A Regional Approach to Resource Adequacy: The Participation of External Resources in Capacity Remuneration Mechanisms

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Introduction

The development of integrated, regional day-ahead electricity markets is progressing rapidly in Europe. Day-ahead markets are now well established, and progress is being made in integrating both intra-day and balancing markets. Furthermore, market integration is producing tangible results, evidenced by a reduction of around one-third in average wholesale prices over the period 2008 to 2012. However, while Member States appear to accept that non-domestic generation will contribute to meeting domestic demand in real time through these regional markets, they are reluctant to rely on non-domestic generation capacity when assessing resource adequacy in investment timescales. This reluctance is somewhat surprising given Europe's tradition of mutual support and regional cooperation via the interconnected transmission system, as well as the fact that a regional approach to resource adequacy would allow supply reliability to be maintained at a reduced cost to consumers. However, many view supply reliability as a national responsibility,[1] and rules are not yet in place that would give Member States the confidence to rely on neighbouring systems during periods of resource scarcity.

This national approach to supply reliability has prompted Member States to take unilateral action to address concerns about generator decommissioning and the lack of investment in replacement capacity. As illustrated in Figure 1, Member States have introduced or plan to introduce capacity remuneration mechanisms (CRM) of quite different design, driven by varying national circumstances and perceptions of the underlying problems. For example, Great Britain decided to implement a centralised market-wide forward CRM based on annual auctions, while France opted for a decentralised obligation-based mechanism. Other Member States (such as Belgium) have chosen strategic reserve options and Germany appears to be heading in the same direction.[2]

[1] Directive 2005/89/EC *Concerning measures to safeguard security of electricity supply and infrastructure investment* requires Member States to take all measures necessary to safeguard security of electricity supply and infrastructure investment. See http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32005L0089&from=EN.

[2] Federal Ministry for Economic Affairs and Energy (BMWi) (2015). *An Electricity Market for Germany's Energy Transition*. Retrieved from http://www.bmwi.de/English/Redaktion/Pdf/weissbuch-englisch,property=pdf,bereich=bmwi2012,sprache=en,rwb=true.pdf.

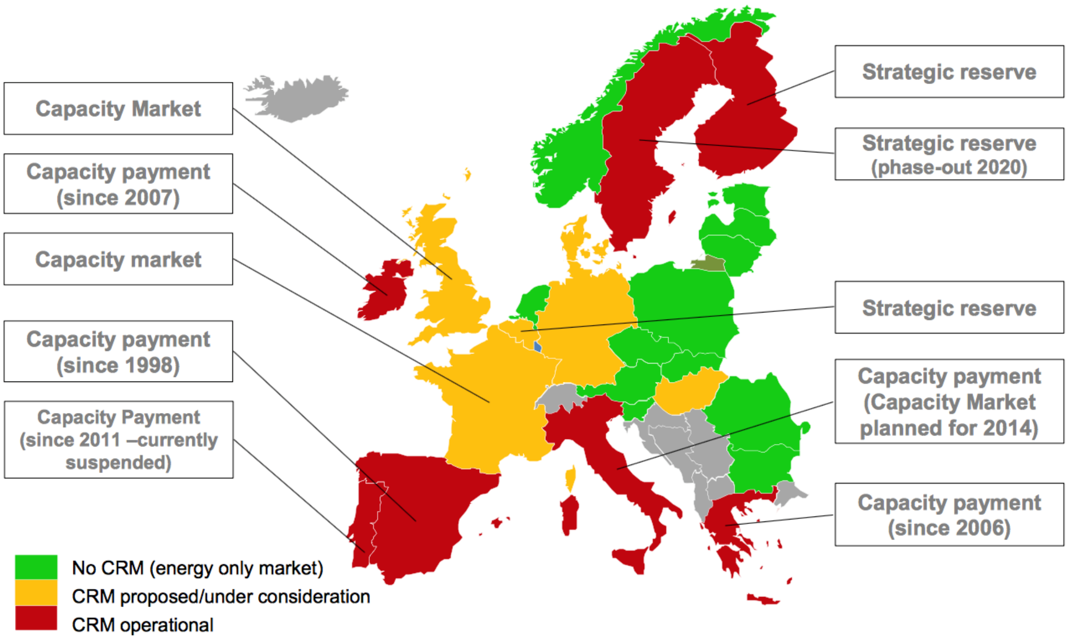

Figure 1. Status of CRM Design in Europe[3]

This unilateral approach to CRM design makes a regional approach to resource adequacy more difficult. Furthermore, many CRM designs take no account of the contribution to be made by interconnection or the participation of external (non-domestic) resources, which results in an inefficient outcome with customers being forced to fund unnecessary investment. This exclusive dependence on domestic generation capacity to meet domestic demand can incur significant costs. The CRM introduced by Great Britain offers an excellent example. It takes no account of potential imports over the 5 GW of interconnection capacity with neighbouring systems expected to exist by the first delivery year of 2018–19. Based on the auction supply curve, had a more reasonable contribution from interconnection been assumed when conducting the first auction in December 2014, the £900 million cost to be incurred by consumers in 2018–19 would have been reduced significantly.[4] This resulted in contracting more capacity than was strictly necessary, with the associated costs imposed on end customers.

[3] Agency for the Cooperation of Energy Regulators (ACER) (2013). *Capacity Remuneration and the Internal Market for Electricity*. Retrieved from http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/CRMs%20and%20the%20IEM%20Report%20130730.pdf.

[4] Assuming that the interconnection with neighbouring countries is de-rated by 40 percent, the capacity market auction price would have reduced to around £15/kW, resulting in an overall reduction of costs imposed on customers of around £200 million. See National Grid (2014). *Final Auction Results: T-4 Capacity Market Auction*. Retrieved from https://www.emrdeliverybody.com/Capacity%20Markets%20Document%20Library/T-4%202014%20Final%20Auction%20Results%20Report.pdf.

A Regional Approach to Resource Adequacy

The European Commission recognizes the need to take a regional approach to resource adequacy assessment. In the recent Energy Union package, the Commission calls for increased cooperation between neighbouring Member States and concludes that CRMs should not be introduced unless a regional resource assessment indicates a need.[5] In fact, European law already requires that Member States not discriminate between domestic and external resources,[6] while the State Aid guidance for environmental protection and energy requires external resources capable of contributing to supply reliability be allowed to participate in CRMs.[7]

These requirements are eminently sensible, as the European Network of Transmission System Operators for Electricity's (ENTSO-e) recent Scenario Outlook and Adequacy Forecast (SO& AF) demonstrates that while some Member States will experience a capacity shortage over the investment-planning horizon, many will not. Overall, Europe is likely to enjoy a surplus of generation capacity as illustrated in Figure 2. Clearly, in these circumstances, a regional assessment of resource adequacy has the potential to even out some of these surpluses and deficits and reduce the overall need for investment in new capacity. Furthermore, when translated into real time, a more regional approach to resource adequacy will allow the significant advantages of balancing energy and demand over much larger areas to be realised.

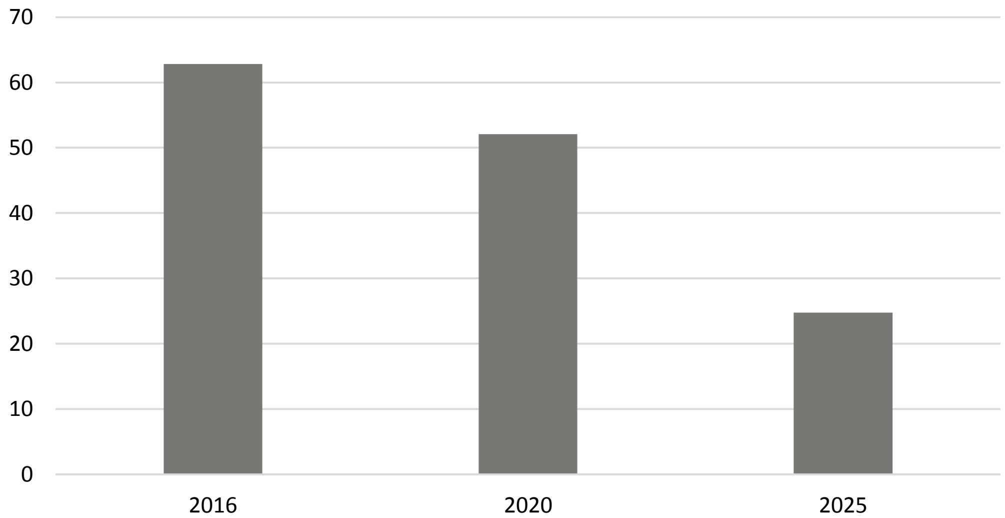

Figure 2. Net Scarce Capacity (Remaining Capacity – Spare Capacity) in Europe (GW) [8]

[5] European Commission (EC) (2015). *A Framework Strategy for a resilient Energy Union with a forward-looking climate change policy*. Retrieved from http://ec.europa.eu/priorities/energy-union/docs/energyunion_en.pdf.
[6] European Parliament and Council (2006). *Concerning measures to safeguard security of electricity supply and infrastructure investment* [Directive 2005/89/EC]. Retrieved from http:// http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32005L0089.
[7] EC (2014). *Guidelines on state aid for environmental protection and energy 2014-2020* [Communication 92014/C 200/01]. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014XC0628(01)&from=EN.
[8] Calculated from ENTSO-e SO&AF underlying data. See ENTSO-e (2015). *Scenario Outlook & Adequacy Forecast (SO&AF)*. Retrieved from https://www.entsoe.eu/Documents/SDC%20documents/SOAF/150630_SOAF_2015_publication_wcover.pdf.

Taking Account of Interconnector Capacity

A starting point in moving to a regional assessment of resource adequacy and supply security is to ensure that the potential interconnector contribution in investment timescales is appropriately considered. Assuming an appropriate interconnection contribution at this stage will reduce the need for domestic resources by an equivalent amount and ensure that non-domestic generation capacity will contribute to ensuring supply reliability in real time. Though this does not amount to a full regional resource adequacy assessment, ensuring that interconnection contribution is adequately taken into account will release some of the benefits that balancing energy and demand on a regional basis can bring.

However, deciding what assumptions to make about interconnection contribution at some point in the future is not a simple task. Prevailing market conditions in the connected markets and the availability of non-domestic generation behind the interconnector will determine energy flows across the interconnector. The reliability and likely availability of the interconnection assets themselves will also need to be taken into account in assessing what contribution can be assumed.

There are two basic approaches to addressing these uncertainties. One would be to perform an analysis of actual interconnector flows over a number of years, which can be used to predict future performance, and the other would be to make a full probabilistic assessment of the range of conditions that could apply to the interconnected markets in the delivery period. These two options are explored in detail below.

Historic Analysis of Interconnector Flows

This is perhaps the simpler of the two options and involves the analysis of interconnector performance over peak demand periods or periods of system stress that have occurred in the recent past. This option implicitly assumes a stable market environment and that past interconnector performance is a good indicator of future performance. Inherently, therefore, the option does not appear to be particularly suited to the present situation in Europe, where electricity markets are in a state of flux. Historically, interconnector flows have reflected aggregated, pre-determined, bilateral cross-border trades. Looking forward, however, these flows will increasingly be driven by energy market price differentials. The other difficulty with analyzing past performance is that periods of real capacity scarcity are infrequent and may not have occurred during the period under consideration. Interconnector flows during periods of genuine capacity shortage should reflect the increased price differentials that will occur in these circumstances and may be quite different from those that occur during normal peak demand periods.

Probabilistic Assessment

The contribution made by interconnection during a scarcity event will depend on the characteristics of the individual interconnected markets and the extent to which those markets are correlated. A regional probabilistic assessment would allow these issues to be taken into account together with the probability of rare but extreme events that may result in real generation scarcity. These events include periods of extreme weather, which might reduce the availability of renewable resources

and the underlying country data at https://www.entsoe.eu/Documents/Publications/SDC/data/SO_AF_2015_dataset.zip.

such as wind or hydro or increase demand well above normal forecasts. Probabilistic assessments are notoriously difficult and complex to carry out and require the close cooperation of all regional transmission system operators (TSOs) involved. However, a probabilistic approach offers the prospect of a forward-looking assessment of interconnector contribution that both captures the probability of extreme events and continuing intra-day and balancing market development. As such, a regional probabilistic approach seems most suited to the current situation in Europe.

A recent assessment carried out by the Pentalateral Energy Forum (PLEF) provides an example of how a probabilistic assessment of regional resource adequacy may proceed.[9,10] Using an optimal unit commitment and economic dispatch programme, the stochastic Monte Carlo simulation of the combined PLEF region provides an hour-by-hour assessment of resource adequacy and the interconnector flows expected under specific circumstances. The assessment also provides information on the correlation between the participating markets and the extent to which extreme stress events may be experienced simultaneously. The analysis shows the benefits in terms of reduced loss of energy expectation (LoLE) of a regional approach to resource adequacy for the Member States involved.

The PLEF analysis is a first attempt at a regional probabilistic resource adequacy assessment and can no doubt be improved. However, the sharing of data and technical know-how by the TSOs involved, together with the development of regional temperature-sensitive load models and harmonised hydrological data points the way forward. The analysis is a clear advance on the aggregated state-by-state, deterministic, scenario-based methodology currently used by ENTSO-e in their Scenario Outlook & Adequacy Forecast (SO&AF), but it is understood that a more stochastic approach will be adopted for future SO&AF analysis.

Delivery in Real Time

Whichever approach is taken to predicting interconnection contribution at the planning stage, actual interconnector flows on the day will be driven by a combination of energy trading, cross-border balancing activity, and (possibly) the implementation of emergency procedures. When viewed in investment timescales, several years in advance, none of these processes are considered firm. Delivery via market trading will depend on the energy price differentials at the time, while the contribution made by cross border balancing activity will depend on the availability of balancing resources. Similarly, as emergency arrangements between Member States are normally based on "reasonable endeavours," emergency support may not be available if resource scarcity extends to both ends of the interconnection. For example, where the interconnection is asynchronous or where circuit flows can be controlled (i.e., phase-shifters), positive system operator action may be required to realise the emergency support.

Where resource scarcity is restricted to one individual Member State, the contribution made by interconnection with neighbouring markets is likely to be substantial. However, when scarcity

[9] The Pentalateral Energy Forum is the framework for regional cooperation in Central Western Europe and consists of Austria, Belgium, France, Germany, Luxembourg, the Netherlands, and Switzerland.
[10] Pentalateral Energy Forum Support Group 2 (2015). *Generation Adequacy Assessment.* Retrieved from http://www.benelux.int/files/4914/2554/1545/Penta_generation_adequacy_assessment_REPORT.pdf.

extends beyond national boundaries, for example due to a widespread cyclonic weather event that reduces wind output to low levels over a wide area, then the contribution made by interconnector flows to resource adequacy in an individual Member State becomes uncertain. Steps can be taken to improve the reliability of interconnector flows in these circumstances by removing or at least harmonising energy market price caps, but even then, price differentials may be insufficient to allocate available resource according to need.

A Contractual Approach to Ensuring Resource Adequacy

Concerns over the ability of energy market price differentials or emergency arrangements to deliver reliable interconnector contributions during periods of widespread resource scarcity suggest the need for a more “contractual” approach. This could be achieved indirectly, where an interconnector owner participates in a neighbouring CRM, or directly, where individual non-domestic generators participate in the CRM themselves.

Indirect Participation

Where participation is indirect, the contractual responsibility to provide energy when required lies with the interconnector owner rather than with any individual non-domestic generator. Non-delivery would presumably be subject to the same penalties that apply to domestic resources and the interconnector owner may decide to hedge that risk of non-delivery by contracting with non-domestic generation. In the case of merchant-exempt interconnection, capacity revenues would be retained by the interconnector owner while, in the case of regulated interconnection, capacity revenues would be used to either support asset availability or be returned to customers.

The participation of interconnection in a neighbouring CRM is likely to be a (relatively) simple option compared with the participation of individual non-domestic generators. The delivery of contractual commitments is easily monitored and there are no issues associated with monitoring non-domestic generating sites. However, within Europe’s integrated electricity market, interconnection is treated as transmission, not generation. The direct participation of interconnection in CRMs is therefore something of an anomaly and could raise competition issues. As transmission, interconnection is not subject to transmission access charges, a fact that could bestow an unfair advantage in those Member States where transmission charges are applied to generation. Furthermore, interconnector owners would need to consider the need to contract with external generation in order to ensure that contractual commitments could be delivered and penalties for non-delivery avoided.

Direct Participation

As suggested above, allowing the direct participation of non-domestic generation in a CRM is likely to be more complex than indirect participation via an interconnector. In addition to the need to restrict total external resource participation to take account of interconnector capacity and the issues of monitoring non-domestic sites referred to above, enhanced data exchange and TSO cooperation is required. In addition, the interaction of CRM delivery commitments and energy market coupling is complex, and concerns that contributions from non-domestic generation cannot be guaranteed has led some Member States to opt for indirect participation via interconnection.[11]

In attempting to address these concerns, it is instructive to consider what the participation of non-domestic generation in a neighbouring CRM is really attempting to achieve. Essentially, the value of non-domestic generation participation is in maximising the contribution of interconnection in situations where capacity is scarce, particularly when that scarcity extends to the electricity markets at both ends of the interconnection. In order to illustrate how this occurs, consider the simple example shown in Figure 3 of two interconnected Markets, A and B. Market A has a CRM, while Market B is a pure energy-only market with no capacity remuneration. Consider that a generator located in Market B, Generator B1, takes up a capacity contract in the Market A CRM. The following paragraphs investigate how this arrangement would operate when scarcity occurs in Market A only and when scarcity extends to both markets.

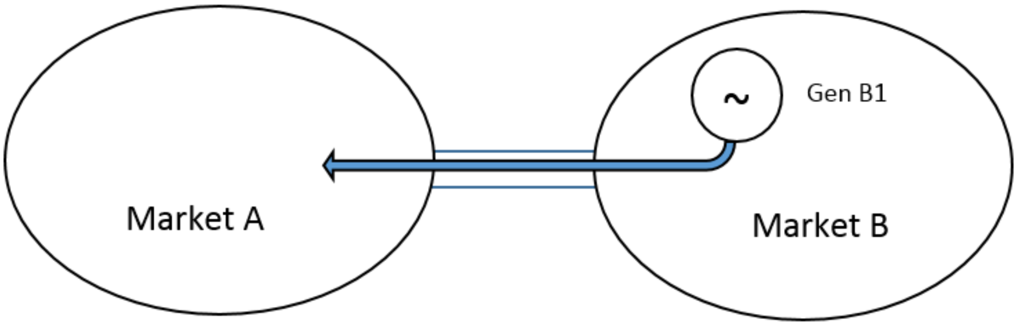

Figure 3. Two Interconnected Markets, A & B

Scarcity Occurs in Market A–Identified at the Day-ahead Stage

In this case, Generator B1 bids into the Market B day-ahead energy auction in the normal fashion. The Market A and Market B generation and demand curves are combined by the Euphemia algorithm[12] and, assuming sufficient interconnection capacity is available, the market coupling process schedules sufficient generation capacity to meet the combined Market A and Market B demand. A single clearing price across both markets would emerge, and if Generator B1 cleared the energy auction it would be scheduled to run. If it did not clear the auction, it would not run.

In this case, the day-ahead market coupling process will deal with the scarcity event in Market A. Generator B1 either operates and contributes to meeting the combined Market A and Market B demand, or its output is replaced by lower-cost Market B generation. In the latter case, the capacity contract between Market A and Generator B1 could be considered an unused insurance policy.

[11] UK Department of Energy & Climate Change (DECC) (2014). *Electricity Market Reform: consultation on capacity market supplementary design proposals and Transitional arrangements.* Retrieved from https://www.gov.uk/government/consultations/consultation-on-capacity-market-supplementary-design-proposals-and-transitional-arrangements.

[12] Euphemia (EU Pan-European Hybrid Electricity Market Integration Algorithm) is the algorithm used to support market coupling in Europe. Its aim is to allocate interconnection capacity in the market coupling process to maximise welfare. More information on Euphemia is available at http://energy.n-side.com/day-ahead/.

Because Generator B1 was available to provide capacity in the scarcity situation regardless of whether it cleared the day-ahead auction, Market A must make capacity payments based on availability and not energy delivered.

The above assumes that the interconnection capacity between Market A and Market B is sufficient to fully accommodate the export from Market B necessary to meet Market A demand—in other words, the interconnector was unconstrained. If this is not the case, the Market A and Market B clearing prices will diverge, with the price in Market A rising above the Market B price. Generator B1 may or may not clear the Market B auction in these circumstances. However, this is immaterial as the interconnection between Market A and Market B is fully utilised and no more can be done to support Market A demand. Again, in the event of Generator B1 not clearing the Market B auction, the contract between Generator B1 and Market A can be considered as an unused insurance policy and, provided Generator B1 was available to generate, it should be entitled to capacity payments.

Scarcity Extends Across Both Market A and Market B–Identified at the Day-Ahead Stage

As before, Generator B1 bids into the Market B day-ahead energy auction in the normal fashion. The Market A and B generation curves would be combined and would attempt to satisfy the total Market A and B demand. The clearing price in both markets would rise to reflect scarcity but any price differential that occurred may be insufficient to fully utilise available interconnector capacity.[13]

Assuming that interconnector capacity remains unconstrained and that Generator B1 clears the combined auction (as it would do if insufficient capacity was available to meet either the combined or individual Market A and B demand), then it is scheduled to run. However, as Generator B1 is contracted to provide capacity to Market A, it would need to be replaced in Market B by additional resources. If no additional resources were available in Market B, Generator B1's output would need to be replaced by an equivalent amount of demand reduction.

This particular situation—scarcity affecting both markets and the interconnection between the two remaining under-utilised—is where capacity contracts with external non-domestic generation are useful. In all other situations where scarcity is restricted to one market, then market coupling should "do the job" either with or without the need for the contracted generation to run. However, when scarcity exists across markets, capacity contracts will effectively define where any necessary demand disconnection takes place. This implies that generation participating in a neighbouring CRM results in the "virtual relocation" of that generation from the market in which it is located to the market to which it is contracted. The "donor" system operator will need to respond to that virtual relocation by discounting the output from its energy balancing systems and replacing that energy, either by additional generation capacity or, if none is available, by demand reduction.

In these circumstances, the "recipient" market or Member State needs to have confidence that the TSO in the "donor" market would indeed discount the output from any contracted generation from its balancing activities and maintain an energy balance by disconnecting domestic consumers. Currently, we are far from this desired position as most, if not all, Member State procedures for

[13] This raises the issue of price caps and the possibility of distorted interconnector flows due to unequal price caps.

dealing with supply reliability will curtail interconnection exports before initiating domestic demand disconnection.[14] Furthermore, in market timescales, the principles underpinning the market-coupling algorithm Euphemia would result in sharing resources equally in situations where scarcity is widespread.[15] Clearly, for a regional approach to resource adequacy to be adopted in practice, these issues will need to be addressed and clear rules established to ensure that contractual commitments will be fulfilled during periods when capacity is scarce.

Scarcity Identified After Day-Ahead Market Closure

Where scarcity situations are identified post day-ahead market closure, there is an opportunity for the intra-day or balancing markets to utilise any interconnector capacity that remains unused. In these circumstances, the process would essentially be similar to that described above. Where scarcity was limited to Market A, price differentials should ensure that interconnector flows are maximised to ensure that all demand could be satisfied. If scarcity affected both markets then, provided sufficient Market B generation was contracted to participate in Market A's CRM, the interconnector capacity would be fully utilised, even if this required Market B demand to be reduced.

If a scarcity event occurred in balancing market timescales, then it is unlikely that penalties for non-delivery would apply as contracted generation would have insufficient time to react. In this case, bilateral TSO emergency procedures could be activated. However, as mentioned above, these are likely to be "best endeavours" measures and will only provide useful support where resources are available and domestic supply reliability not compromised.

Does Generation Contracted to a Neighbouring CRM Need to Reserve Interconnector Capacity in Advance?

Parties wishing to engage in cross-border trade have the opportunity to hedge any potential energy market price differentials on the day by reserving interconnector capacity in advance, i.e. by purchasing physical or financial transmission rights. At first sight, it would therefore seem appropriate that non-domestic generation wishing to participate in a neighbouring CRM should do the same. Indeed, this is a requirement in other jurisdictions, such as the United States, where external capacity trades take place.[16]

However, reserving interconnector capacity in advance so that external generation could contribute to resolving scarcity situations would reduce the capacity available for day-ahead and intra-day trading. This would be not only undesirable but unnecessary—if the premise is accepted that the purpose of contracting with non-domestic generation is only to ensure that interconnection utilisation is maximised when scarcity exists. From the previous sections, it can be seen that capacity

[14] Arguably, provisions that involve the curtailment of interconnection exports during scarcity events are in conflict with the requirements of the Security of Supply directive that disallow discrimination between external and domestic resources.

[15] Central Western European (CWE) (2014). *Adequacy Study*. Retrieved from http://www.casc.eu/media/Adequacy_study_report_CWE.pdf.

[16] International Energy Agency (IEA) (2014). *Seamless Power Markets: Regional Integration of Electricity Markets in IEA Member Countries*. Retrieved from https://www.iea.org/publications/freepublications/publication/SEAMLESSPOWERMARKETS.pdf.

contracts only come into play if market coupling cannot deliver the energy necessary to fully utilise interconnector capacity, i.e. the interconnector is unconstrained. The value of interconnector capacity when it is unconstrained is zero, and therefore, there is no case to impose any charges on generation utilising capacity that would otherwise remain unused.

Another way of looking at this issue is to recognise that the purpose of reserving interconnection capacity in advance is to gain access to higher energy prices in an adjacent market. As non-domestic capacity participating in a CRM would only ever be able access energy prices in its home market (noting that where interconnection capacity is not fully utilised, energy prices in coupled markets would be the same), there is again no case for requiring that generation reserve interconnection capacity in advance.

Physical Delivery

In the simple two-market example considered above, energy flows between the two markets are limited by the capacity of the single interconnector and all generation would be equally capable of participating in the neighbouring CRM, although it would be pointless contracting for more capacity than could be accommodated over the interconnector. However, in the extensive and highly interconnected system that exists in Europe, consisting of numerous national control and balancing areas, the situation is more complicated. Provided that all other control areas are balanced, energy from a donor electricity market will find its way to the recipient market that has an energy deficit. However, as illustrated in Figure 4, where it is assumed that French generation is participating in the Great Britain CRM, many loop flows could exist and the route taken by that energy will depend on the location of the energy source, network configuration, and the disposition of all other operating generation on the day.

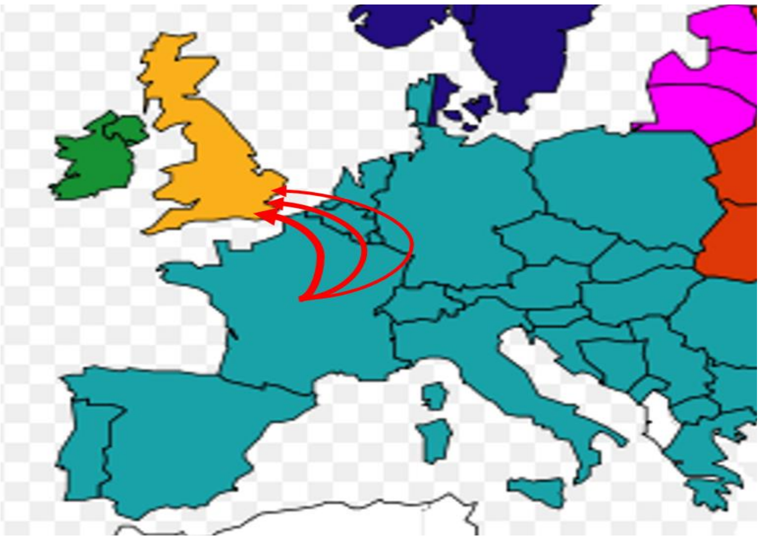

Figure 4. Illustration of the Physical Delivery of Energy

The energy flows may cause or add to congestion across several interconnector and internal transmission boundaries, and this would need to be taken into account when deciding what capacity contribution any individual generator is capable of making. For this reason, it is likely that the number of generators practically capable of participating in a particular neighbouring CRM would be limited in number.

Figure 4 also raises another issue that arises when energy transfers occur between synchronous systems. Within synchronous areas, energy transfers will occur naturally, but across HVDC interconnectors, transfers will require system operator intervention. This again points to the need for clear rules of solidarity to be established, as system operators may need to set up energy exports across HVDC interconnectors to meet contractual commitments—even when this may lead to the need for demand disconnection in the domestic market.

Conclusion

This paper has outlined the benefits of a regional approach to resource adequacy and assessment, and has considered some of the implementation issues that such an approach raises. In considering these issues, the paper has identified the following actions that the Commission would need to consider in order to make progress:

- While security of supply seems likely to remain a national responsibility, Directive 2005/89/EC should be revisited in order to mandate a regional approach to resource adequacy assessment, rather than just requiring Member States to "take account of the possibility of cross-border cooperation." In addition, the Commission's call for CRMs to be introduced only when a regional resource adequacy assessment indicates the need should become a condition for the granting of State Aid approval.
- ENTSO-e and ACER should develop a probabilistic methodology template for regional resource adequacy assessment as soon as possible. This would encourage closer TSO cooperation and data exchange, provide consistency in resource adequacy assessments across Europe, and ensure a consistent approach to assessing the contribution made by interconnection. The development of a probabilistic approach would also be a marked improvement on the deterministic, scenario-based methodology currently used by ENTSO-e in its SO&AF process.
- Direct participation of non-domestic generation in neighbouring CRMs is preferred to the participation of interconnection. However, direct participation introduces additional complexities, and ACER should establish a standard process for dealing with issues of data exchange, monitoring non-domestic generation sites, etc. The existing State Aid guidance that any external resource capable of contributing to supply reliability in a neighbouring CRM should be allowed to participate, should be strictly enforced.
- The principles underpinning market-coupling methodology, including the Euphemia algorithm and its application, should be revisited to ensure that contractual commitments entered into when non-domestic resources participate in a CRM can be delivered. Resources should not allocated on a pro-rata basis in scarcity situations. Similarly, energy market price caps across coupled markets should be avoided, or at least harmonized, in order to prevent energy flows from being distorted in scarcity situations.
- Solidarity rules should be established, possibly in a new Security of Supply Directive, to ensure that TSOs respect the contractual commitments entered into when domestic generation participates in a neighbouring CRM and do not prevent those commitments from

being delivered. This may require the implementation of demand reduction to maintain an energy balance due to resources being committed to a neighbouring CRM.

- Non-domestic generation participating in a neighbouring CRM will need to be rewarded for availability, not output.
- The value of non-domestic resources participating in a neighbouring CRM is to maximise the interconnection contribution to supply reliability where market coupling fails to do so. Consequently, generation participating in a neighbouring CRM should not be required to reserve interconnector capacity in advance.

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