RÉPUBLIQUE FRANÇAISE
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CRE COMMISSION DE RÉGULATION DE L'ÉNERGIE

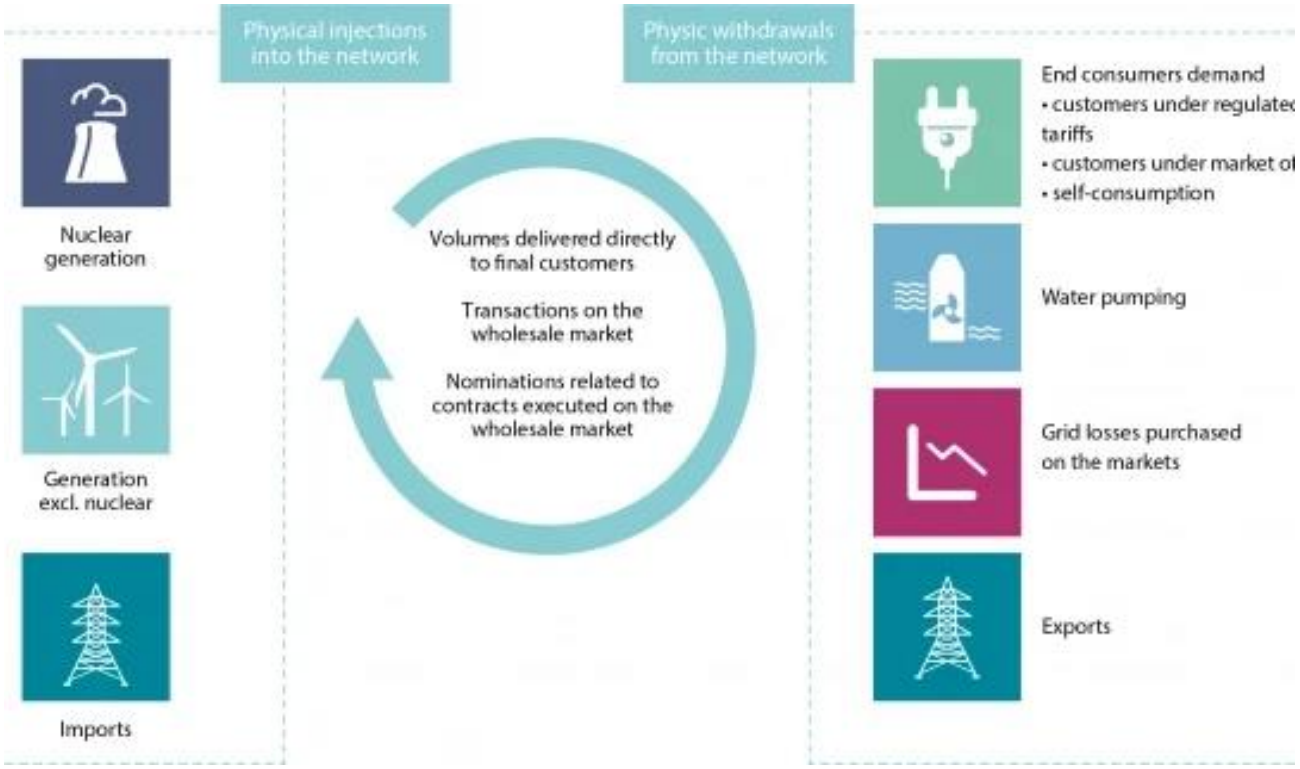
ERRA ENERGY REGULATORS REGIONAL ASSOCIATION

ERRA Electricity Markets and Economic Regulation Committee

Scarcity payment mechanism: France Case study

30/01/2025

Context: The wholesale electricity market is central to the operation of the French power system



The wholesale electricity market plays a central role in the operation of the French power system, by allowing the supply of electricity to be balanced with demand.

At the top of the chain, electricity injected into the network comes from the following sources:

- Around 95% from generating facilities (nuclear power plants and others);
- Imports from other European countries.

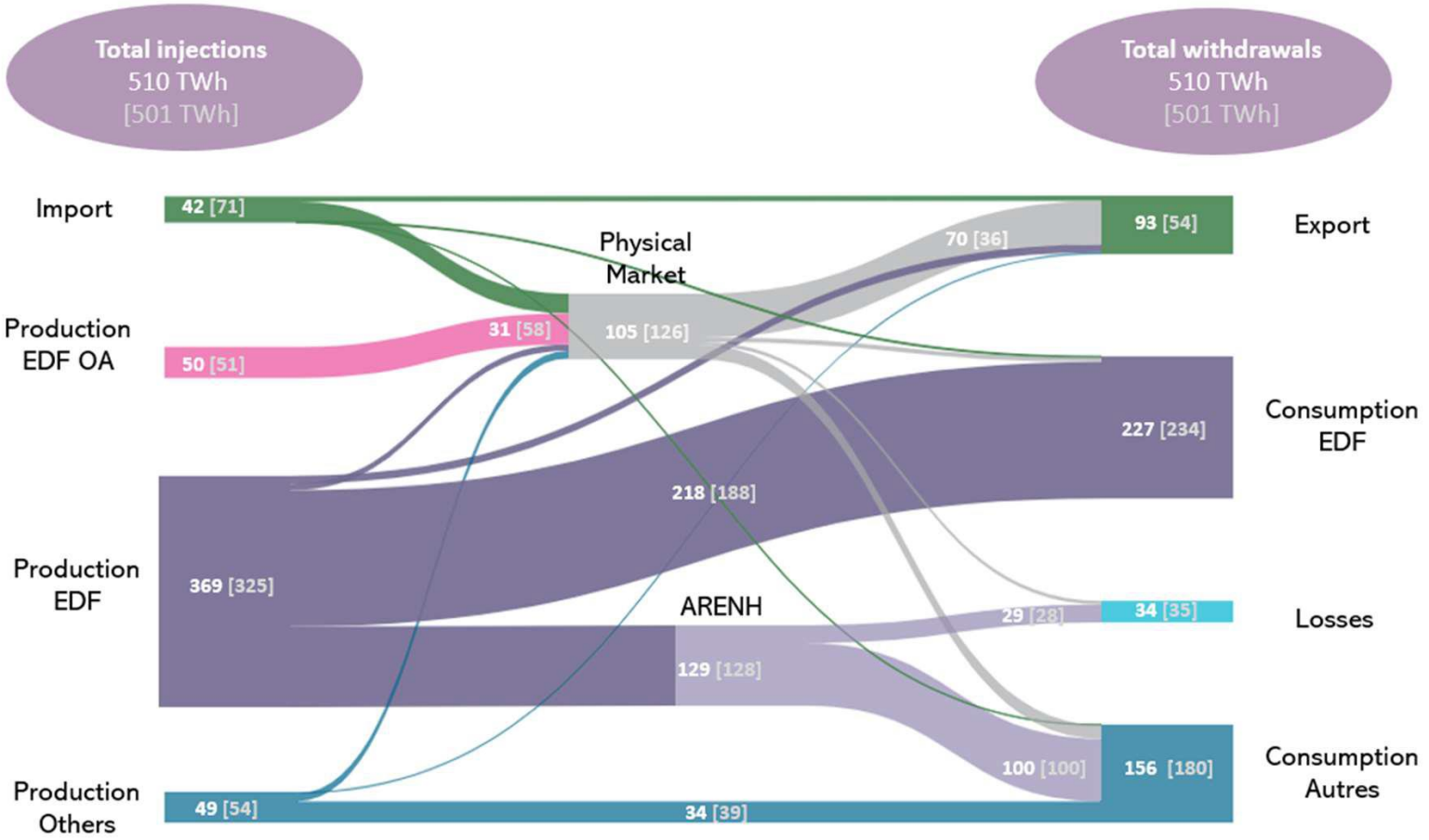
At the other end of the chain, electricity is extracted (known as “offtake”) from the network:

- To satisfy end consumption (more than 75% of the electricity offtaken is used for this purpose);
- For exports.

NB: Some electricity is lost during transmission or used for pumping.

Context: physical flow chart of the French electricity market in 2023

The French electric system in 2023 was marked by the resolution of the dual crises of 2022, which concerned both the gas supply to Europe and the production of the French nuclear power fleet.

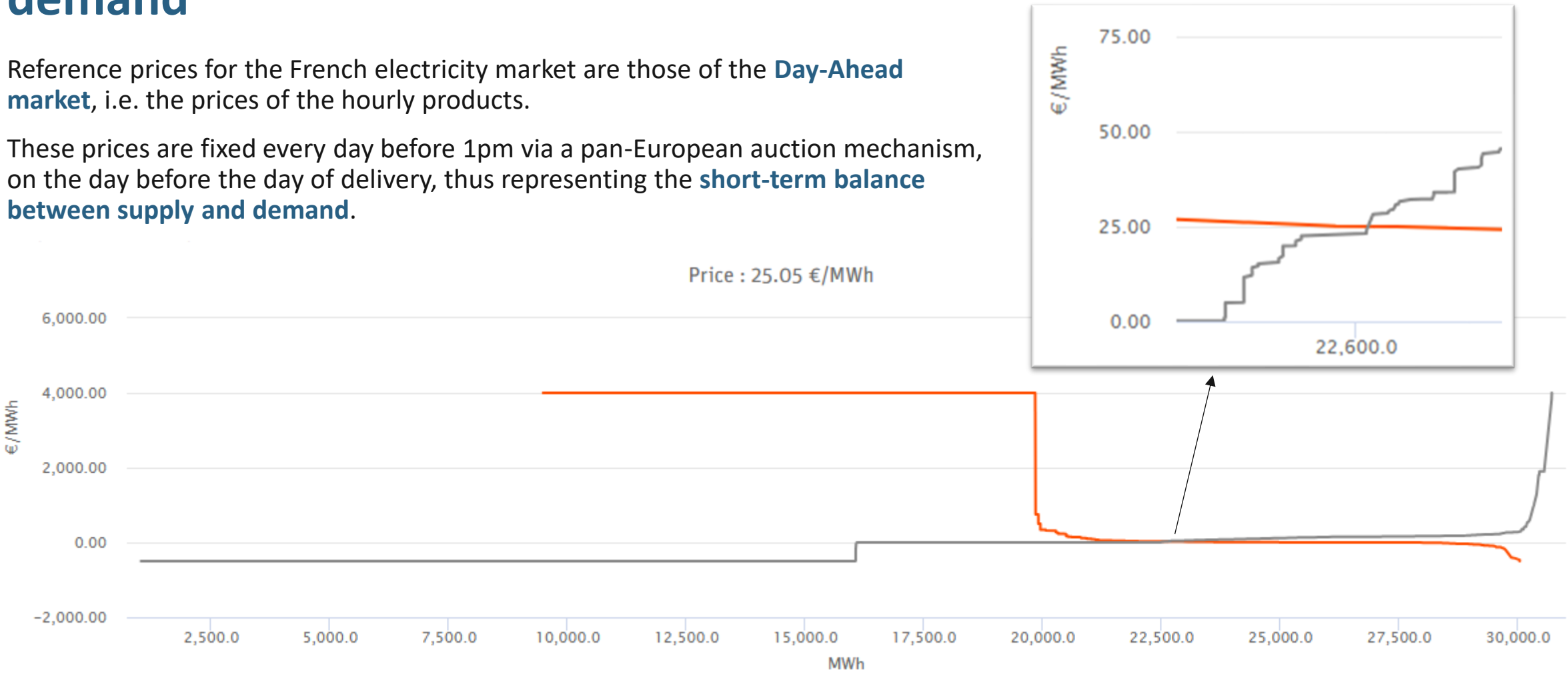


Source: RTE

The spot market optimizes short-term exchanges between supply and demand

Reference prices for the French electricity market are those of the **Day-Ahead market**, i.e. the prices of the hourly products.

These prices are fixed every day before 1pm via a pan-European auction mechanism, on the day before the day of delivery, thus representing the **short-term balance between supply and demand**.



EPEX SPOT : Day-Ahead FR - 28 January 2025

The optimal electricity mix involves some scarcity

In theory, the 'energy-only' electricity market should lead to investment in **optimal production capacity** to meet demand at all times:

- baseload to meet hours of low demand

- peak to meet hours of high demand

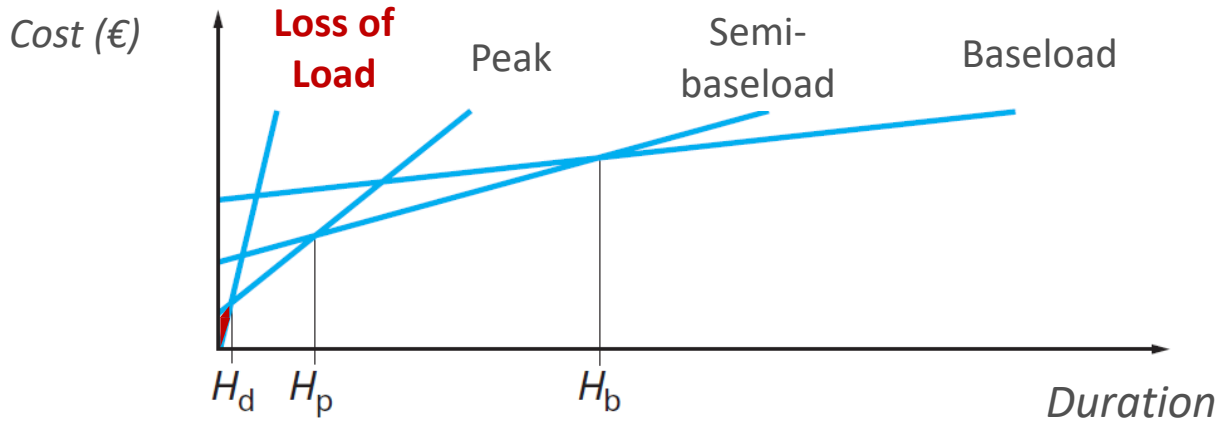
- while leaving part of the maximum demand unsatisfied during **scarcity event**. The part of the demand left unsatisfied is called "loss of load".

The optimal Loss of Load is not zero.

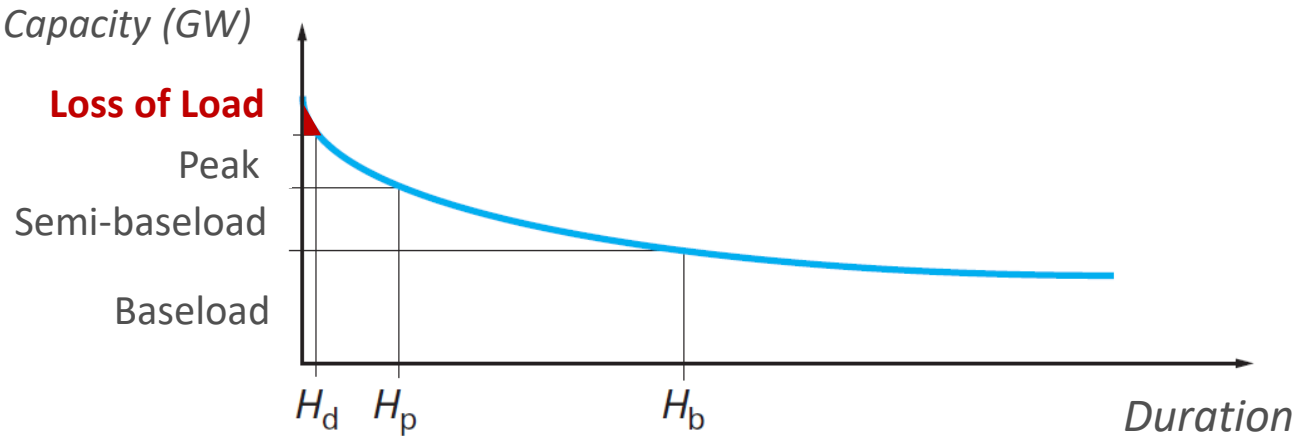
It depends on the ***Value of Loss of Load*** (VOLL), and of the **Fixed cost of peak generation**:

Loss of Load Optimal Duration =

Value of Loss of Load / Fixed Cost of Peak-load



A. Total cost of generation depending on duration



B. Installed capacity and demand monotone

What is missing ?

In practice, the ‘energy-only’ electricity market can lead to **sub-optimal generation capacity.**

Decisions to invest in new generation capacity have to be taken **several years in advance**. At these timeframes, the probability of a Loss of Load is highly uncertain, since it depends on:

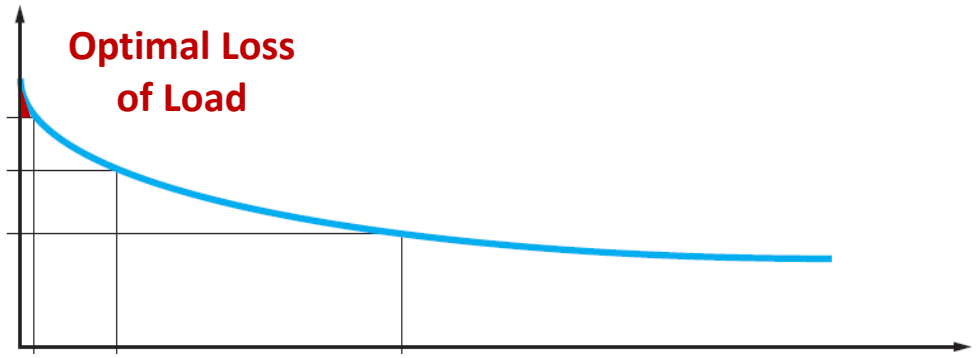
- the normal margins of error in forecasts

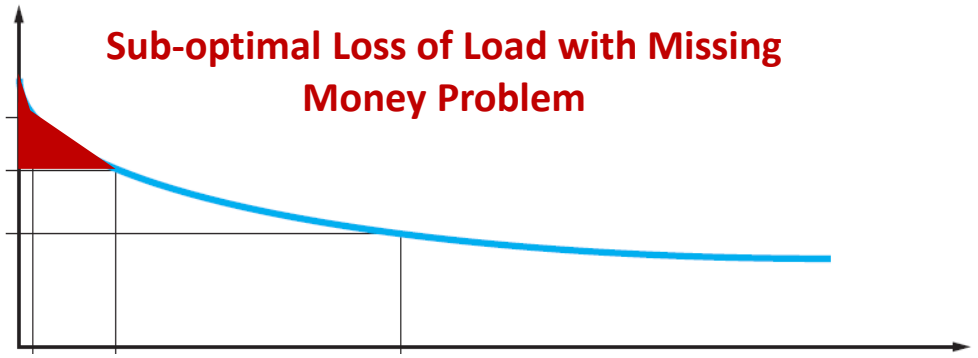
- as well as on exceptional events that may affect the balance between supply and demand (e.g. Covid 2020).

Revenues from peaking power plants may be too uncertain to cover the high cost of capital of a peaking power plant.

Put another way, utilities and IPP may have a hard time justifying investments in generation facilities that may never be called up by the electricity market, leading to **unsustainable Loss of Load**.

This is the **Missing Money Problem**.





Addressing the Missing Money Problem with scarcity payment: the French Capacity Mechanism

To address the **Missing Money Problem,** France launched in November 2016 a **Capacity Mechanism**.

Articles L. 335-1 et seq. of the Energy Code established a capacity obligation mechanism.

Each supplier is required to obtain sufficient capacity guarantees to cover the consumption of all of their customers during periods of peak national demand. This mechanism gives market participants incentives to develop demand side management capacities.

Capacity guarantees can be obtained by investing in generating facilities or DSM capabilities, or from capacity operators. RTE guarantees that these operators' capacities will be available during periods of tightness in the power system.

After capacities have actually been delivered, financial incentives are paid at the end of the year to ensure that the various parties concerned fulfil their commitments and obligations.

A secondary capacity guarantee market is organised through EPEX SPOT. The first auction of this kind took place in December 2016.

As required by Articles R. 335-48 and R. 335-51 of the Energy Code, CRE publishes the administered price and the market reference price identified in the capacity mechanism rules, for each year of delivery.

Capacity Price for the Delivery Years 2024/2025

Clearing prices and volumes traded for auctions for the delivery year 2024

AL 2024	02/03/2023	27/04/2023	22/06/2023	21/09/2023	16/11/2023	07/12/2023
Price (€/MW)	29,899.1	34,499.8	35,000.0	32,799.1	35,379.5	6,200.2
Volume (MW)	4,288.0	4,486.4	4,357.9	4,591.1	4,771.4	7,923.2

Source: EPEX SPOT – Analysis: CRE

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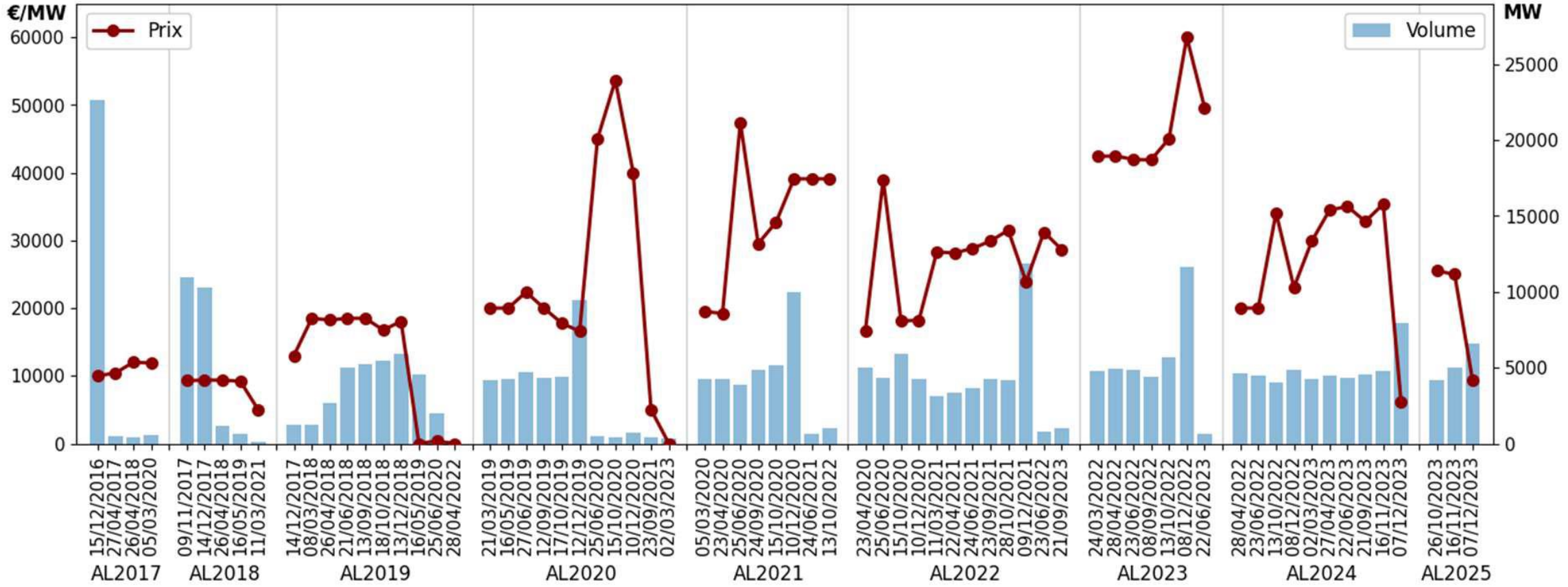
Source: EPEX SPOT – Analysis: CRE

Certification Levels of Capacities for 2023/2024

Sector	December 2022 (AL 2023) (GW)	March 2024 [79](AL 2024) (GW)	Evolution (GW)
Nuclear	39.9	43.9	+4.0
Lac/STEP	10.4	10.2	-0.2
Renewables + others *of which batteries*	15.8 *0.4*	16.6 *0.7*	+0.8 *+0.3*
Load shedding	3.1	3.5	+0.4
Gas	7.2	7.1	-0.1
Coal	1.6	1.4	-0.2
Oil/fuel	1.9	1.8	-0.1
Total – excl. interconnections	**80.3**	**84.6**	**+4.3**
Interconnections	8.4	7.7	-0.7
Total – incl. interconnections	**88.7**	**92.3**	**+3.6**

Source: RTE Register – Analysis: CRE

EPEX SPOT Capacity Auction Prices



Source: EPEX SPOT – Analysis: CRE

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