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Electricity Security of Supply TF

**Treatment of Interconnectors and
Neighbouring Resources in Capacity
Remuneration Mechanisms**

CEER Report

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INFORMATION PAGE

Abstract

This document (C15-ESS-06-03) is a report on the treatment of interconnectors and neighbouring resources in capacity remuneration mechanisms. The purpose is to assess and identify ways for interconnectors and foreign capacity providers to explicitly and efficiently participate in existing and future CRMs and ensure the provision of proper long-term investment signals that do not distort the Internal Energy Market.

Target Audience

European Commission, energy suppliers, traders, gas/electricity customers, gas/electricity industry, consumer representative groups, network operators, Member States, academics and other interested parties.

Keywords

Electricity, security of supply

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Related Documents

CEER documents

- [Joint ACER-CEER response](#) to the European Commission's Consultation on a new Energy Market Design, Agency for the Cooperation of Energy Regulators, Council of European Energy Regulators, 7 October 2015.

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External documents

- Communication from the Commission, [Guidelines on State Aid for environmental protection and energy 2014-2020](#), European Commission (2014) OJ C 200/1 -55 (EEAG 2014-2020).
- [Commission Regulation \(EU\) 2015/1222](#) of 24 July 2015 establishing a guideline on capacity allocation and congestion management, European Commission, 24 July 2015
- [Capacity Remuneration Mechanisms and the Internal Market for Electricity](#), Agency for the Cooperation of Regulators, 30 July 2013 [State Aid: sector inquiry into capacity mechanisms - factsheet](#), European Commission, 29 April 2015.
- [Interim Report of the Sector Inquiry on Capacity Mechanisms](#), European Commission, 13 April 2016.
- [DIRECTIVE 2005/89/EC](#) OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, of 18 January 2006, concerning measures to safeguard security of electricity supply and infrastructure investment , the European Commission, 18 January 2006.



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EXECUTIVE SUMMARY

There is a growing movement in a number of European Union (EU) Member States (MS) towards the implementation of Capacity Remuneration Mechanisms (CRMs) alongside the electricity wholesale market. This shift has mainly been driven by the rapid growth in renewable energy sources (RES) suppressing wholesale energy prices, combined with a lack of trust in the ability of scarcity signals in the energy market to trigger the investments necessary to ensure the required level of security of supply; the so-called ‘missing money problem’.

Expanding on previous analyses on CRMs and their potential impacts on the Internal Energy Market, the Council for European Energy Regulators (CEER) in this report focuses on the importance of including capacity located outside a country’s borders in national CRMs and sets out possible ways forward for doing so without causing undue discrimination between internal and cross-border participants and in accordance with the principles of market coupling.

The purpose of this analysis is to assess and identify ways for interconnectors and foreign capacity providers to explicitly and efficiently participate in existing and future CRMs and ensure the provision of proper long-term investment signals that do not distort the Internal Energy Market.

The report is divided into four parts: (i) context, (ii) preliminary analysis, (iii) different models for explicit participation, and (iv) conclusions and recommendations

Context

In the ACER-CEER response to the Energy Market Design consultation, it was acknowledged that:

“ [...] we do not necessarily see the need for a single EU-wide capacity mechanism or a need for the same design to be applied in every region, or, possibly, even in every location within each region, as long as explicit cross-border participation is allowed and within each region, and the differences in design do not adversely affect the functioning of the IEM. However, in all cases, the rationale for implementing new mechanisms should be carefully scrutinised and agreement at regional level is required.”

This paper builds on the above, focussing on approaches to cross-border participation in capacity mechanisms. It recognises that capacity mechanisms will not be implemented in all regions, but where they are adopted by a MS, the specifics of a capacity mechanism should not adversely affect the functioning of the Internal Energy Market.

An equally important aspect of cross border participation in capacity mechanisms was also highlighted in the response to the EMD consultation, namely the importance of the TSOs not limiting the amount of cross-border capacity that is available in the case of a shortage situation, and ensuring that there is clear treatment of local and foreign capacity providers, particularly when there is a simultaneous shortage situation in two countries.



A common European framework for cross-border participation which addresses both of the above components is needed so that national CRMs comply with the principles of efficiency, transparency and non-discrimination, and provide the appropriate incentives for investment and use of interconnection capacity.

In simple terms this report seeks to answer the question: “if a MS or region has decided to implement a capacity mechanism, how can that be designed in the most efficient and least distortive manner?”

In assessing whether and how cross-border capacity should be included in CRMs, we consider arguments related to system adequacy analysis. Under the current EU legal framework (EC Directive 2005/89), the MSs are required to ensure security of electricity supply (SoS), compatible with the internal market for electricity. The introduction of CRMs is considered to safeguard generation capacity and the contribution of cross-border flows to the system adequacy should be taken into account in order for CRMs to be efficiently implemented. The European Commission’s State Aid Guidelines (EAAG)¹ and working papers on State Aid also require including cross-border capacity in CRMs and strongly favour explicit inclusion of cross-border capacity.

Preliminary Analysis

Along with the provisions set out in the EAAG and the cross-border trading rules provided for in the Guideline on Capacity Allocation and Congestion Management (CACM Guideline), several prerequisites have been identified for the efficient treatment of cross-border participation:

- a. Transmission System Operators (TSOs) are incentivised to make a sufficient and appropriate amount of cross-border capacities available for cross-border trade throughout the year(s)²;
- b. TSOs are not allowed to adjust, limit or reserve³ these cross-border transmission capacities at any point in time, including in case of a scarcity situation;
- c. TSOs agree ex ante on the treatment of local/foreign adequacy providers in case of widespread scarcity situation (i.e. a situation in which a scarcity situation affects at least two countries simultaneously).

¹ Communication from the Commission, Guidelines on State Aid for environmental protection and energy 2014-2020 (2014) OJ C 200/1 -55 (EEAG 2014-2020).

² We note that this is a requirement of the Capacity Allocation and Congestion Management guideline and is an issue which regulators will closely scrutinise when faced with a decision to approve Capacity Calculation Methodologies developed under the CACM regulation.

³ Except for exchange of Balancing Services in accordance with the forthcoming Electricity Balancing Guideline



In accordance with the EEAG, this paper emphasises that CRMs should not disrupt the proper functioning of the internal energy market and of market coupling mechanisms in particular. At the same time, however, a common understanding on the market coupling outcome when there is coincident scarcity in two countries is needed in order for countries to be able to efficiently account for cross-border capacity in CRMs.

In the report we discuss different ways of taking into account the contribution of foreign capacity to the CRMs based on an overview of CRMs in Europe. These include implicit contribution, strategic reserves and explicit participation.

Currently in Europe, accounting for the contribution of cross-border participation is mostly happening via implicit contribution (inclusion of cross-border flows in adequacy analysis only). This approach poses the issue of discrimination between domestic and foreign capacity by preventing interconnectors and foreign capacity providers from being remunerated for their contribution to SoS. This, in turn, could distort long-term investment-signals and put at risk the security of supply in the country with a CRM and therefore across the Internal Energy Market. In the case of strategic reserves, under the assumption that reservation of transmission capacity is not allowed, we conclude that it is not feasible for explicit cross-border participation to be implemented. We consider explicit participation to be the most efficient way for cross-border capacity to participate in the CRMs.

Different Models for Explicit Participation

We recognise several kinds of cross-border participation within the concept of explicit participation. **In the table below we summarise the three models and assess their ability to correct distorted investment signals.** As explained in the report, we consider that the greatest value in explicit cross-border participation is likely in the revenue sharing model that appears to always send the proper investment signals (to the resource that is scarce) and is able to reflect changes in interconnector investments and foreign capacity over time.



Model	How does it work?	Does it correct distorted investment signals?	
		Interconnector capacity is scarce	Interconnector capacity is not scarce
1. 'Pure' Interconnector Model	1IC participates directly and receives the full capacity agreement.	Yes - if the remuneration corresponds to the capacity price differential- supports signals for interconnector investment	No – likely to undermine signals for investment in foreign capacity and inefficiently support IC investment
2. Pure 'Foreign Capacity Provider' Model	Foreign capacity participates directly. Capacity agreement shared if supply at the same price exceeds the interconnector capacity.	No – likely to undermine signals for investment in ICs.	Yes - supports signals for investment in foreign capacity
3. Revenue Sharing Model	Separate auction for foreign capacity. Revenue shared between IC and foreign capacity according to the scarcity resource during scarcity periods.	Yes - supports signals for interconnector investment	Yes - supports signals for investment in foreign capacity

Conclusions and Recommendations

On the basis of the provided analysis and in accordance with EEAG, we emphasise the need for explicitly taking into account the contribution of foreign capacity to the CRMs in order for efficient investment signals to be provided. The Agency for the Cooperation of Energy Regulators (the Agency) has outlined several recommendations, which, together with the explicit cross-border participation approach, should be treated at EU level:

1. Interconnection capacity calculation methodology should be transparent and enable to maximise the available capacity while respecting network constraints. TSOs should be incentivised to make a sufficient and appropriate amount of cross-border capacities available for cross-border trade throughout the year(s), and they should not be permitted to limit cross border capacity during scarcity situations;
2. The allocated interconnection capacity should be firm;
3. The regulators could investigate the issue regarding the maximisation of firm capacity and address accordingly the recommendations in the framework of the development of capacity calculation methodologies foreseen in the CACM Guideline;
4. Simultaneous scarcity situations in two countries should be taken into account in the European guidelines/network codes implementation and market coupling algorithms; and
5. The question of long-run investment signals to be sent has to be addressed as either transmission capacity or level of foreign capacities could improve security of supply. A mechanism that provides for the remuneration of either foreign capacity of interconnectors, depending on which is the scarce resource, could be the most efficient, equitable and adaptable approach.



1 Context of the report

1.1 Introduction

A number of factors in the European electricity sector have motivated some EU MSs to introduce or consider introducing CRMs alongside the energy market and the implementation of the European Electricity Target Model.

These factors include:

- Low level of wholesale prices due to a significant penetration of subsidised RES;
- Insufficient price-responsive demand in scarcity situations to ration supply giving rise to ‘the missing money problem’ in such that there is a lack of trust in the ability of scarcity signals in the energy market to trigger the investments necessary to ensure the required level of security of supply;
- A lack of confidence in the ability of market coupling alone to address national security of supply’s concerns and ensure long run revenue adequacy;
- And a lack of an appropriate regulatory framework for the development of demand response.

While the Agency has already expressed its strong doubts whether the implementation of these uncoordinated complementary markets will make the European energy market more efficient⁴, there remain fundamental challenges that need to be addressed in order to ensure that these CRMs will not adversely impact further the functioning of the internal market. One of these challenges in the design of CRMs is the way how cross-border capacity (interconnectors and foreign capacity providers) can explicitly and efficiently participate in current or future CRMs in order to minimise distortions to signals for investment in capacity across Europe.

This paper sets out our views on how to ensure that, where CRMs are implemented in the EU, their rules do not unduly discriminate between internal and cross-border trade or distort market coupling.

The first part of the report deals with the overall context, the second part is a preliminary analysis, and the third part describes the different models for explicit cross-border participation in CRMs. In the fourth part of the report we set out our conclusions and recommendations for next steps.

⁴http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/CRMs%20and%20the%20OEM%20Report%20130730.pdf



1.2 Terminology

In this report we use various concepts which we will briefly introduce below.

- **CRMs:** the report considers all models of capacity remuneration mechanisms⁵ that are covered by the taxonomy used by the European Commission in its press release on the Sector Enquiry into CRMs in the EU of 29 April 2015⁶ (Figure 1).

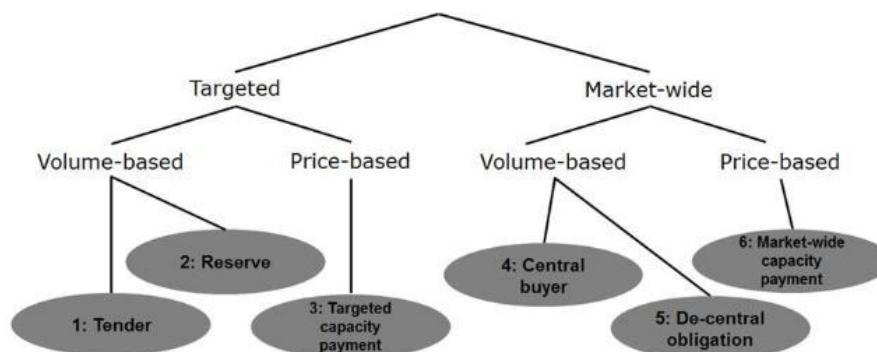


Figure 1: Models of CRMs taken into account in this report [Source: European Commission 2015]

- **Capacity:** if not specified, this term refers to generation capacity as well as flexible demand side and storage capacity. To avoid confusion, the term ‘interconnection capacity’ will not be shortened.
- **Neighbouring resources:** the term “neighbouring resources” refers to (a) generation capacity located in adjacent bidding zones and (b) interconnectors between the two bidding zones. These bidding zones are based on structural congestion and are determined under the terms of the EU Regulation on Capacity Allocation and Congestion Management.
- **Cross-border participation:** means the participation of interconnectors and/or foreign capacity in national and regional CRMs.
- **System adequacy analysis:** the analysis of the adequacy of the electricity system, including expected patterns of demand, supply and cross-border exchanges.
- **Explicit participation:** participation and remuneration of cross-border capacity providers or interconnectors in CRMs.
- **Implicit contribution:** inclusion of cross-border flows in system adequacy analysis and/or in the design of a CRM (e.g. to calculate a target capacity volume). Implicit, in this context, means no direct participation of capacity providers.
- **Delivery:** depending on the type of CRM being considered, when delivery is remunerated, capacity owners are required to produce energy during certain periods and energy is flowing towards the country with a CRM.

⁵ We define as Capacity Remuneration Mechanism (CRM) any mechanism explicitly aimed at tackling (potential) adequacy and operational reliability issues by either remunerating capacity (in terms of money per power) or requiring the fulfilment of capacity obligations or targets. The term CRM is the one mostly often used in literature even if sometimes, the more generic term Capacity Mechanism is also employed. In this report, we will treat the two terms as synonymous.

⁶ http://europa.eu/rapid/press-release_MEMO-15-4892_en.htm



- **Availability:** depending on the type of CRM being considered, when availability is remunerated, capacity providers are only required to submit a bid into the relevant market timeframe in their bidding zone or just to be capable of producing energy.
- **Capacity margin:** usually the capacity margin is defined as the proportion by which the total expected available generation exceeds the maximum expected level of electricity demand at the time of maximum demand. In this report, the term is used to describe whether the available generation in a specific country is expected to exceed the total load at a given time. If the capacity margin is positive, the country can export electricity to neighbouring bidding zones. If it is negative, the country is required to import power from other countries to ensure that there is sufficient supply to meet demand.
- **Scarcity situation:** scarcity refers to situations in which available capacity (which might include operating reserves and/or security margin) is not able to meet the anticipated demand of electricity and therefore there is the risk of shedding load in order to keep the system balanced.

1.3 System adequacy analysis

Under the current EU legal framework there is an obligation for MSs to ensure system adequacy in electricity and proper functioning of the internal market. EC Directive 2005/89 on security of electricity supply calls for MSs to define transparent, stable and non-discriminatory policies on security of electricity supply (SoS), compatible with the internal market for electricity. All MSs have since developed SoS policies for electricity in their jurisdiction.

System adequacy analysis is an important tool both to identify system adequacy issues and evaluate the effect of an intervention to introduce a CRM to safeguard generation adequacy. We consider that system adequacy analyses should better take into account the full contribution of cross-border exchanges of electricity to national security of supply's concerns. Most national adequacy analyses take into consideration some degree of imported energy from neighbouring countries and bidding zones. However, so far, there is no harmonised methodology to assess the contribution of cross-border flows to system adequacy in a transparent manner, including the correlation of supply and demand curves between different countries. A harmonised method to analyse security of supply should encompass transparent criteria, include clear methodologies to assess both how the system functions during periods of scarcity and the extent to which you can rely on cross-border trade in those situations. This methodology should be harmonised on an EU-wide level.

Furthermore, in an integrated European energy market, security of supply can no longer be regarded as a purely national consideration, and should therefore also be addressed on a regional and pan-European level. It is for this reason CEER is considering the matter of harmonisation of system adequacy and the impact of interventions for generation adequacy on the internal electricity market.



Regional system adequacy analysis will also lead to a better understanding of system adequacy issues and higher efficiency of both the internal market, and potential policy interventions to enhance system adequacy. We encourage current works on this topic, particularly regional initiatives such as the Pentalateral Energy Forum. A fully coordinated (transparent and efficient) regional and ultimately European adequacy assessment is, together with a well-functioning market, an important cornerstone of any efficient security of supply policy.

1.4 The Environmental and Energy State Aid Guidelines

On 29 April 2015 the European Commission launched a sector inquiry on the existence and functioning of CRMs. The Commission published an interim report in April 2016 for consultation. A final report is aimed to be published by the end of 2016.

Before this initiative, the European Commission published some guidelines related to cross-border participation in CRMs through the EEAG in summer 2014. Section 3.9 of these guidelines is dedicated to “aid for generation adequacy” and raises some points that are linked to the consideration of interconnections as listed below:

- (226): *“The measure should be open and provide adequate incentives to both existing and future generators and to operators using substitutable technologies, such as demand-side response or storage solutions. The aid should therefore be delivered through a mechanism which allows for potentially different lead times, corresponding to the time needed to realise new investments by new generators using different technologies. **The measure should also take into account to what extent interconnection capacity could remedy any possible problem of generation adequacy**”* ;
- (232): *“The measure should be designed in a way so as to make it possible for any capacity which can effectively contribute to addressing the generation adequacy problem to participate in the measure, in particular, taking into account the following factors:*
 1. *The participation of generators using different technologies and of operators offering measures with equivalent technical performance, for example, demand side management, **interconnectors** and storage. Without prejudice to paragraph (228), **restriction on participation can only be justified on the basis of insufficient technical performance required to address the generation adequacy problem**. Moreover, the generation adequacy measure should be open to potential aggregation of both demand and supply;*
 2. ***The participation of operators from other Member States where such participation is physically possible in particular in the regional context**, that is to say, where the capacity can be physically provided to the Member State implementing the measure and the obligations set out in the measure can be enforced (98);*
 3. *Participation of a sufficient number of generators to establish a competitive price for the capacity;*
 4. ***Avoidance of negative effects on the internal market, for example due to export restrictions**, wholesale price caps, bidding restrictions or other measures undermining the operation of market coupling, including intra-day and balancing markets”*;



- (233): *“The measure should be designed in a way so as to make it possible for any capacity which can effectively contribute to addressing the generation adequacy problem to participate in the measure, in particular, taking into account the following factors:*
 1. **Not reduce incentives to invest in interconnection capacity ;**
 2. **Not undermine market coupling, including balancing markets ;**
 3. *Not undermine investment decisions on generation which preceded the measure or decisions by operators regarding the balancing or ancillary services market ;*
 4. *Not unduly strengthen market dominance ;*
 5. *Give preference to low-carbon generators in case of equivalent technical and economic parameters”.*

In addition the European Commission Directorate-General for Competition held a series of Working Groups on the EEAG and in particular on capacity mechanisms, with a Workshop held on 30 June 2015 specifically on participation of cross-border capacity in capacity mechanisms⁷.

Furthermore, the communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, launching the public consultation process on a new energy market design, also states that:

(4.3): “A framework to opening capacity mechanisms across borders: European security of supply monitoring and clear system adequacy standards should be the basis to identify whether a capacity mechanism is needed. Existing Commission action, in particular State aid guidelines, require all Member States to respect a number of important principles when opting for capacity mechanisms. Notably such mechanisms should not discriminate between technologies (including demand response or storage) or between new and existing capacity providers, but should pay only for availability (per MW) and allow for cross-border participation. In the absence of common arrangements, organising effective cross-border participation can be challenging.”

2 Preliminary analysis

⁷ See:http://ec.europa.eu/competition/sectors/energy/capacity_mechanisms_working_group_6_draft.pdf



2.1 Interactions with energy market and coupling mechanisms

A central issue for consideration in the context of the Internal Energy Market is the question of interactions between CRMs and energy markets and energy market coupling mechanisms (day ahead, intraday and balancing). In the EEAG the European Commission points out the fact that the measure should “*not undermine market coupling, including balancing markets*”.

As it is necessary to avoid any undermining of the functioning of energy market and coupling mechanisms we consider that rules for the participation of cross-border capacity in CRMs do not have any undue impact on commercial and physical flows of energy (short-term operation), in accordance with EEAG provisions. Therefore, we exclude the following solutions from our scope:

- Solutions based on transmission capacity reservation should not be implemented as it would modify the market coupling allocation and would not be consistent with the Regulation (EC) 2015/1222 establishing a guideline on capacity allocation and congestion management (CACM Guideline);
- Solutions where market coupling rules as provided for under the CACM Guideline are not respected;
- Solutions with cross-border participation based on energy delivery (and not based on availability) as we consider that such solutions are likely to distort the underlying energy market.

Assuming MSs have well-functioning market coupling⁸, including intraday, should ensure that electricity flows to the areas where it is needed during a scarcity situation. This means that in the majority of situations, countries should have confidence that cross-border capacity will deliver (minimising the need for obligations based on delivery). However, in case of simultaneous scarcity in both markets, the available supply is insufficient to meet all demand orders.

	Interconnection not congested	Interconnection congested	
		A --> B	B --> A
No scarcity	No problem	No problem	No problem
Scarcity A & no B	This case is not possible with market coupling ⁹	This case is not possible with market coupling	Interconnection is fully used in the optimal direction
Scarcity A & B	It is more difficult to predefine the direction of flows	It more difficult to predefine the direction of flows	It is more difficult to predefine the direction of flows

⁸ Market coupling for all short-term markets (day-ahead, intraday and balancing).

⁹ More precisely, it is not possible if the scarcity appears at the time of the market coupling.



This specific situation of simultaneous scarcity leads to an order curtailment situation in which part of the price taking demand orders¹⁰ cannot be fulfilled by the available supply offers. The market coupling algorithm needs to reduce demand orders among the involved countries. If this cannot be done in price order (for example because price caps have been breached), then the algorithm will need to find a different way to determine flows. There may be a lack of clarity about how market coupling will determine flows during double scarcity. In order for countries to be able to efficiently account for cross-border capacity in CRMs, it is important that there is a common understanding on the market coupling outcome when there is coincident scarcity in two countries. It is therefore important that there is a greater clarity and a full account of this issue in the European guidelines/network codes¹¹ and market coupling algorithms around what happens in these situations.

In addition, while EU rules require TSOs to allow market coupling to determine flows, even during simultaneous scarcity¹², countries may not be confident or clear about when neighbouring TSOs might take emergency actions which could limit cross-border flows (for example, market suspension). It is vital that TSOs not only respect the results of market coupling, but also the rules/arrangements in the framework of the implementation of network codes and guidelines which should be defined in case of simultaneous scarcity situation even if this leads to load shedding within their own control area.

2.2 Interconnection capacity and cross-border participation in CRMs

As is the case for market coupling in general, the level of interconnection capacity between MSs directly impacts the extent to which neighbouring resources are able to participate in national CRMs. In addition, external participation in a CRM affects security of supply of a neighbouring country and raises the question of the firmness of the allocated interconnection capacities. It also raises the issue of the level of cross-border capacity made available to the market compared to the built physical interconnection lines. In order to maximise the impact of neighbouring resources participation, the firm available interconnection capacity should be maximised. In this regard, TSOs must develop interconnection capacity calculation enabling to optimally allocate the existing transmission capacity and to avoid any undue discrimination issue between cross-border and internal flows. In addition, the allocated interconnection capacities should be firm, including in times of simultaneous market scarcity. The maximisation of firm capacities is a prerequisite for the functioning of cross-border participation of neighbouring resources in CRMs.

¹⁰ These price taking demand orders are buy orders submitted at the maximum price which is currently set at 3000 €/MWh in the MRC region.

¹¹ Specifically the EC Guideline on Capacity Allocation and Congestion Management (CACM), the draft Emergency and Restoration Network Codes and the draft Electricity Balancing Network Codes. For example, the NRAs' approval of the market coupling algorithms (foreseen for the CACM implementation) might help to address some issues.

¹² Article 4(3) of the Security of Electricity Supply Directive (2005/89/EC)



In the joint ACER-CEER response to European Commission's Consultation on a new Energy Market Design (EMD) this approach was supported by promoting a common European framework in which *"TSOs are incentivised to make a sufficient and appropriate amount of cross-border capacities available for cross-border trade throughout the year(s)"* and *"TSOs are not allowed to adjust, limit or reserve these cross-border transmission capacities at any point in time, including in case of shortage emergency situation"*.

Interconnector capacities determine the maximum extent of neighbouring participation in the CRM. The full available interconnector capacity between MSs may not be open for neighbouring participation in a national CRM¹³. It is crucial for the reliability of explicit cross-border participation that cross-border capacities are firmly committed to the relevant TSOs which means that there should not be rules that empower TSOs to unduly discriminate between internal and cross-border flow by either limiting ex ante the level of cross-zonal capacities made available to the market or by curtailing allocated cross-zonal capacities including in case of simultaneous scarcity.

The regulators could investigate the issue regarding the maximisation of firm capacity and address accordingly recommendations in the framework of the development of capacity calculation methodologies foreseen in the CACM Guideline.

2.3 Implicit contribution

Based on the overview of CRMs in Europe, we can note that today when there are CRMs in place the most widespread approach is not explicit participation, but taking cross-border flows into account when dimensioning the CRM. This is referred to as implicit contribution. For this reason, we consider that it is necessary to analyse the framework around the implicit contribution.

Implicit contribution helps to reduce the risk of inefficient volumes of capacity being built across Europe as a result of CRMs. However, it does not enable cross-border capacity to be rewarded for its contribution to security of supply. It would therefore not resolve the issue of domestic capacity being inefficiently supported in favour of cross-border capacity. As a consequence, implicit contribution of cross-border capacity alone would not correct the distorted long-run investment signals introduced by CRMs.

In conclusion, we consider that accounting for the contribution of cross-border capacity in an adequacy study ("implicit contribution") is clearly better than not taking neighbouring resources into account at all, as it leads to a more efficient overall volume of capacity being procured. However implicit contribution would not enable interconnectors and foreign capacity providers to be remunerated for their contribution to security of supply, which would distort investment signals.

2.4 Explicit participation in strategic reserves

¹³ The report does not deal with the question of the level of interconnector capacity (i.e. the de-rated interconnector capacity) which should be open for neighbouring participation in CRM.



Strategic reserves, such as the planned German Capacity and Climate Reserve, usually do not allow owners of generating capacities participating in the reserve to commercially operate their reserve plants on the electricity market. They are not allowed to offer or sell the energy at any electricity market such as the day-ahead, intraday or balancing power market. Instead, the capacity is called on exclusively by the TSOs if neither day-ahead nor intraday trading is able to fully cover the demand, despite competitive bidding and market-based pricing, and balancing power is insufficient to prevent load shedding. Thus, the reserve is called on after the trade at the day-ahead and the intraday market is completed. The aim of such a CRM design is to minimise the impact of the CRM on the functioning of the energy market.

However, the implementation of explicit cross-border participation is challenging in such a CRM design. In order to transport energy to another bidding zone, capacity owners need to acquire interconnection capacity implicitly (through market coupling) or explicitly. With implicit allocation under market coupling, interconnection capacity is acquired through submitting energy bids and offers into the day-ahead or intraday-market. Without reservation of cross-border capacities, an activation of foreign capacity by the TSOs is unlikely to provide any security of supply benefit as there is unlikely to be any commercially available interconnector capacity after the closure of the day-ahead market and intraday market. Therefore, in case of these strategic reserves and assuming there is no reservation of interconnection capacity it does not seem to be feasible for explicit cross-border participation to be implemented.



3 Explicit participation

This section deals with the explicit schemes for external capacities to participate to a CRM and analyses the consequences on investment signals.

3.1 Long-run considerations and investments incentives

A question which could be further analysed with regard to explicit participation relates to long-run remuneration and its distribution across different types of capacity provider and between producers and consumers. CRMs are developed to ensure long-run adequacy and therefore the price signals and the improvement in security of supply that they provide should be analysed in this respect.

Theoretically, cross-border capacity can increase security of supply only if a physical flow between the two countries can occur during scarcity periods. So two events have to be simultaneous:

- The ability of the capacity provider to produce during these periods; and
- The possibility for this energy to transit across the border during these periods.

Let us consider the example of country A where a CRM is in place and an interconnection with a limited interconnection capacity of 1 GW between A and B. In that case, different situations can occur when A is confronted to a scarcity situation:

- If the interconnection is not congested, then an investment signal could be sent to foreign capacities by the CRM. Development of new capacities in B could improve the security of supply in A.
- If the interconnection is congested, even if new capacities are developed in B, the security of supply in A would not be better. In that case, it is necessary to increase the interconnection capacity between A and B to improve security of supply in A.

This simple case shows that, in the long-run, security of supply can be improved by investing in foreign capacities or interconnections depending on the physical situation in country A's scarcity periods. These long-run signals should be sent by enabling cross-border capacity which can *effectively* contribute to addressing a capacity adequacy issue access to national CRMs.

More generally, the two parameters that are to be considered to analyse the security of supply issue in long-run on a given border, are the congestion status of the interconnection and the total capacity margin available in the neighbouring zone. This is because supporting investment in neighbouring capacity which is unlikely to influence flows during a scarcity situation in country A is unlikely to be efficient as it would not address the capacity adequacy issue. This arguably includes capacity which is expected to be contributing to foreign demand during a scarcity situation in country A.



This allows us to draw a table of possible situations in scarcity time in A:

Is the interconnection congested?	Is cross-border capacity margin positive?	Consequences
No	Yes	This situation should not happen if there is no market coupling failure
No	No	In that case, development of foreign capacities would improve Security of Supply
Yes	Yes	In that case, development of interconnection capacity would improve Security of Supply
Yes	No	In that case, development of both foreign capacities and interconnection capacity would improve Security of Supply

Economically, a capacity mechanism that is capable of remunerating both capacity providers and interconnectors depending on these long-run considerations could lead to security of supply being achieved more efficiently. The equilibrium of this security of supply optimisation would be defined by the incentives provided by the CRM.

In the next section we summarise possible models for explicit participation and analyse whether they are able to appropriately remunerate interconnectors or foreign capacity according to their contribution to security of supply.

3.2 Possible models of explicit participation

Three models could be studied for explicit cross-border participation in CRMs: one based on interconnectors' participation, one based on foreign capacity providers' participation and one based on the sharing of revenues between interconnector and foreign capacity providers.

3.2.1 "Pure" interconnectors' model

In this model, interconnectors can participate in the CRM as if they were domestic capacity providers. The CRM remuneration of foreign resources is received exclusively by interconnectors and so it will create incentive for investment in interconnections.



Interconnectors receive the remuneration without necessarily signing contracts with external capacity owners. We consider that such a model will send efficient signals¹⁴ when the interconnections limit the contribution of SoS from the foreign country (to the country where CRM is implemented). However, when scarcity is expected in two markets simultaneously, no investment signal is sent to build new capacity on the other side of the border, even though this could be a more efficient solution to the capacity adequacy issue. The investment signal is not properly defined (cf. 4.1) as the remuneration goes to the interconnector in all situations. It is then incentivised to increase its transmission capacity, even if there is not enough “capacity margin” on the other side of the border and thus the scarce resource is not the interconnection anymore.

We also note that the interconnector’s model is operationally in place in Great Britain and that it is relatively easy to implement. While the model is inappropriate when interconnector capacity is not the scarce resource, it could be a practical explicit-participation-solution in certain situations (e.g. when interconnector capacity is expected to be the scarce resource).

3.2.2 “Pure” foreign capacity providers model

The idea of this model is to be able, as an owner of a capacity in a country B, to directly participate in the CRM existing in a country A. In the same way, this owner is able to sell its energy in the integrated energy market.

Consequently, capacity providers receive the CRM remuneration. Nevertheless, this assertion raises the question of how the foreign capacities who should receive this remuneration are selected.

On the one hand, all foreign capacities contribute to security of supply, but, on the other hand, they may not necessarily all agree to undertake any commitment related to the CRM in country A.

A solution could be to select any foreign providers that can accept lower capacity payments than domestic providers. However, the supply of relatively inexpensive foreign capacity is likely to outweigh the interconnector capacity, particularly when interconnector capacity is scarce. These providers might all bid at the same low price in order guarantee a capacity agreement, meaning there would be no obvious way to differentiate between them. In this situation, the capacity agreements awarded to foreign capacity might need to be shared between them. This would reflect the fact that capacity behind a constrained transmission line is limited by its transmission capacity.

With this model, if the transmission capacity is the scarce resource, the interconnector could not receive this remuneration. Thus, it would therefore not correct potential distortions to signals for interconnector investment. In this situation, the model would also send inefficient signals for investment in foreign capacity which is unable effectively contribute to the capacity adequacy issue.

¹⁴ Assuming that the revenue is properly defined (corresponding to the capacity price differential between the two countries)



3.2.3 “Revenue sharing” model

A solution to provide efficient investment signals could be a “revenue sharing” model. This model should provide the right investment signal to both interconnectors and capacity providers, depending on what is the scarce resource: when interconnectors are the scarce resource, they will receive the CRM remuneration and when foreign capacity providers are the scarce resource, they will receive the CRM remuneration. If this model is well designed, the scarce resource should be remunerated. Two possible ways to achieve this could be:

- Foreign capacity providers compete in the CRM with an amount not higher than the interconnector’s capacity through a separate auction. The successful capacity providers will receive the clearing price of the separate auction, which is equal to the highest successful foreign capacity bid, while the interconnector would earn the difference between the CRM clearing price and the clearing price from the auction for foreign capacity; or
- Interconnectors can sell ‘tickets’ to the foreign capacity provider for access to the CRM, with the maximum volume of ticket sales being equal to the interconnectors’ capacity. The interconnector would earn the income from the “ticket” sales, while the foreign capacity provider would earn the difference between the CRM clearing price and the “ticket” price.

These are two possible models to ensure efficient investment signals, depending on what is the scarce resource.

In cases where there is a high likelihood of simultaneous scarcity in the two interconnected countries, it may be needed to investigate additional measures to ensure that the model will provide efficient investment signals.

One possible solution to this issue may be to compare the level of transmission capacity and the “capacity margin” in the foreign country during scarcity periods of the CRM. Other solutions may be to apply de-rating methodologies to account for the risk of simultaneous scarcity situations.

In practice, to ensure a correct investment signal which takes into account the risk of simultaneous scarcity is complex, as it is both difficult to assess the “capacity margin” and to assess what an efficient de-rating should be. A solution could be to base the evaluation on an *ex ante* probabilistic calculation based on its historical load factors, but this needs to be further studied.

In the case of similar and harmonised CRMs in both countries, a common auction launched in both countries could enable to balance the remuneration between interconnectors and capacity providers: (i) if interconnection capacity is the scarce resource, interconnector will receive the revenues equal to the price difference between both CRMs and (ii) if capacity providers are the scarce resource, they will get all the CRM remuneration.



3.2.4 Comparison between these models

The table below sums up the differences between these three explicit participation schemes:

Model	How does it work?	Does it correct distorted investment signals?	
		Interconnector capacity is scarce	Interconnector capacity is not scarce
1/ "pure" inter-connectors	IC participates directly and receives the full capacity agreement.	Yes - supports signals for interconnector investment	No – likely to undermine signals for investment in foreign capacity and inefficiently support IC investment
2/ "pure" foreign capacity providers	Foreign capacity participates directly. Capacity agreement shared if supply at the same price exceeds the interconnector capacity.	No – likely to undermine signals for investment in ICs.	Yes - supports signals for investment in foreign capacity
3/ "revenue sharing"	Revenue shared between IC and foreign capacity according to the scarcity resource during scarcity periods, either through a separate auction or directly in the CRM auction.	Yes - supports signals for interconnector investment	Yes - supports signals for investment in foreign capacity

In the three models, remuneration from the CRM and responsibility (in terms of SoS) associated are differently shared between entities. In the "pure interconnector" model, the interconnector is remunerated and commits itself to participate in the CRM set in the foreign country, whereas in the "pure capacity providers" model, this mission is dedicated to foreign capacities who are remunerated for this. Only the "revenue sharing" model is able to share the revenues and the linked responsibility between interconnector and foreign capacity providers. Nevertheless, implementation costs of each of them could be different as, for example, the revenue sharing model and the 'pure' foreign capacity providers model seem to be more complex than the 'pure' interconnectors model. It should be preferable to evaluate further the costs of the different options compared to their added-value.

It is possible that it might be most cost effective to implement different approaches in different situations. For example, if the European wide capacity adequacy study finds that the scarce resource between two certain regions is clearly the interconnector capacity, then only the interconnector might need to participate in the CRM in that particular year. When the scarce resource is less clear, then a revenue sharing model could be used. However, the situations in which each model is enacted would have to be very clearly defined in order avoid investor uncertainty.



3.3 Technical issues raised by explicit participation

Before concluding this report, it appears that, whatever the explicit participation model which could be set, some technical issues would have to be dealt with during the implementation phase. The following explains some of these issues:

Participation of a capacity in two CRMs

In principle, cross-border capacity should be capable of participation in two national CRMs as such capacity can contribute to security of supply of the two countries. For example, two neighbouring countries could have different security of supply drivers as peak load demand in winter or intermittency of RES production. A given capacity provider can help both of these countries by activating at different period, depending on the specific problem of security of supply that emerges. Not considering this case may lead to overcapacity resulting in higher costs for consumers.

Nevertheless, such cross-border capacity providers have to respect certain conditions. Theoretically, the only condition seems to be that a capacity provider cannot provide the same capacity at the same time in two different mechanisms. For example, a given capacity could dedicate half of its total power to one CRM and half to the other in case of simultaneous scarcity situations. It can also dedicate all of its power to each CRM if the scarcity periods are not simultaneous.

As it could be difficult to manage the sharing of one capacity provider between two CRMs at the same time, an easier solution could be to consider that a capacity cannot participate in two different CRMs simultaneously. In order to take stock of capacity participating in more than one CRM simultaneously, a possible solution could be implementing a European common capacity register. This register would be public (at least opened to all TSOs and CRM managers) and would contain an exhaustive list of European capacities and the CRMs where they are engaged. Moreover, this kind of register could also be an interesting tool to build regional adequacy studies.

Then, one possible solution could be using this register to avoid simultaneous participation of capacity in more than one CRM. Agreements between European TSOs will also be necessary to avoid double participation situations.

Treatment of particular capacities

Some capacity providers receive subsidies or incentives that are not correlated to the market, especially RES capacity providers under feed-in-tariffs contracts. For example capacity providers which already have a separate long-term support contract that fully remunerate their investment where the level of support was set without the knowledge that CRM revenues would be available. It is important to be sure that these capacity providers do not earn extra-remuneration from CRM. In existing CRM designs, this is generally the case for domestic capacities (for example by deducting CRM revenues from support payments under their contracts), so foreign capacity will need to be treated in a similar manner.

In all cases, coordination between TSOs and MSs will be necessary also.



Control of commitments

In each solution including foreign capacities participation, lies the question of “*how to control these capacities?*” To create no undue discrimination, it appears that foreign controls have to be very close to domestic capacities controls. As CRM are for the time being the result of national initiatives, control protocols are based on systems that are not necessary spread all over the borders. Moreover, in some specific designs, it may be more efficient and practicable to give control responsibilities to the TSOs where the capacities are connected (it knows better the capacities, the local constraints, etc.). For these reasons, coordination between TSOs from both sides of borders could be necessary to enable pertinent controls. Agreements would be needed to ensure the conformity of controls and the share of responsibility between TSOs.

A last point to mention about controls relates to the frequency of scarcity periods. The scarcity situations would be very infrequent in practice and, for some explicit schemes; it could be the source of more complexity. For example, when considering a CRM based on availability, it could be necessary to define control periods to check the availability of capacities. These control periods would not necessarily be during scarcity periods, so, for example, the direction of flows on a border could be different than those in scarcity events.

Timeline of each CRM

As CRMs could have different timelines, it is important for the cross-border participation to take into account these constraints. For example, the timeslots where capacities have to be identified or can communicate their will to participate in a foreign CRM, the length of the commitments, etc.



4 Conclusion and recommendations

A number of factors in the European electricity sector have motivated some EU MSs to introduce or consider introducing CRMs alongside the energy market and the implementation of the European Electricity Target Model. These factors include low level of wholesale prices due to a significant penetration of subsidised RES, insufficient price responsive demand in scarcity situations or a lack of confidence in the ability of market coupling alone to address national security of supply's concerns and ensure long run revenue adequacy.

While the Agency has already expressed its strong doubts about whether the implementation of these uncoordinated complementary markets will make the European energy market more efficient¹⁵, there remain a range of fundamental challenges that need to be addressed in order to ensure that these CRMs will not adversely impact further the functioning of the internal market.

In the contribution to the EMD initiative, a number of pre-requisites were identified which need to be fulfilled in order to make explicit cross-border participation not only possible but also beneficial:

- a. TSOs are incentivised to make a sufficient and appropriate amount of cross-border capacities available for cross-border trade throughout the year(s);
- b. TSOs are not allowed to adjust, limit or reserve¹⁶ these cross-border transmission capacities at any point in time, including in case of scarcity situation; and
- c. TSOs agree ex ante on the treatment of local/foreign adequacy providers in case of widespread scarcity situation (i.e. a situation in which a scarcity situation affects at least two countries simultaneously).

The fulfilment of these three conditions seems indispensable in order to enable TSOs and MSs to be able to efficiently account for cross-border capacity to provide a real contribution to the SoS in case of scarcity situation.

While the fulfilment of condition c) goes beyond the NRAs' remit and requires a strong involvement and commitment of MSs, conditions a) and b) are more in NRAs' hands. In particular, the forthcoming NRAs' approval of new capacity calculation methodologies in the framework of the CACM Guideline implementation will be an excellent opportunity to improve the regulatory framework for the determination of cross-border capacities. Once these cross-border capacities available have been properly calculated, it should be easier to analyse the adequacy and so evaluate the contribution of cross-border flows to security of supply during scarcity periods. The methodology of these adequacy studies needed for all mechanisms of cross-border contribution should be transparent and harmonised at European level.

¹⁵ http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/CRMs%20and%20the%20IEM%20Report%20130730.pdf

¹⁶ Except for exchange of Balancing Services in accordance with the forthcoming Electricity Balancing Guideline



Assuming the three conditions above are fulfilled, the EC points out, in the Environmental and Energy State Aid Guidelines (EEAG), the fact that the CRMs should “*not undermine market coupling, including balancing markets*”. We agree that the EEAG provision means that, in that case, CRMs should not cause any change in the functioning of energy market and coupling mechanisms as well as any impact on commercial and physical flows of energy (short term operation). For that reason, we agreed to exclude some solutions immediately from our scope:

- Solutions based on transmission capacity reservation should not be implemented as it would modify the market coupling allocation and would not be consistent with the CACM Guideline;
- Solutions where market coupling rules as provided for under the CACM Guideline are not respected;
- Solutions with cross-border participation based on energy delivery (and not based on availability) as we consider that such solutions are likely to distort the underlying energy market; and
- Solutions which impact the level of wholesale energy prices in the short-term and/or prevent electricity from flowing to the areas where it is valued the most.

Respecting these requirements enable market coupling to continue to deliver the most efficient use of existing resources in real time. However, when there is simultaneous scarcity situation in two countries, it is important that there is a common understanding on the market coupling outcome in order for countries to be able to efficiently account for cross-border capacity in CRMs. It is therefore important that there is greater clarity and a full account of this issue in the European guidelines/network codes and market coupling algorithms around what happens in these situations.

Throughout this document we analysed the possible mechanisms for taking into account contribution of foreign resources in CRMs.

First of all, we consider that accounting for the contribution of cross-border capacity in adequacy study (“implicit contribution”) is clearly better than not taking neighbouring resources into account at all, as it leads to a more efficient overall volume of capacity being procured. However, implicit contribution would not enable interconnectors and foreign capacity providers to be remunerated for their contribution to Security of Supply (SoS), and therefore does not correct distorted signals for investment in cross-border capacity.

Then, we analyse the strategic reserves. In this case and assuming reservation of transmission capacity is not allowed, it does not seem to be feasible for explicit cross-border participation to be implemented.

Finally, while there may not be undue discrimination in every situation, it is essential that when interconnectors and foreign capacity providers do contribute to the security of supply of a CRM-country, that they are appropriately remunerated for this. We studied three models of explicit participation: 1) “pure” interconnectors’ participation, 2) “pure” foreign capacity providers’ participation and 3) interconnectors/capacity providers’ participation.



Our analysis suggests that the nature and extent of this distortion in terms of investment signals depends on how scarce interconnector capacity or capacity provider in stress period is:

- When interconnector capacity is scarce, the value of new capacity in a neighbouring country is likely to be relatively low, while the value of new interconnector capacity could be relatively high. In this situation, without explicit participation, market-wide CRMs risk undermining signals for interconnector capacity (in particular because they can dampen wholesale energy prices).
- When interconnector capacity is not scarce, there is likely to be little value in new interconnection, but the value of capacity in the neighbouring country could be a lot higher. The main risk with market-wide CRMs in this situation is inefficient signals for investment in domestic capacity compared to neighbouring capacity.

The properties of the three models studied can be compared:

- With the **“pure” interconnectors model**, the CRM remuneration of foreign resources is received exclusively by interconnectors in all situations and so it will create incentive for investment in interconnections. We consider that such a model can send efficient signals when the interconnections limit the contribution of SoS from the foreign country (to the country where CRM is implemented). However, it does not seem relevant only to remunerate interconnections in all situations. Indeed, it will send a wrong investment signal in all those cases in which the foreign capacity providers (and not interconnections) are the scarce resource.
- With the **“pure” foreign capacity providers model**, capacity providers receive the CRM remuneration. Nevertheless, this assertion raises the question of which of them should receive this remuneration. On the one hand, all foreign capacities contribute to security of supply, but, on the other hand, they may not necessarily all agree to stand any commitment related to the CRM in country A. A solution could be to select any foreign providers that can accept lower capacity payments than domestic providers. However, the supply of relatively inexpensive foreign capacity is likely to outweigh the interconnector capacity, particularly when interconnector capacity is scarce. In this situation, the capacity agreements awarded to foreign capacity might need to be shared proportionally. This would reflect the fact that capacity behind a constrained transmission line provides less security of supply benefit than capacity that isn't.

With this model, if the transmission capacity is the scarce resource, the interconnector could not receive this remuneration. Thus, it would therefore not correct potential distortions to signals for interconnector investment. In this situation, the model would also send inefficient signals for investment in foreign capacity which is unable effectively resolve a capacity adequacy issue.

- A solution to solve the investment signals issue in the two previous models should be to build a **“revenue sharing” model**. This model should provide the right investment signal if it would be able to send the relevant remuneration distribution between interconnectors and capacity providers: when interconnectors limit the contribution in security of supply, they will receive the CRM remuneration and when foreign capacity providers are limiting, they will receive the CRM remuneration. If this model is well designed, in every case the



scarce resource for security of supply will be remunerated. Two ways to achieve this could be: (i) foreign capacity providers compete in the CRM with an amount not higher than the interconnector's capacity through a separate auction. The successful capacity providers will receive the clearing price of the separate auction, which is equal to the highest successful foreign capacity bid, while the interconnector would earn the difference between the CRM clearing price and the clearing price from the auction for foreign capacity; or (ii) interconnectors can sell 'tickets' to the foreign capacity provider for access to the CRM, with the maximum volume of ticket sales being equal to the interconnectors' capacity. The interconnector would earn the income from the "ticket" sales, while the foreign capacity provider would earn the difference between the CRM clearing price and the "ticket" price.

- These are two possible models to ensure efficient investment signals, depending on what is the scarce resource. In cases where there is a high likelihood of simultaneous scarcity in the two interconnected countries, it may be needed to investigate additional measures to ensure that the model will provide efficient investment signals. One possible solution to this issue may be to compare the level of transmission capacity and the "capacity margin" in the foreign country during scarcity periods of the CRM. Other solutions may be to apply de-rating methodologies to account for the risk of simultaneous scarcity situations.

In practice, to ensure a correct investment signal which takes into account the risk of simultaneous scarcity is complex, as it is both difficult to assess the "capacity margin" and to assess what an efficient de-rating should be. A solution could be to base the evaluation on an ex ante probabilistic calculation based on its historical load factors, but this needs to be further studied.

- In the case of similar and harmonised CRMs in both countries, a common auction launched in both countries could enable to balance the remuneration between interconnectors and capacity providers: (i) if interconnection capacity is the scarce resource, interconnector will receive the revenues equal to the price difference between both CRMs and (ii) if capacity providers are the scarce resource, they will get all the CRM remuneration. The remuneration to distribute to "interconnectors + capacity providers" is proportional to the minimum of "transmission capacity" and "capacity margin". The main difference between the three models is the way this remuneration is shared between interconnectors and capacity providers.

We consider that the "revenue sharing" model appears to be the most suitable for a harmonised approach to explicit participation. It is more likely to send the right signals for investment in different situations across a number of countries. It is also able to adapt to reflect changes in interconnector investment and foreign capacity over time.

The "pure" interconnector model seems to be the easiest to implement. However, as discussed, it is unsuitable where interconnectors are not the scarce resource and therefore might not always be an appropriate solution. The implementation of the "pure" foreign capacity model raises the same problem. The "revenue sharing" model is more complex to implement than the "pure" interconnector model but seems to be the only one to be able to always send proper signals.



In all explicit models, some global conditions have to be fulfilled to build models that do not introduce distortion into the energy market coupling and to ensure there are no undue discrimination between capacities cross-border and an efficient signal for investment. To sum up, our main recommendations are:

1. Interconnection capacity calculation methodology should be transparent and enable to maximise the available capacity while respecting network constraints;
2. The allocated interconnection capacity should be firm in order to prevent the TSOs from reducing cross-border transmission capacities at any point in time, including in case of simultaneous market scarcity situations;
3. The regulators could investigate the issue regarding the maximisation of firm capacity and address accordingly recommendations in the framework of the development of capacity calculation methodologies foreseen in the CACM Guideline;
4. Greater clarifications on the market coupling outcome when there is simultaneous scarcity situation in two countries are needed. These specific situations should be taken into account in the European guidelines/network codes implementation and market coupling algorithms; and
5. The question of long-run investment signals to be sent has to be addressed as either transmission capacity or level of foreign capacities could improve security of supply. A mechanism able to contribute to a better security of supply by either paying foreign capacities or interconnectors depending on the situation could be a good answer to this question. The cost of implementing a complex mechanism (auction, ticket) should be assessed and compared with its added value.

Even with these recommendations, some issues are still to be addressed to implement properly explicit participation schemes. We could for example think about the participation of a capacity in two CRMs, the effective control of commitments, the treatment of subsidised capacities, etc.

To conclude, we would like to reaffirm the need for implementing – if physically possible¹⁷ – the explicit cross-border participation solution in CRMs to provide efficient signals for investment in either interconnectors or foreign capacity providers.

The fulfilment of recommendations and the solutions for the issues raised by explicit participation should be treated at EU-level; however this should not prevent MSs to proceed with implementing explicit participation.

Annex 1 – List of abbreviations

Term	Definition
ACER/the Agency	Agency for the Cooperation of Energy Regulators
CACM	Capacity Allocation and Congestion Management
CEER	Council of European Energy Regulators
Commission	European Commission

¹⁷Extract from the EEAG section 3.9: “physically possible in particular in the regional context, that is to say, where the capacity can be physically provided to the MS implementing the measure and the obligations set out”.



Term	Definition
CRM	Capacity Remuneration Mechanisms
EAAG	European Commission's State Aid Guidelines
EC	European Commission
EMD	Energy Market Design
EU	European Union
RES	Renewable Energy Sources
SoS	Security of (electricity) supply
TSO	Transmission System Operator



About CEER

The Council of European Energy Regulators (CEER) is the voice of Europe's national regulators of electricity and gas at EU and international level. CEER's members and observers (from 33 European countries) are the statutory bodies responsible for energy regulation at national level.

One of CEER's key objectives is to facilitate the creation of a single, competitive, efficient and sustainable EU internal energy market that works in the public interest. CEER actively promotes an investment-friendly and harmonised regulatory environment, and consistent application of existing EU legislation. Moreover, CEER champions consumer issues in our belief that a competitive and secure EU single energy market is not a goal in itself, but should deliver benefits for energy consumers.

CEER, based in Brussels, deals with a broad range of energy issues including retail markets and consumers; distribution networks; smart grids; flexibility; sustainability; and international cooperation. European energy regulators are committed to a holistic approach to energy regulation in Europe. Through CEER, NRAs cooperate and develop common position papers, advice and forward-thinking recommendations to improve the electricity and gas markets for the benefit of consumers and businesses.

The work of CEER is structured according to a number of working groups and task forces, composed of staff members of the national energy regulatory authorities, and supported by the CEER Secretariat. This report was prepared by the CEER Electricity Security of Supply Task Force of the Electricity Working Group.

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