CAPACITY MECHANISMS WORKING GROUP

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HIGH LEVEL COMPARISON OF CAPACITY MECHANISM MODELS AND COMPATIBILITY WITH STATE AID GUIDELINES

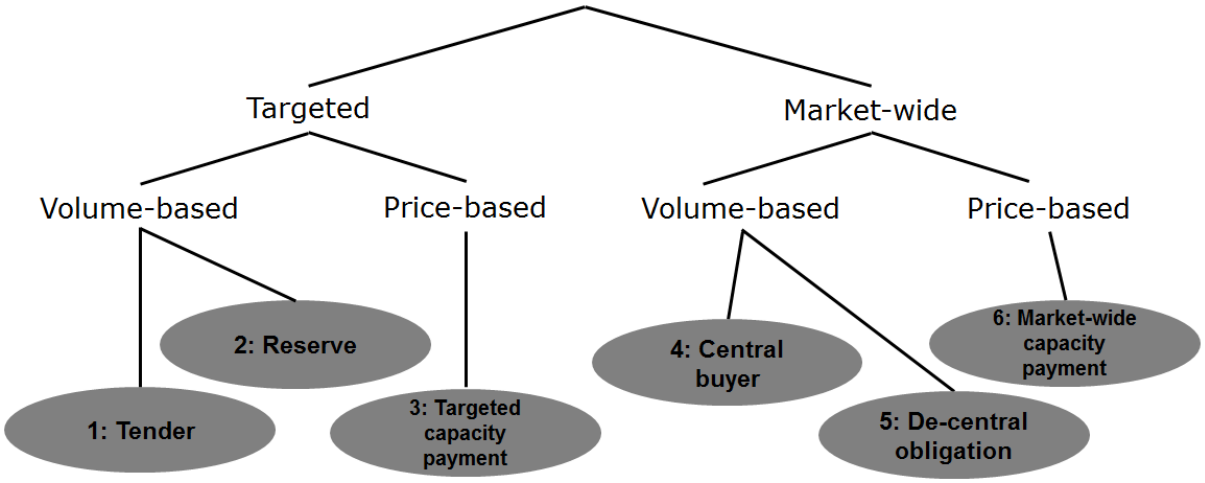
This paper describes the different types of capacity mechanisms that have been proposed or implemented in Europe and discusses the compatibility of their main design features with the Guidelines on State aid for environmental protection and energy (EEAG).

There is very limited case practice in this area, as only one case (SA.35980) has so far been assessed against EEAG Section 3.9. Therefore the high level and initial views expressed in this paper are presented for discussion and, as with other working group papers, should not be considered a definitive position of DG Competition.

1. TYPES OF CAPACITY MECHANISM

There are various forms of capacity mechanisms. They can be grouped into two broad categories: targeted mechanisms and market-wide mechanisms. Within these two categories, it is also possible to distinguish volume-based mechanisms and price-based mechanisms.

Figure 1: Taxonomy of capacity mechanism models:



Targeted mechanisms

Targeted mechanisms are those where the amount of capacity required and the amount expected to be brought forward by the market are determined centrally. The difference, or top up, is then procured through a capacity mechanism. Therefore, targeted capacity mechanisms provide support only to the additional capacity expected to be required on top of what the market provides, rather than to the market as a whole.

For the purposes of the sector inquiry, we have identified three basic types of targeted mechanisms[1]:

[1] http://europa.eu/rapid/press-release_MEMO-15-4892_en.htm

- Tender for new capacity – typically, the beneficiary of such a tender receives public financing for the construction of a power plant that would bring forward the top up capacity. Once the plant is operational, in some models the top up capacity runs in the market as normal (without a guarantee that the electricity will be sold). In other cases, the plant receives a power purchase agreement (so is paid for both its capacity and electricity through the capacity mechanism).
- Strategic reserve – in a strategic reserve mechanism, the top up capacity is contracted and then held in reserve outside the market. It is only run when specific conditions are met (for instance, when there is no more capacity available or electricity prices reach a certain level).
- Targeted capacity payment – in this model, a central body sets the price of capacity. This price is then paid to a subset of capacity operating in the market, for example only to a particular technology, or only to capacity providers that meet specific criteria.

Both the strategic reserve and the tender models are 'volume-based' mechanisms because the volume of capacity that receives support is determined at the outset. They differ from the targeted payment model where there is no restriction on the amount of capacity that receives the payment, but rather a restriction on the type of capacity.

Market-wide mechanisms

In a market-wide mechanism, all capacity required to ensure security of supply receives payment, including both existing and new providers of capacity. This essentially establishes 'capacity' as a product separate from 'electricity'.
There are three basic types:

- Central buyer – where the amount of required capacity is set centrally, and then procured through a central bidding process so that the market determines the price. This mechanism provides support to all (or at least the majority of capacity providers in the market – there may still be some restrictions on eligibility for example because some market participants receive alternative support).
- De-central obligation – where an obligation is placed on market participants (electricity suppliers / retailers) to contract with capacity providers to secure the capacity they need to meet their consumers' demand. The difference compared to the capacity market model is that there is no central bidding process to establish the price for the required capacity volumes.
- Market-wide capacity payment – where the price of capacity is set centrally, based on central estimates of the level of capacity payment needed to bring forward sufficient investment.

The central buyer and de-central obligation models are volume-based: in these models the volume of capacity required is set at the outset, while the price is determined by the market. The market-wide capacity payment is price-based since the price for capacity expected to achieve sufficient investment is fixed at the outset, while the volume may vary depending on how the market reacts to that price.

Further variations are possible within the different models depending on the specification of the capacity product and the associated obligations and penalties. For example, a reliability option, where capacity providers commit to deliver energy whenever called at a specified price, could be auctioned through a central buyer or be the product suppliers are obliged to buy in a de-central

obligation model. The market may also bring forward particular capacity products either in a system with a capacity mechanism, or in a system with an energy only market.

2. TENDER FOR NEW CAPACITY

2.1. Advantages

The tender for new capacity should be simpler to implement than most other measures.

Furthermore, if successfully implemented as a one-off measure, while market functioning is improved, a tendering procedure could result in minimal market distortion, particularly if participants, once constructed, participate as normal in the energy market.

2.2. Disadvantages

There is a risk that a tender reduces investor confidence and that future investors postpone investment to encourage further tender rounds that they can benefit from. This could mean all future investment becomes dependent on further tenders.

Since a tender only corrects the missing money problem for selected new generators, and not for existing capacity providers, it may not be an equitable (or effective) solution where there is a missing money problem[2]. It could prompt closure of existing capacity and thus be entirely ineffective.

Tenders are likely to lock in generation solutions and reduce opportunities for developing the demand side, interconnection and storage.

2.3. Compatibility with the guidelines

Point 226 requires a generation adequacy measure to be open and provide adequate incentives to both existing and future generators. A tender limited to new capacity could not meet this requirement.

Depending on the eligibility rules, a tender for new capacity may also struggle to meet the EEAG requirements related to technology neutrality (point 232 EEAG)[3].

If the mechanism prompts the closure of existing capacity it could not be considered appropriate.

3. STRATEGIC RESERVE

3.1. Advantages

The strategic reserve mechanisms may be useful for addressing problems of exceptional peak demand, while having minimal impact on market functioning except in times of scarcity (if, for example, the dispatch price is set at consumers' value of lost load). In this way, they arguably function as an extension of the balancing services that are required by TSOs to ensure moment to moment system stability.

[2] See the Capacity Mechanism Working Group paper " Assessing generation adequacy and the necessity of capacity mechanisms"
(http://ec.europa.eu/competition/sectors/energy/capacity_mechanisms_working_group_1.pdf)
[3] See also the Capacity Mechanism Working Group paper "The participation of non-generation activities, demand-side and storage in generation adequacy measures"
(http://ec.europa.eu/competition/sectors/energy/capacity_mechanisms_working_group_4.pdf)

The mechanism may be simpler to implement than market-wide measures.

3.2. Disadvantages

In the strategic reserve model, the price level at which the reserve is dispatched could become a price cap for the market, which will create a missing money problem if this price is less than consumers' value of lost load.

Furthermore, the existence of a reserve could undermine the confidence of investors in the market outside the reserve, for example because they believe the government may change dispatch rules if there are periods of high prices and pressure to reduce bills. If investor confidence is affected, this could lead to a need to increase the size of the reserve (the 'slippery slope'). Existing plants could also threaten to close unless included in the reserve, also contributing to the slippery slope problem.

Strategic reserve mechanisms may also bring about an inefficient use of resources. First, capacity held in reserve does not participate in the merit order which would ordinarily determine when it should run. In addition, since this capacity may not run as often as it would in the absence of the mechanism, the development of certain technologies may be hampered. For instance, although demand response can form part (or all) of a reserve, this may not be as effective a way of supporting the longer term development of the demand side as other capacity mechanisms that allow DSR to compete under normal market conditions.

It is also difficult to see how a strategic reserve tender could enable new and existing capacity to compete effectively. It would be inefficient to keep new capacity in reserve (except perhaps for a very small quantity of peaking capacity). Yet a reserve limited to existing plants could end up supporting old plants longer than would be the case in an efficient market.

3.3. Compatibility with the guidelines

Point 226 of the EEAG requires capacity mechanisms to provide adequate incentives to both existing and future generators and to operators using substitutable technologies. The extent to which interconnection capacity could remedy the generation capacity problem should also be taken into account. Depending on its design – for example the lead time between the tender process to establish the reserve and the point in time when the reserve must be available – a strategic reserve may fail to provide adequate incentives to future generators.

Finally, a strategic reserve may not meet point 231 of the EEAG, according to which the price paid for availability automatically tends to zero when the level of capacity supplied is expected to be adequate to meet the level of capacity demanded.

4. TARGETED CAPACITY PAYMENTS

4.1. Advantages

The targeted capacity payment model may be simpler to implement than market-wide capacity mechanisms.

4.2. Disadvantages

The mechanism involves a large number of difficult central calculations which are subject to error (not only the volume required, but also the price expected to be sufficient to bring forward this volume). The underlying issue is a problem of 'asymmetric information' whereby the central

administration has less information over the true costs of providing a service than the market players i.e. capacity providers.

Furthermore, because of the difficulty to calculate the appropriate price level, this model is more likely than amount-based market-wide mechanisms to lead to either over- or under-investment, depending on whether the price is set too low or too high.

In addition, given that the price is not calculated on the basis of a competitive bidding process, it may lead to overcompensation.

4.3. Compatibility with the guidelines

The administrative price setting and lack of a competitive bidding process is likely to be insufficient to demonstrate proportionality without an individual assessment of each beneficiary.

Depending on the eligibility criteria, the mechanism may discriminate for or against certain types of capacity. The measure may affect competition between different technologies (see point 232 EEAG), especially if payments are made to certain named technologies rather than to capacity providers in general that meet defined technical criteria.

Point 232(c) requires the establishment of a competitive price for capacity as part of avoiding negative effects on trade. An administrative price setting process may not provide sufficient reassurance in this regard.

5. CENTRAL BUYER

5.1. Advantages

The central bidding process (eg. auction) should transparently establish the sustainable market price for capacity. The transparent capacity price, and accessibility of the central bidding process, should also avoid providing any additional advantage to vertically integrated market participants.

Furthermore, the price should be responsive to the amount of capacity on the system, with a lower price at times of overcapacity and a high price at time when new entry is needed. This should send the right signals for efficient market entry and exit.

The central buyer mechanism offers the option to include long-term contracts / agreements which may be necessary to encourage new capital intensive projects and enable competition between new and existing capacity.

5.2. Disadvantages

The central buyer model requires significant market intervention and complex rules (though this could potentially be reduced with some models, for example a model reliant on high non-delivery penalties rather than extensive physical checking, pre-qualification and de-rating)[4].

The mechanism may be difficult to adapt and/or remove, particularly if long-term contracts have been awarded.

Need to centrally estimate overall capacity needs for entire market.

[4] See also the Capacity Mechanism Working Group paper " Designing appropriate obligations and penalties" (http://ec.europa.eu/competition/sectors/energy/capacity_mechanisms_working_group_6.pdf)

5.3. Compatibility with the guidelines

A central buyer model will require careful assessment but could meet all EEAG requirements.

Different contract lengths may be needed to ensure that the mechanism provides adequate incentives to both existing and future generators, in line with point 226 of the EEAG.

6. DE-CENTRAL OBLIGATION

6.1. Advantages

The de-central obligation mechanism may be easier to implement than mechanisms involving a central allocation process, as it avoids the need for the complex design of such a process and could involve the fewest central calculations (which are all subject to error / risk aversion).

The price of certificates should be responsive to the amount of capacity on the system, with a lower price at times of overcapacity and a high price at time when new entry is needed. This should send the right signals for efficient market entry and exit. Furthermore, if penalties are sufficient, the mechanism should provide a good incentive for suppliers to accurately judge the amount of capacity required.

The obligation on suppliers to contract bilaterally for capacity mirrors arrangements for electricity trading in liberalised energy markets.

This model potential allows room for the market to develop different capacity products that allow suppliers to more efficiently meet their obligation (for example by contracting different amounts of capacity from different types of provider on different contract types) than in other models.

6.2. Disadvantages

The system requires significant market intervention and the development of complex rules (though perhaps less complex than a central buyer mechanism).

Unless the design includes long contracts / agreements, it may not encourage new investment (or enable competition between new and existing market participants). This could lead to overcompensation of incumbent market participants and market power issues.

Reliance on bilateral trading may increase incentives for vertical integration and present a barrier to entry for independent capacity providers and electricity suppliers. Furthermore, vertically integrated companies have the potential to source certificates internally removing liquidity from the market if there is no compulsory trading of certificates on exchanges.

6.3. Compatibility with the guidelines

Point 226 of the EEAG requires a generation adequacy measure to be open and provide adequate incentives to both existing and future generators. The extent to which a de-central obligation supplier obligation / certificate scheme enables new and existing providers of capacity to compete would need to be carefully assessed.

A de-central obligation mechanism may lead to overcompensation (paid by consumers) where the market for certificates is not competitive i.e. if generators or retailers have market power (see points 230 and 233(d) EEAG.

7. MARKET-WIDE CAPACITY PAYMENT

7.1. Advantages

The market-wide capacity payment may be simpler to implement than other market-wide measures.

7.2. Disadvantages

The mechanism involves a large number of difficult central calculations which are subject to error (not only the volume required, but also the price expected to be sufficient to bring forward this volume).

Furthermore, because of the difficulty to calculate the appropriate price level, this model is more likely than amount-based market-wide mechanisms to lead to either over- or under-investment, depending on whether the price is set too low or too high.

In addition, given that the price is not calculated on the basis of a competitive bidding process, it may lead to overcompensation.

7.3. Compatibility with the guidelines

The administrative price setting and lack of a competitive bidding process is likely to be insufficient to demonstrate proportionality without an individual assessment of each beneficiary.

Point 232(c) requires the establishment of a competitive price for capacity as part of avoiding negative effects on trade. An administrative price setting process may not provide sufficient reassurance in this regard.

8. QUESTIONS FOR DISCUSSION

- Which factors should be taken into account when choosing one capacity mechanism model over another?
- Are certain models more appropriate than others to address particular generation adequacy problems (e.g. peak demand, seasonal demand, expected capacity closure, intermittent energy sources, regional shortages / constraints)?
- Do you agree with the advantages and disadvantages identified for each model? Has experience in your market shown something different? Are there major advantages or disadvantages missing from this list?