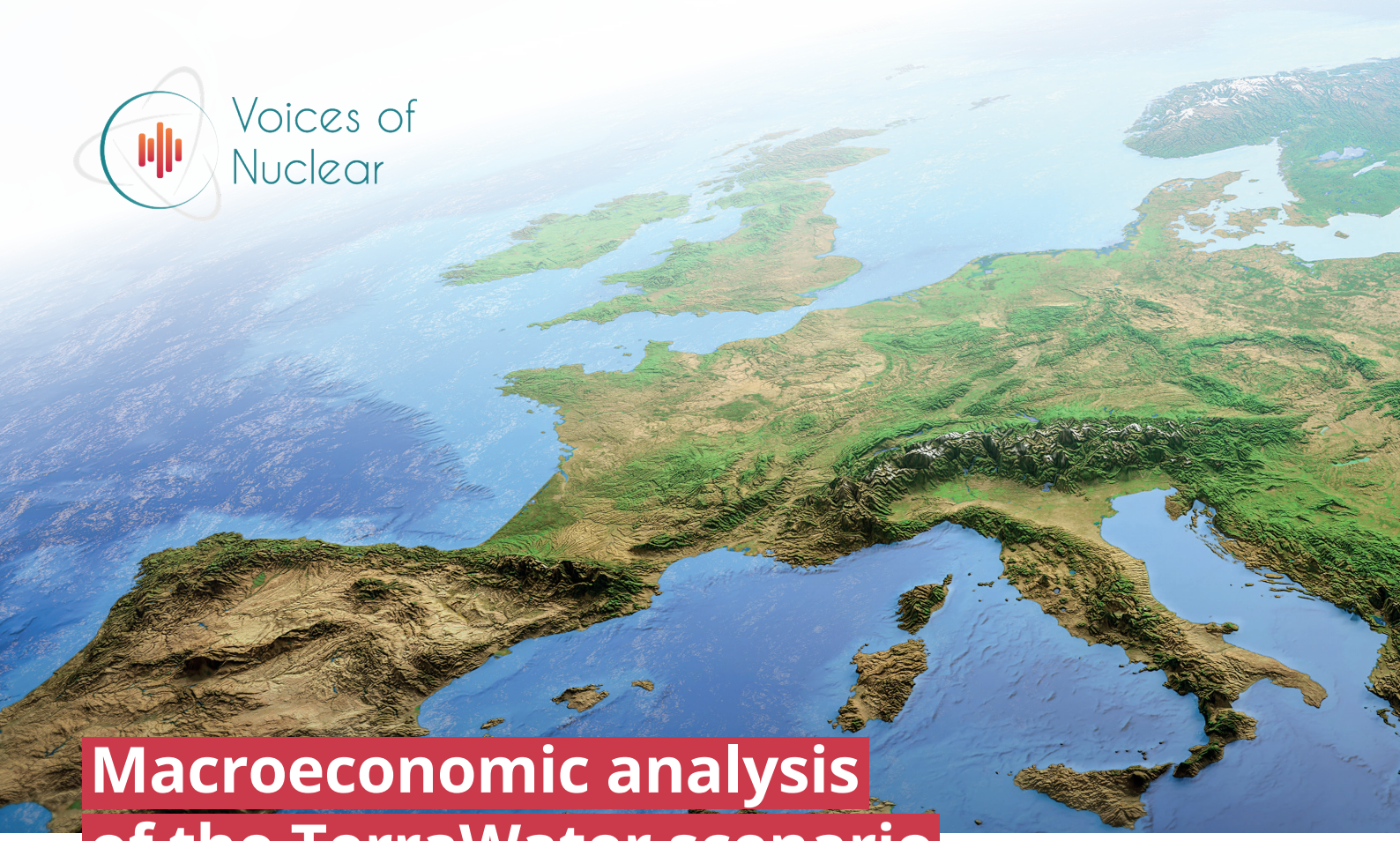

Macroeconomic analysis of the TerraWater scenario

The summary economic analysis that was carried out to determine the cost range within which the scenario falls leads to **a final full cost in 2050 of €75–80bn/year with a weighted mean capital cost of 4%**, which could extend to €70–90bn per year (this full cost – production, transmission, distribution (excluding tax) – is currently valued at €42bn/year).

Given that net electricity consumption for mainland France would be 730 TWh/year, **this leads to an electricity cost of €103–110/MWh. For comparison, the N03 scenario defined by RTE leads to a cost of €98/MWh. The main difference lies in the choice made in the TerraWater scenario to safeguard supply, whether in base load or peak load, and to have an additional margin of 10%** (vs. 7%for RTE) of gross production capacity above consumption forecasts. It should be emphasised that the structure of the equipment financing plays a highly decisive role in the final cost, such that it could make or break the project. This is one of the reasons why, at this stage, we have not gone into a more detailed economic analysis.

While a quest for the economic optimum is not the priority of the TerraWater scenario, close attention has nonetheless been paid to this aspect, in the name of solidarity, to maintain its costs within a reasonable range acceptable to taxpayers and the industry

In doing so, various elements have an upward or downward influence on the final cost of the scenario.

Outline assumption

The main goal of robustness has led to **deliberate overcapacity** to ensure supply security under all conditions, thus slightly increasing costs by about 2% compared to N03.

The choice not to base supply security in normal operation on interconnections is also a cost-raising factor, as it results in a need to strive for **self-sufficiency in backup resources** (+€5,000bn/year).

The net extra cost remains low (a few percent), as the capacity designed for the 'self-sufficient France' mode makes it possible to **avoid costly electricity imports** (€2,000bn/year for N03, €6,000bn/year for the M scenarios). This choice not to rely on electricity imports for supply security is also a factor stabilising electricity prices in France, as the country's independence in terms of supply prevents its consumers from being exposed to foreign market prices (which will probably continue to be guided by gas prices for some time to come).

By retaining **a net exporting capacity**, export revenues can be maintained at a value of €4–5,000bn/year, thus reducing the additional cost of the system to €3,000bn/year.

Storage

The exclusive choice of pumped storage schemes (PSP) for storage purposes (combined with biomass combustion turbines as a last resort):

- instead of imports of synthetic gas and batteries, is a factor in reducing the overall cost of the system because, as emphasised by RTE, PSPs are among the least costly means available for introducing flexibility (due to their simplicity, low operating costs, very high efficiency and service life).
- enables savings to be made on the 'maintenance of frequency stability' cost item, as such schemes make it possible to dispense with dedicated synchronous condensers.
- supplies significant nation-wide highly efficient storage capacity, enabling arbitration on imports and exports.

Transmission and distribution

Locating PSPs exclusively in the southern half of the country **will require substantial strengthening of the north-south transmission network**. To take this into account, the scenario uses the transmission network cost from RTE's 100% RES scenarios.

The choice to continue basing the electricity supply on a fleet of **large centralised units** provides significant savings on the distribution network, which is the most costly aspect.

Production facilities

The aim of the **generalised extension of the legacy nuclear fleet to 70 years' operation** is to reduce the overall cost of the system by deferring the need for new production capacity.

Large-scale construction of EPR2 plants is a factor in stabilising and reducing the unit cost of these reactors.

The desire to **eliminate the natural gas distribution network** is a factor for savings estimated at €3,000bn/year.

The choice to **limit VRE* imports**, especially in the second part of the period when tension on the metals markets is expected to increase (including copper for the interconnections), is an advantage for the stability of prices and for limiting exposure to unexpected geopolitical and market events.

*Variable Renewable Energy

Despite these factors, precisely establishing the costs of a system that has not yet been constructed is a difficult and risky task. Cost assumptions for the different technologies and assumptions on the structure of financing for infrastructure are arbitrary choices that may only be confirmed or refuted when they become reality.

A more detailed analysis of the costs associated with this scenario may be made in a future version.