European Energy Exchange Response to the ACER Public Consultation on the Influence of Existing Bidding Zones on Electricity Markets

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1. Introduction

The European Energy Exchange (EEX) is the leading energy exchange in Europe. It develops, operates and connects secure, liquid and transparent markets for energy and related products, on which power, natural gas, CO2 emission allowances and coal are traded. At present, 230 companies from 24 countries are licensed to trade on EEX as trading participants.

EEX welcomes the opportunity to take part in ACER's consultation on the influence of existing bidding zones on electricity markets. This consultation is issued in the context of the joint initiative of ACER and ENTSO-E for the early implementation of the Network Code on Capacity Allocation and Congestion Management (CACM). However, we want to point out that we still have strong concerns about two aspects of the Network Code itself: The review process of bidding zone configuration within Europe (Article 37) and the proposed biennial assessment of the current bidding zone configuration (Article 39). Moreover, we are worried about the practicability of the methodology proposed to re-assess bidding zones.

In general, we believe that instead of re-assessing bidding zones, grid congestions between or within countries should be eliminated up to the efficient amount. Therefore, the market design should focus on creating incentives to invest in the transmission system. Moreover, where investments in the transmission system are delayed or not possible in the foreseeable future, alternative measures such as redispatch or enhanced cross-border cooperation between TSOs should be applied.

Such a continuous development combined with a long-range market coupling leads to a stable European Market with large and liquid bidding zones. This procedure does not rely on periodic structural changes of the market environment, but rather allows for a continuous convergence of markets. The inefficiencies sketched above can therefore be prevented, while welfare is maximised mid-term.

> EEX supports a continuous development of markets within Europe. Therefore, incentives should be created for players to invest in transmission infrastructure. Such a continuous development combined with a long-range market coupling leads to a stable European Market with large and liquid price zones. In constrast, re-defining bidding zones should be an ultima ratio solution.

Admitting a biennial re-assessment of the bidding zones as foreseen in the current version of the CACM NC could eventually put at risk the achievements made through European Price Coupling and optimised cross-border Intraday trading, according to the European Target Models for the Day-Ahead and Intraday markets.

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2. Response to the questions asked by ACER

2.1. How appropriate do you consider the measure of redefining zones compared to other measures, such as, continued or possibly increased application of redispatching actions or increased investment in transmission infrastructure to deal with congestion management and/or loop flows related issues? What is the trade-off between these choices and how should the costs attached to each (e.g. redispatching costs) be distributed and recovered?

1) **First of all, redefining bidding zones is not an appropriate measure to deal with loop flows** for the following reason. Consider a bottleneck within a large bidding zone. As of today, the dispatch of power plants is determined for the overall bidding zone. Afterwards, redispatching actions are taken in case bottlenecks occur at the given dispatch of power plants. If the current flows from the north to the south at the given dispatch of power plants, any redispatching measure decreases electricity generation in the north and increases electricity generation in the south. To sum up, the bottleneck is accounted for *ex-post* with respect to day-ahead market clearing (Case A).
Contrarily, if the bidding zone is split up, the dispatch of power plants is determined separately for both bidding zones, while the bottleneck is managed *ex-ante* by, say, an implicit or explicit auction. If the bottleneck is managed properly, it is congested at the given dispatch of power plants (Case B).
The key observation is that the final dispatch of power plants in Case A in which one single bidding zone is managed and in Case B in which the bidding zone is split up coincide (or differ at most slightly). As a consequence, the physical flows essentially coincide, and thus the loop flows coincide. (However, this does not mean that redispatch is costless; see section 2 e.)

A review of bidding zones does not dissolve the issue of loop flows sufficiently. EEX regards investment in infrastructure up to the efficient level as the first-best solution. Redispatching measures are a helpful instrument to deal with bottlenecks that are supposed to be dissolved mid-term, therefore cross-border redispatch and TSO cooperation should be strengthened.

2) **Investment in transmission infrastructure is the first-best solution to deal with grid congestion** for the following reasons.
First, eliminating bottlenecks in bidding zones and merging existing bidding zones by increasing transmission infrastructure enhances the efficiency of the corresponding wholesale markets. This is because

   a. Liquidity increases on both the spot and the derivatives markets. This enables market participants to trade and hedge risks, which is an *essential precondition to stipulate any investment* in generation capacities, storages or demand response.
   b. Market concentration decreases.

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c. The aggregated supply curve becomes smoother, meaning that it exhibits less jumps. This is because the supply structure becomes more diversified. To smoothen the supply curve by enlarging bidding zones and thus to diversify supply, however, is to increase efficiency.
d. Besides efficiency, increasing the transmission infrastructure also supports security of supply.

Second, investing in transmission infrastructure ensures a *continuous* development of the market environment. In contrast, reviewing bidding zones exhibits structural changes, i.e. the markets are exposed to shocks. Worse, the biennial reassessment of bidding zones creates the inherent risk that bidding zones are redefined.
However, a *continuous development of markets by investing in infrastructure* combined with a long-range market coupling leads to a stable European Market. This procedure does not rely on periodic structural changes of the market environment, but rather allows for a continuous convergence of national markets. We believe that there is a substantial scope for development of the grid before the efficient point market convergence is reached.
Nevertheless, we share the statement provided in the consultation document that the marginal costs of *network development and maintenance* are increasing and that the marginal benefits of market convergence are decreasing. However, please note that the costs of *network development* are irrelevant when it comes to long-term efficiency – in contrast to the information provided in the figure on page 7/10. This is because the benefits of network development are increasing with time, whereas the costs are constant. Thus, the costs of network development may not be taken into account when the question as to whether a further development of the network increases efficiency is answered.

e. **Finally, (cross-border) redispatching measures are a helpful instrument to deal with bottlenecks that are supposed to be dissolved mid-term.** Redispatching measures in Germany have proven to be effective. Moreover, the costs of redispatching measures are insignificant compared to the main drivers of costs for grid operation (2011: 4.6 % [6])]. The costs of redispatching should be recovered by regulated tariffs to prevent the abuse of market power. The costs should be distributed among consumers.
f. **To conclude,** there is a trade-off between
    i. Preserving todays bidding zone configuration, investing in network infrastructure, accepting the temporary but low costs of redispatching measures,
    ii. Reviewing bidding zones and thus potentially diminishing liquidity, increasing market concentration, increasing price risk for both consumers and generators and increasing the risk of investment in both generation and network infrastructure.

    As outlined above, we believe that a continuous development of markets according to i) clearly outperforms a reassessment of bidding zones according to ii).

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2.2. Do you perceive the existing bidding zone configuration to be efficient with respect to overall market efficiency (efficient dispatch of generation and load, liquidity, market power, redispatching costs, etc.) or do you consider that the bidding zone configuration can be improved? Which advantages or disadvantages do you see in having bidding zones of similar size or different size?

1) **First of all and most important, there is no framework available to measure the efficiency of bidding zone configuration properly.** In order to be comparable, the efficiency of different bidding zone configurations has to be aggregated to a single number. This problem has not yet been dissolved by the scientific literature.
The *pure costs of electricity generation in terms of fuel consumption and the costs of grid operation* may be measured approximately ex-post. However, in order to evaluate alternative bidding zone configurations, one has to estimate the future costs of electricity generation and grid operation for a different configuration of bidding zones. It is unclear how this can be done properly. Usually a cost-minimizing approach is applied, see [1]. However, this approach is only valid if the markets are perfectly atomistic and have complete information. In reality, this is not the case. Therefore, calculating future costs by means of a cost-minimizing simulation model would systematically underestimate costs, meaning that such a methodology is inadequate.

> The concept of „efficiency“ is not sufficiently specified by ACER or ENTSO-E. Today, there is no proper framework available to catch the numerous impacts of bidding zone configuration on social welfare. We are afraid that the framework applied might be biased such that the costs of a re-configuration of bidding zones are underestimated while the benefits are overestimated.

2) Beside these difficulties to forecast the pure costs of electricity generation and network operation, it is a challenge to provide a proper framework to measure the *overall efficiency* when markets are *not perfectly atomistic* (as they are not in Europe).
First, one has to take into account properly the issues of a possible decrease of liquidity and a possible increase of market power potential. Second, both the current review of bidding zones and the possible future review of bidding zones create price risks that cannot be hedged, which creates costs, because players, in particular consumers, are risk averse. Lastly, these impacts have to be quantified and have to be put into the relationship with other costs. That is to say, the welfare losses from a decrease of liquidity and an increase of market concentration are likely to be underestimated.

3) Beside these undissolvable conceptual problems, the question is unfavourably put. The question should rather be: *„Do you consider that there exists a bidding zone configuration such that moving from the current configuration to the new configuration increases social welfare?“* Thus, the question would incorporate the costs of changing bidding zones. As outlined above, it is a challenging task to develop a methodology to measure the efficiency of a bidding zone configuration. Thus, we barely have the ability to calculate numbers within two months in order to answer the question based on a quantitative

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assessment. However, we believe that the costs of amending the current bidding zone configuration overcompensate the benefits by far.

4) There is no general rule of thumb as to whether bidding zones should be of similar or of different size. A meaningful bidding zone configuration should ensure a sufficient amount of competition and liquidity within each zone. However, the advantages of large bidding zones are listed in section 2.1 2) in the document at hand.

2.3. Do you deem that the current bidding zones configuration allows for an optimal use of existing transmission infrastructure or do you think that existing transmission infrastructure could be used more efficiently and how? Additionally, do you think that the configuration of bidding zones influences the effectiveness of flow-based capacity calculation and allocation?

1) As outlined in section 2.1 1) of this document, the physical flows are barely influenced by the configuration of bidding zones, provided that redispatching measures are taken properly. In fact, managing congestion by taking redispatching measures ensures that bottlenecks are fully utilized if this is efficient, whereas this must not be true when bottlenecks are managed ex-ante, at least when explicit auctions are in place (see [3]).

2) Regarding the flow-based capacity calculation, ACER may refer to the detailed response by EPEX Spot.

2.4. How are you impacted by the current structure of bidding zones, especially in terms of potential discrimination (e.g. between internal and cross-zone exchanges, among different categories of market participants, among market participants in different member states, etc.)? In particular, does the bidding zones configuration limit cross-border capacity to be offered for allocation? Does this have an impact on you?

No answer.

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2.5. Would a reconfiguration of bidding zones in the presence of EU-wide market coupling significantly influence the liquidity within the day-ahead and intraday market and in which way? What would be the impact on forward market liquidity and what are the available options to ensure or achieve liquidity in the forward market?

1) **Regarding the impact on the liquidity of day-ahead and intraday markets, ACER may refer to the response of EPEX Spot.**

2) **Impact on derivatives markets.** First, we outline the impacts resulting from a reconfiguration of bidding zones to be expected regardless of the question as to whether bidding zones are split up or merged or both. Today, roughly 50% of EEX customers are financial players that do not trade physical products, but rather financial products in order to complement their commodity portfolio. These financial players are located across whole of Europe (indeed, a minority is located in Germany). These players have an interest to trade Phelix Future products only if the corresponding markets are reliable. The threat of a regular re-assessment of bidding zones will make these markets unreliable. Moreover, a review of bidding zones induces costs of amending existing open positions. Thus, derivatives markets will become unattractive for financial players (we have seen in the emission market that in particular financial players react quite sensitive to structural changes in the market induced by the authorities). This will reduce liquidity dramatically.

> First, the reconfiguration of biddig zones itself will destabilize the market environment and will most likely frighten financial players to trade derivatives on electricity. This reduces liquidity in the derivatives market. Second, if the reconfiguration is such that a bidding zone is split-up, its liquidity will be split up, too. The options to restore liquidity in the resulting bidding zones are insufficient.

Second, if a bidding zone is split up, its liquidity is split up as well. This effect can be mitigated by Forward Capacity Allocation rules, but it cannot be mended.

3) **Options to restore liquidity in the forward market.** First, as argued above, one reason for a loss of liquidity is a loss of market participants. We do not see any option to preserve the liquidity provided by these participants, since we cannot create hedging instruments that can be used to hedge the basis risk created by structural changes of the market conducted by the authorities.
Second, as argued above, the remaining liquidity is split up once a bidding zone is split up. At first glance, introducing contracts for differences (CfDs) can bundle the remaining liquidity of the markets under consideration. CfDs are used in the Scandinavian power markets to hedge the difference between a local price and a generic system price. However, if there is low liquidity in a bidding zone, then the corresponding CfD is

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illiquid as well, i.e. CfDs inherit the liquidity they are supposed to eliminate. In fact, CfDs in Scandinavia suffer from low liquidity. We do not believe that transmission rights, be they physical or financial, can bundle liquidity either, for this would require every remaining trader to trade in both bidding zones and, in addition, to trade transmission rights between these bidding zones.

2.6. Are there sufficient possibilities to hedge electricity prices in the long term in the bidding zones you are active in? If not, what changes would be needed to ensure sufficient hedging opportunities? Are the transaction costs related to hedging significant or too high and how could they be reduced?

The German-Austrian bidding zone has proven to provide sufficient hedging opportunities. Although it is the most liquid zone in the EU market with a churn rate of 8-9, its liquidity is significantly smaller compared to, for example, the market for crude oil, which has a churn rate of roughly 20. Most likely, both the churn rate and the liquidity would decrease if the zone would be split-up.

Low liquidity reduces hedging opportunities, as the Dutch market shows (churn rate of 3-4). However, traders located in the Netherlands hedge part of their risk via the German market, which emphasises the importance of the German-Austrian bidding zone.

The Nordic market is a good example for insufficient liquidity. There, only products referring to the generic system price are liquid, while products that refer to local prices are not. As a consequence, contracts for differences between local prices and the system price are not liquid as well.

2.7. Do you think that the current bidding zones configuration provides adequate price signals for investment in transmission and generation/consumption? Can you provide any concrete example or experience where price signals were/are inappropriate/appropriate for investment?

1) **Investment in generation infrastructure.** Today, experts disagree on the question as to whether the current market design provides sufficient signals for investment. The main argument why this might not be true is presented for example in [4] and states that *„spot prices are too low to pay for adequate capacity when capacity is adequate“.* This means that if a sufficient amount of capacity is built, so that a given level of security of generation is ensured, then prices will be driven down to short-run marginal costs. Today, no one knows if this argument is correct; however, we do know that it is either wrong or true for *any* bidding zone configuration, at least in the long run, meaning that the question is not relevant for the purpose of reassessing bidding zones.

2) **Investment in transmission infrastructure.** We do not see sufficient price-based incentives to resolve congestions, regardless of the bidding zone configuration, meaning that there is no player in the market who is both able to invest in infrastructure and who has sufficient incentives to do so. Moreover, the price differences between bidding zones provide inadequate signals for investment. This is because *a price difference be-*

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tween bidding zones does not necessarily indicate that the transmission line between these zones is congested and the other way round (see, for example, [2]). The argument that a reconfiguration of bidding zones uncovers congestion and induces efficient price signals for investment in transmission infrastructure is therefore misleading to some extent; this argument is true regarding *transportation networks*, however, it is less straightforward regarding *electricity networks.*

2.8. Is market power an important issue in the bidding zones you are active in? If so, how is it reflected and what are the consequences? What would need to be done to mitigate the market power in these zones? Which indicator would you suggest to measure market power taking into account that markets are interconnected?

The question as to whether there is sufficient competition in the German wholesale market for electricity is regularly investigated by *Bundeskartellamt* or *Monopolkommission*. In its recent report [7], Monopolkommission finds that in 2012 market power potential is significantly lower compared to 2007 and 2008. In its analysis, Monopolkommission calculates the Residual Supply Index (RSI), which is a well-established measure to estimate market power in electricity markets. The methodology of RSI relies on the fact that a player has substantial market power if the player is *pivotal*, meaning that the player's generation capacity is required to meet demand for electricity (which is inelastic in the very short-term). Roughly speaking, the RSI of player *i* is defined by

$$RSI_i = (\text{Generation Capacity in the Market} - \text{Capacity controlled by player i}) / \text{Demand for Electricity.}$$

Thus, large values of RSI indicate little market power potential of player *i*, whereas there is substantial market power in case the RSI falls below 1. Interconnector capacities to neighbouring bidding zones reduce market power by increasing the *Generation Capacity in the Market.*

At the end of the document further insights of the impact of bidding zone configuration on market power potential are provided. The discussion there is based on the model discussed by [5]. The basic message provided there is that if splitting up bidding zones such that the RSI increases in one or even two of the resulting bidding zones, then market power does. Therefore, we are convinced that the RSI is an appropriate indicator to measure market power potential.

2.9. As the reporting process (Activity 1 and Activity 2) will be followed by a review of bidding zones (Activity 4), stakeholders are also invited to provide some expectations about this process. Specifically, which parameters and assumptions should ENTSO-E consider in the review of bidding zones when defining scenarios (e.g. generation pattern, electricity prices) or alternative bidding zone configurations? Are there other aspects not explicitly considered in the draft CACM network code that should be taken into account and if so how to quantify their influence in terms of costs and benefits?

First, we expect from the review of bidding zones that it is based on a transparent and appropriate methodical framework. In particular, we expect that the measure for social welfare and the details of the cost-benefit analysis are properly and transparently defined before the bidding zone review takes place. Moreover, we expect that assump-

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tions on costs and other relevant parameters are made carefully and are made transparent to stakeholders.

Second, ACER should clarify the roles of stakeholders in the process. In particular:

a. Who takes the final decision on bidding zone configuration?

b. How does the decision making process look like?

c. What is the role of the TSOs?

d. Are other stakeholders involved in the process as well?

2.10. In the process for redefining bidding zones configuration, what do you think are the most important factors that NRAs should consider? Do you have any other comments related to the questions raised or considerations provided in this consultation document?

The overarching goal of bidding zone configuration should be to create (or to preserve) functioning wholesale markets. *Market* means both spot markets and derivative markets. *Functioning* means that markets are liquid and, as far as possible, atomistic. This is because a competitive and liquid market maximises social welfare.

Of course, this maximisation is subject to physical conditions existing today. However, a proper market design would *create incentives* that make market players dissolve physical limitations reducing social welfare. Moreover, any market player is then able to anticipate the market's evolution. In contrast, a sudden re-configuration of bidding zones is non-transparent and thus creates risks and makes players lose their trust in the markets.

That is to say, a re-configuration of bidding zones should be a measure of last resort. When bidding zones are reviewed, the impact of a re-configuration on the functioning of markets should not be underestimated. In particular, splitting up bidding zones will most likely decrease liquidity significantly. Moreover, the market power potential increases in each zone when a large zone is split up (see also section 3).

At the same time, the social costs of redispatching measures should not be overestimated. These costs are not equal to a loss of social welfare, but rather make the costs of congestion explicit. When congestions are relieved by splitting up bidding zones, these costs are to a large extent implicitly incorporated in the markets' prices for electricity. The actual additional costs arising from redispatching are small.

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3. Other Comments on the Consultation Document

3.1. On the issue of market power and its relation to bidding zone configuration

1) We agree that *„the relation between market power and the size of the bidding zone is not straightforward“* as stated in the consultation document. However, we do not agree on the assertion that due to a better appraisal of network congestions and the increase of transmission capacity, the reduction of zone size allows for an increase of cross-zonal competition. In addition, we do not see in how far this assertion is supported by [5]. These authors present a rather stylised model to assess the market power potential for different bidding zone configurations.
However, the authors *do not work out any general result* on the interdependency of market power potential and bidding zone configuration. Instead, they analyse market power potential by means of *examples*. Indeed, in the given model framework an example where market power decreases when a bidding zone is split up is easily constructed (see Figure 9 on page 18 in [5]). *(Please note that due to the model construction, players exert market power whenever possible. We do not claim that players exert market power in reality whenever they are able to do so.)*

   a. The following figure and table present another example that we have constructed within the very same model framework as developed by [5]. As pictured, we consider two zones, where demand in each zone equals 1,000 MW. In each zone there is one generator commanding 2,000 MW of generation capacity. The marginal costs of electricity generation are equal to 20 €/MW in Zone 1 and 30 € /MW in Zone 2.
   b. In the case where both zones are merged to a single zone and the congestion is not taken into consideration when bidding takes place, the market's equilibrium price amounts to 29 €/MWh. This is because neither the supplier located at Zone 1 nor the supplier located at Zone 2 is *pivotal*, meaning that their production capacity is not required to serve the market. Therefore, both suppliers undercut each other until the price falls below the marginal costs of the supplier located in Zone 2. Then, the supplier at Zone 1 finds it profitable to sell its electricity for 29 €/MWh. In a second step, a re-

The question of market power in different bidding zone configurations is complex. However, a large bidding zone minimises market power potential on day-ahead and derivative markets. In addition, regulated tariffs eliminate market power of those players providing redispatching measures. That is to say, the bulk of electricity traded is priced competitively, while a minor quantity resulting from redispatching measures is priced via regulated tariffs. Thus, market power is mitigated effectively.

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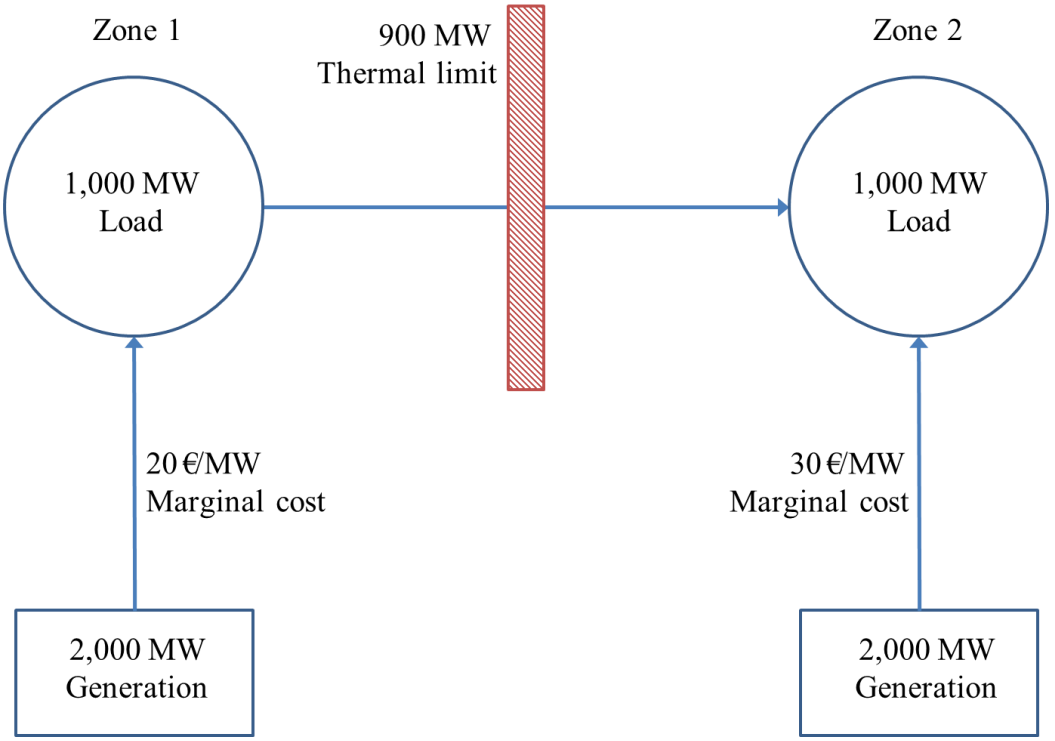
dispatching measure is conducted. Both suppliers then abuse market power to maximise their profits from providing redispatching measures. To provide an upper bound on these profits, we assume for convenience that suppliers can generate 1,000 €/MWh regardless if they increase or decrease their generation as a measure of redispatching.

c. In case two bidding zones, both suppliers are pivotal, meaning that their capacity is essential to serve the market. Therefore, they abuse market power by assumption of the model, and the equilibrium price on both markets amounts to 1,000 €/MWh. Thus, the overall costs of electricity procurement are higher in the case two bidding zones.

d. This example shows that the large bidding zone increases competition in the first stage before redispatching measures are taken. The market power both suppliers have is inherent at the given market regardless of bidding zone configuration. However, given a single large zone, the abuse of market power affects a *smaller quantity*, since only the quantity that is subject to redispatching measures is priced at 1,000 €/MWh, whereas total demand is priced at 1,000 €/MWh when the bidding zone is split-up.

e. The cost advantage of the large bidding zone configuration even increases if the price for redispatching measures is regulated. And while it is suitable to regulate the small quantity of electricity generation that is subject to redispatching measures, and thus to eliminate monopoly rents, it is impossible to regulate prices when the bidding zone is split-up without eliminating the market completely. That is to say, a large bidding should be preferable from a regulator's perspective.



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	Two bidding zones		One bidding zone	
	Price	**Payments**	**Price**	**Payments**
Zone 1	1,000	1,000,000	29	29,000
Zone 2	1,000	1,000,000	29	29,000
Total				
- Congestion Rent Credits			0	0
Constrained On/Off Payments			0	200,000
Net Payments		2,000,000		258,000

4. Contact & References

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[1] Burstedde, B., 2012. *Essays on the Economics of Congestion Management – Theory and Model-based Analysis for Central Western Europe*. PhD thesis, University of Cologne.

[2] Wu, F., Varaiya, P.,Spiller, P.,Oren, S., 1996. *Folk Theorems on Transmission Access: Proofs and Counterexamples*. Journal of Regulatory Economics 10, 5-23.

[3] Richter, J., Viehmann, J., 2013. *The Value of Information in Explicit Cross-Border Capacity Auction Regimes in Electricity Markets*. EWI Working Paper No 13/05.

[4] Cramton, P., Ockenfels, A., 2012. *Economics and Design of Capacity Markets for the Power Sector*. Zeitschrift für Energiewirtschaft 36, 113-134.

[5] Scott, M.H., Hogan, W.W., 2000. Nodal and Zonal Congestion Management and the Exercise of Market Power. (unpublished)

[6] Bundesnetzagentur, Monitoringreport 2012.

[7] Monopolkommission, Energie 2013: Wettbewerb in Zeiten der Energiewende, 2013.

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