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Capacity mechanisms as structural assets for power system stability

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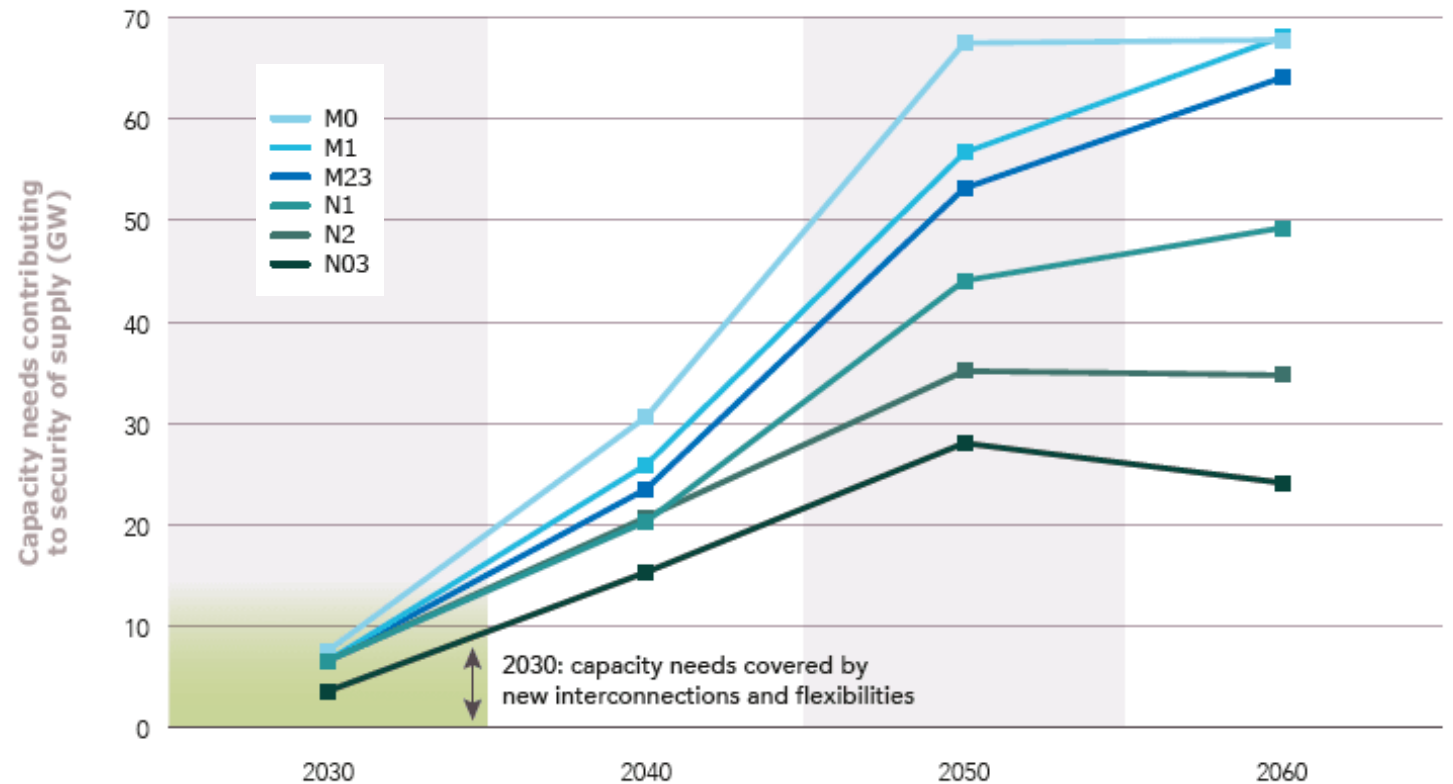


The power system's need for flexibility is a significant part of the energy transition

Flexibility needs for all time horizons (intra-day, intra-week, inter-week, inter-seasonal, inter-annual) **increase in all scenarios** studied in the Energy Futures 2050 report, due to:

- **Increased electricity consumption**
- **Decrease in dispatchable capacity** (nuclear hydro and thermal) replaced by variable renewables

Until 2030, these needs can be covered by the development of interconnections and demand side flexibility (notably load shedding).



The power system's needs for flexibility range from 24 to 64 GW in 2050. Among those, only 4 to 9 GW shall be required for balancing and system services.



These flexibility needs can be sorted in two kinds according to what time horizon they relate to

The massive development of a mix of flexibilities with complementary characteristics is necessary.

Different needs have to be fulfilled :

1. Structural, regular needs

to match power consumption with low carbon and cheaper generation availability periods

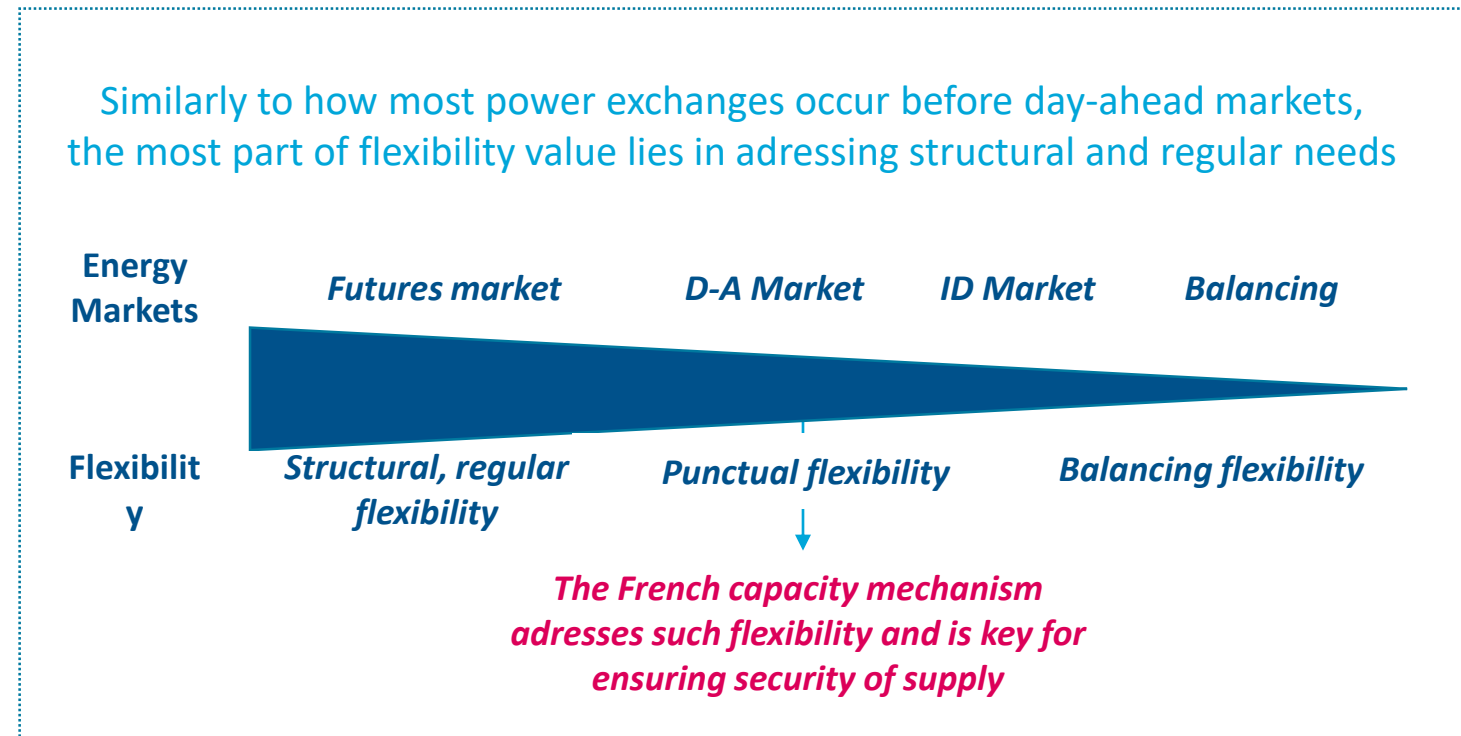
→ « energy value »

2. Punctual needs in peak periods

for example when consumption is high or when renewable generation is low. Flexibilities that can address this need play an insurmountable role for security of supply.

→ « capacity value »

3. Balancing needs close to real-time





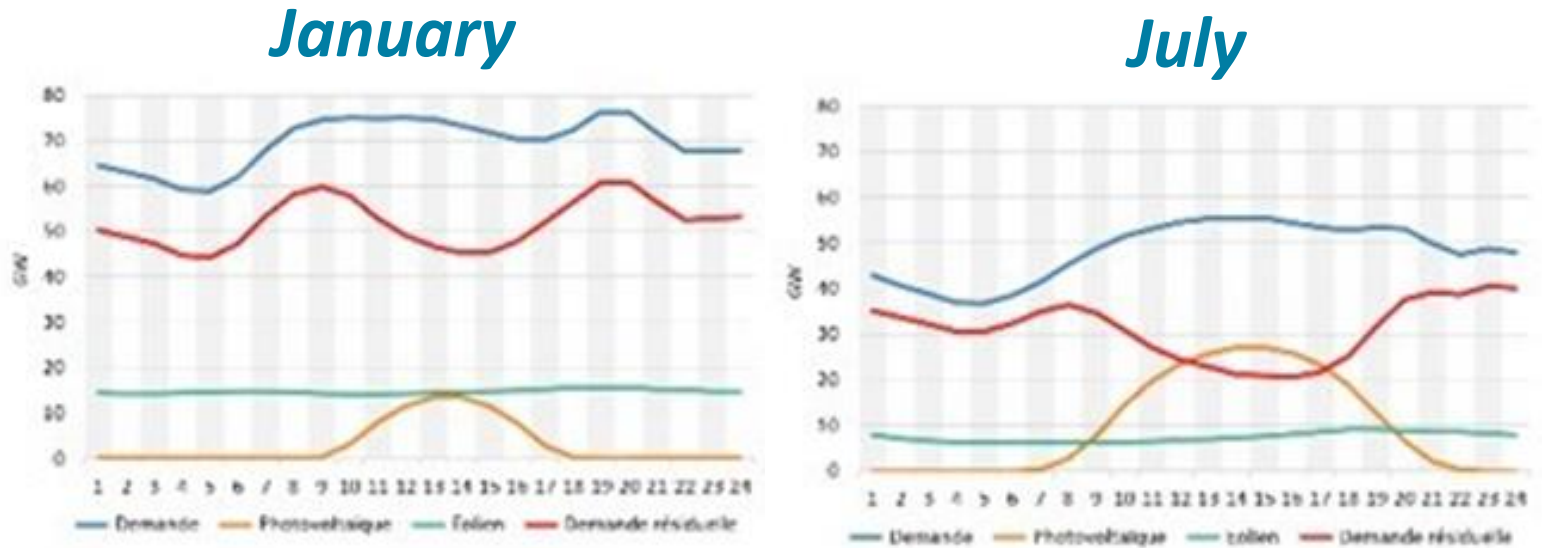
1. « Structural flexibility »

Most of the needs for flexibility are in the structural and regular range and can be adressed long before real time (and balancing)

The main need for flexibility lies in matching consumption and low-carbon generation to smoothen out the peaks of residual demand .

Two main horizons should be considered:

- **Weekly** (3-10 days ahead): modulate consumption and/or storage to compensate for the variability of consumption according to temperatures and wind power generation from one day to the next.
- **Daily**: means able to provide their flexibility for 2-3 hours to deal with residual consumption peaks, taking into account the development of solar power



Projection of the evolution of the residual demand curve of a working day in 2030, for the months of January and July

- Demand
- Residual demand
- Solar PV generation
- Wind power generation

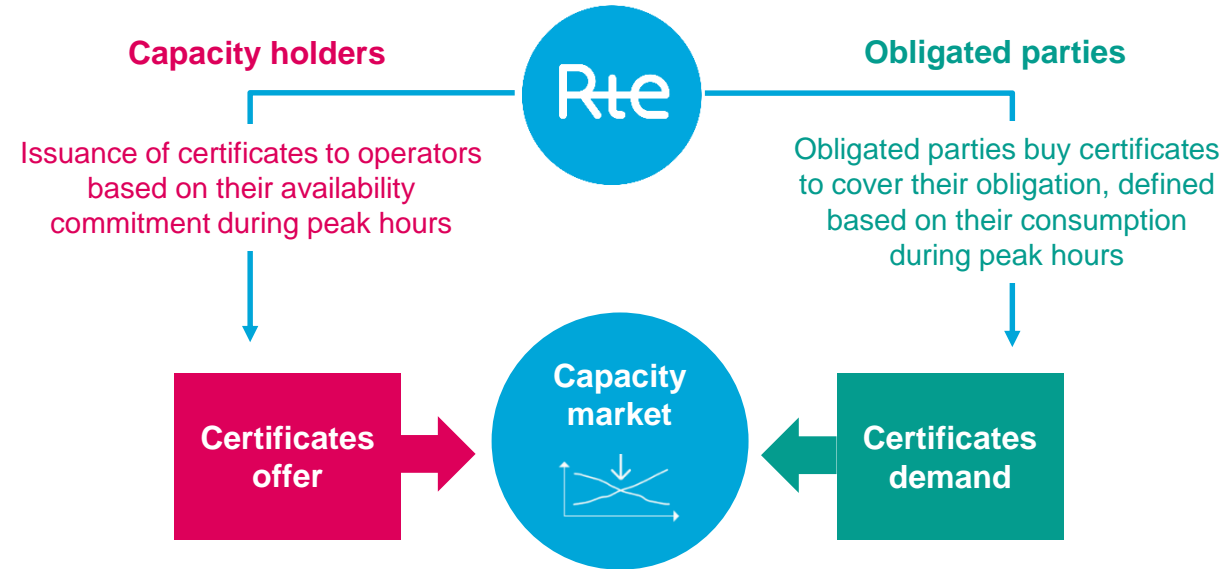


2. « Punctual flexibility »

The current capacity mechanism has enabled the development of generation and demand side flexibilities during peak periods

In France, the capacity mechanism is designed to **coordinate all market parties during peak periods** by encouraging, at the same time, via signals sent in D-1:

- **availability**, on the generation side and explicit DSR;
- **reducing consumption**, on the demand side.



The CM has been instrumental to fulfill the French reliability standard during its first years of operation:

- 5.5 to 10 hours/year of LOLE avoided 2017-2019 by ensuring economic viability of flexible assets (CCGT, thermal assets, DSR)
- net social welfare gain between 75 and 280 M€/year by reducing energy not-served, incentives for maintenance placements

The built-in long-term tenders allowed for ~375 MW of new flexible, low-carbon capacity (DSR and batteries) and the mechanism acts as a price reference for DSR specific tenders (~3 GW of DSR)



Making capacity mechanisms structural features of the market design: the missing part of the ongoing EU debate

- **The need for a capacity mechanism in France seems to persist and even increase beyond its clearance under State aid rules expiring in 2026.** Undergoing adequacy studies will clarify this perspective.
- French authorities and RTE have undertaken a major consultation for renewing and redesigning the capacity mechanism, moving towards:
 - 1 **A centralised design:** definition and procurement by RTE of the volume of capacity needed for security of supply
 - 2 **A financing no longer based on obliged parties but on suppliers or consumers** (options are still open)
 - 3 **A mechanism still encouraging new investments** when necessary through multi-year contracts.
- In this context, the ongoing market design reform is an opportunity to **no longer consider capacity mechanisms as last-resort measures but as a structural feature of the market design to which States can freely resort.**



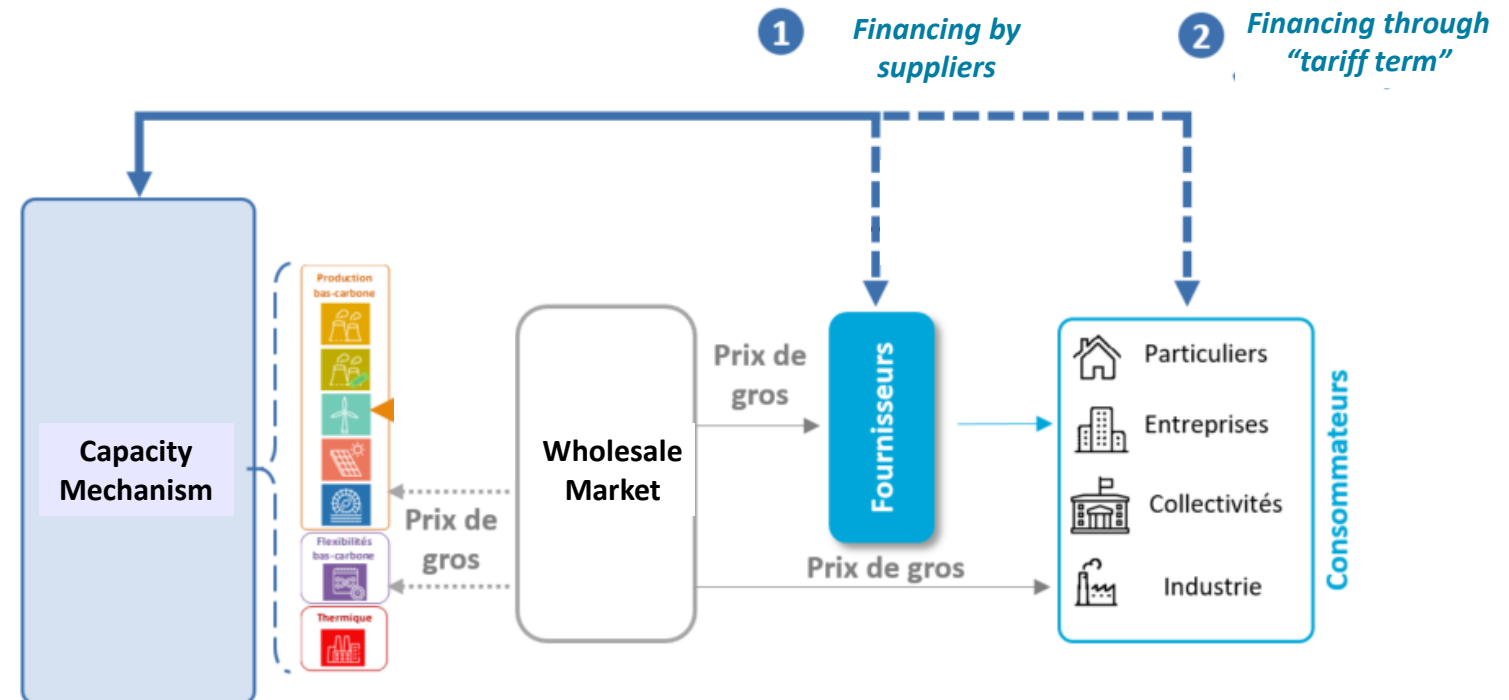
A centralised design allowing for a more direct pass-through of the cost of the mechanism to preserve tariff and flexibility incentives

The feedback provided by RTE on the operation of the mechanism has highlighted that **the intensity of the incentive delivered to demand flexibility could be reinforced** by favoring :

1. a simpler design ;
2. a more direct and less intermediated transfer of the cost of security of supply to consumers.

Two funding options for the future mechanism meet these criteria: **the one offering the greatest resilience to potential changes in the market framework** – including retail – will eventually be preferred.

Should a direct pass-through to consumers be chosen, the next capacity mechanism would therefore address punctual generation flexibility but also structural demand side flexibility.





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Thank you!