
Annex 1: Considerations on Bidding Zone Review Region “Central Europe” Bidding Zone configurations

Bidding Zone Review Region "Central Europe"

1 October 2019

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This document provides an explanation to the competent regulatory authorities and the Agency on what has prevented an agreement amongst the TSOs of the Bidding Zone Review Region Central Europe to propose a set of configurations to be investigated in the bidding zone review process in accordance with Article 14(5) of Regulation (EU) 2019/943 of the European Parliament and the Council of 5th June 2019 on the internal market for electricity (recast).

2 General introduction

According to article 4.3 of the All TSOs proposal for the methodology and assumptions that are to be used in the bidding zone review process and for the alternative bidding zone configurations to be considered in accordance with Article 14(5) of Regulation (EU) 2019/943 of the European Parliament and the Council of 5th June 2019 on the internal market for electricity (recast) (the “IME Regulation”), hereinafter referred to as the “BZR methodology”, the TSOs of a Bidding Zone Review Region (BZRR) shall deliver a set of bidding zone configurations for their BZRR which are to be used in the Bidding Zone Review Process.

Alternatively, according to article 4.4. of the proposed BZR methodology, the TSOs of a BZRR may submit only the status quo configuration, if sufficient justification is provided on the absence of structural congestions that have impact on neighbouring bidding zones under the consideration of applicability of the 70% criterion as intended in Article 16(8) of the IME regulation.

The BZRR Central Europe (BZRR CE), comprising of the bidding zones France, Belgium, The Netherlands, Germany/ Luxembourg, Austria, Czech Republic, Poland, Slovakia, Hungary, Slovenia, Croatia, Romania, Denmark 1, Switzerland and Italy 1, also had the task to deliver a set of alternative bidding zone configurations to be used in the Bidding Zone Review Process, or to provide sufficient justification on the absence of structural congestions if only the status quo configuration was to be provided.

The TSOs of BZRR Central Europe have not been able to agree upon a set of alternative configurations to be provided for the BZRR CE to be used in the Bidding Zone Review Process. This document provides the competent regulatory authorities and the Agency with explanations on the process followed by the BZRR CE TSOs, the relevant proposals and argumentations as provided by the individual TSOs of the BZRR Central Europe, and explains what has prevented an agreement amongst the TSOs of the BZRR on a set of configurations.

3 Process followed by BZRR CE TSOs to determine alternative configurations

The TSOs of the BZRR CE had agreed upon the following two-step process to come to a set of bidding zone configurations to be collectively proposed by the BZRR CE TSOs according to article 4(3) of the proposed BZR methodology:

1. Per Member State, the TSOs of that Member state will come forward with either:
 - a. Alternative bidding zone configurations for the Member State to be investigated in the next Bidding Zone Review, including a justification for the proposed configuration; or
 - b. The status quo bidding zone configuration in its Member State and a justification why no alternative bidding zone configuration would have to be investigated for the Member State
2. The BZRR CE TSOs will discuss the individual proposals and combine them to come to a balanced set of configurations to be investigated by the BZRR CE TSOs.

The outcome of step 1 of the process above is described in section 4 and section 0 of this document; an explanation why the BZRR CE TSOs could not come to a set of alternative bidding zone configurations to be proposed for investigation in the next bidding zone review, is given in section 0.

4 Overview of TSOs which did not provide alternative configurations and their arguments why

In Table 1, the individual justification of each TSO of the BZRR CE which did not provide alternative configurations is given. For the sake of clarity, these justifications reflect the individual positions of the respective TSOs.

Member State	TSO	BZ	Justification
France	RTE	FR	<p>On the horizon of this bidding zone review there are no structural congestions in France</p> <p>As part of its legal obligations, RTE has carried out its grid development study (SDDR: <i>Schéma décennal de développement du réseau</i>) that has been published and submitted to the French NRA's approval on 17th September 2019. The SDDR offers RTE's best forecast on grid congestion and grid development needs until 2035 in four different scenarios with different evolutions of the energy mix. The methodologies used in this study were developed to reflect the specificities of the French electric system. The SDDR presents the following results:</p> <ul style="list-style-type: none"> - In the period 2021-2025, with an amount of RES below 50 GW in all the considered scenarios, RTE's 220 and 400 kV transmission grid will not face any significant increases in congestions, redispatching costs or RES curtailment. The 220 and 400 kV levels will not require any major developments in that period. Development needs will mainly be focused on connections of new RES capacities and not on the reinforcement of the transmission grid. - When the amount of installed RES exceeds 50 GW (closer to 2030 or later depending on the considered scenario), congestions will increase and significant grid developments will be required on all voltage levels in order to mitigate the increase in congestion costs. <p>RTE currently faces a low level of congestion (with redispatching costs around 10 million euros per year) with the French configuration as a single bidding zone. Considering the results of the SDDR study, it appears that challenging this configuration is not relevant before the target year 2025.</p> <p>Studying an alternative bidding zone configuration in France would complexify the bidding zone review from a methodological point of view and put it at risk without proven benefit.</p> <p>As shown by the difficulties faced and explained in the first Bidding Zone Review, the scope and complexity of the Bidding Zone Review make it difficult to correctly model the local specificities of all TSOs. For instance, topological remedial actions, which are heavily used in RTE to solve congestion, could not be taken into account in the study. This explains why congestions shown in this study were so different from those faced by RTE (in the model-based approach, the overall cost of congestion for continental Europe was estimated around 100 million euros and the congestion cost associated to the constraints on the French 225 kV network was estimated around 70% of this amount). Submitting alternative configurations for France in the Bidding Zone Review would imply the risk of displaying results that would not be deemed reliable by RTE and would not be consistent with the SDDR which, as stated above, does not show any significant increases in congestions in the period 2021-2025.</p>
Belgium	Elia	BE	<p>1. A split of the Belgian bidding zone is not required since Belgium does not face structural congestions (as illustrated by the low redispatch costs). This approach is consistent with the choice not to apply for an action plan pursuant to the Article 15 of the Electricity Regulation. Moreover, a split would be detrimental for the liquidity of the bidding zone, hence for the quality of the underlying price formation.</p> <p>2. A merge does not appear appropriate at a time where the legislation pushes towards smaller bidding zone and the non-consideration of internal elements in the capacity calculation process. The expected gain in efficiency in the market coupling thanks to the 70% rule of the Electricity Regulation also reduces the need for considering a merge of bidding zone since the grid will already be used as efficiently as possible.</p>
Czech republic	CEPS	CZ	<p>“Czech Republic (ČEPS, a.s.) does not propose any alternative configuration. Proposal to maintain the current bidding zone is fully in line with conclusions resulting from Market monitoring report 2017 elaborated by ACER and Technical report provided by ENTSO-E.</p> <p>According to the results from the latest Technical report, there is no structural congestion within the Czech Republic bidding zone.</p> <p>In more details, for the capacity calculation for the purpose of DA allocation time frame, no congestions on internal network elements of bidding zone Czech Republic have been recorded. In D-1 time frame and real-time, only several congestions on internal network elements are reported, but they are far from meeting the definitions of structural congestions.</p> <p>The majority of congestions in real-time were caused by unexpected high power flows from the northern direction (either from 50Hertz or PSE) during planned maintenance periods. Few congestions resulted as a consequence of redispatching outside of the Czech Republic.</p> <p>After putting the PST between ČEPS and 50Hertz in July 2017, the level of congestions reported on internal network elements in transiting path from Germany (50Hertz) to the southeast had decreased for both time frames.</p>

Member State	TSO	BZ	Justification
			<p>Based on absence of structural congestion within Czech Republic bidding zone, maintenance of current bidding zone is proposed.</p> <p>In Market monitoring report, efficiency of current bidding zone configuration has been assessed by pair of indicators. First assessment criteria monitors cross-zonal capacity and the second one costly remedial actions. The performance of each country or bidding zone is assessed for each criteria, and is classified into three possible categories. A bidding zone configuration is considered inefficient, and should be improved, when it performs poorly on either the cross-zonal capacity or costly remedial actions criteria. According to the results, current bidding zone (Czech Republic) is not considered inefficient since it does not perform poorly on either the cross-zonal capacity or costly remedial actions criteria. Therefore proposal to maintain the current bidding zone (Czech Republic) is in accordance with conclusions stated in Market monitoring report.”</p>
Poland	PSE	PL	<p>According to Article 14(1) of Regulation 2019/943 Member States shall take all appropriate measures to address congestions. Bidding zone borders shall be based on long-term, structural congestions in the transmission network. Bidding zones shall not contain such structural congestions unless they have no impact on neighbouring bidding zones, or, as a temporary exemption, their impact on neighbouring bidding zones is mitigated through the use of remedial actions and those structural congestions do not lead to reductions of cross-zonal trading capacity in accordance with the requirements of Article 16 (also known as 70% requirement). The configuration of bidding zones in the Union shall be designed in such a way as to maximise economic efficiency and to maximise cross-zonal trading opportunities in accordance with Article 16, while maintaining security of supply. As already described in the report from the First Edition Bidding Zone Review, the Polish bidding zone appears to be a fairly coherent one, without major dominant east – west or north – south power flows, nor any others. The power flow pattern changes with seasons and with demand, thus making it practically impossible to determine one unique, congestion-based geographical PL split suitable for all seasons and demand situations. PSE would like to emphasise that the split of Poland analysed in the First Edition Bidding Zone Review was only one of the theoretically possible splits resulting from the clustering exercise, without significant advantages over other possible split scenarios. The price differences between the Polish bidding zones in the different split scenarios were quite marginal (in the order of tens of euro cents per MWh), which from a PSE point of view confirms that there is no strong indication for any robust split of the Polish bidding zone. Moreover, it should be underlined that most of the (very limited) LMP price differential in Polish bidding zones have come from constraints located outside of Poland. This was clearly visible when comparing shadow prices of European critical branches – shadow prices of the Polish branches were order of magnitude lower than those in other European countries. Further, ENTSO-E Technical Report 2018 has shown that congestions of structural character in Poland are active only on Polish borders or their direct vicinity: cross-border lines and lines directly connected to border substations, and hence they are highly influenced by unscheduled flows and usually result from dynamic changes of those unscheduled flows. Any other constraints presented in the report cannot be deemed as structural congestions. The frequency of those constraints is relatively low, e.g. 220 kV Pila Krzewina – Plewiska is active just 0.5 % of all hours in 2017 and grid investments are expected to solve those constraints in near future, e.g. a new double circuit line 400 kV-Pila Krzewina – Plewiska in 2021. It need to be noted that according to Article 14(5) of Regulation 2019/943 the methodology for the bidding zone review shall be based on structural congestions which are not expected to be overcome within the following three years, taking due account of tangible progress on infrastructure development projects that are expected to be realised within the following three years. In parallel, Article 14(7) of Regulation 2019/943 gives an option to Member States to decide whether to apply Action Plan or to review and amend its bidding zone. This decision has still not been taken in Poland and many other EU countries, providing high level of uncertainties related to future flow patterns and eventual congestions resulting from them. Considering all the above, based on available information and current expert knowledge, PSE sees no sound justification for any split of Polish bidding zone. Internal transactions within the Polish bidding zone have no significant influence on power flows in neighbouring systems, and in particular, they do not constitute a structural cause for the worsening of conditions for the secure operation of these systems. Instead, given the dynamic development of intermittent sources of energy and the resulting frequent and significant trading pattern changes, PSE favours a more significant redesign of the European market by moving from a zonal model towards a more locational one, thereby avoiding the need for ex ante defining of bidding zones and all the implications these entail.</p>
Slovakia	SEPS	SK	<p>Due to the fact that there is no structural congestion registered on the internal lines and the occurrence of such congestion has been detected only on the cross-border lines and bearing in mind the fact that the geographical area of Slovak bidding zone, which is one of the smallest in the BZRR of Central Europe, SEPS decided not to provide any additional bidding zone configuration (especially split of our bidding zone) for the next BZR except the current one.</p>

Member State	TSO	BZ	Justification
Hungary	MAVIR	HU	<p>MAVIR does not propose to perform calculations on any split configuration in case of the Hungarian bidding zone as we believe that, as a long-term solution, the appropriate bidding zone delimitation (or its correction via an Action Plan according to Article 15 of the CEP Regulation) shall be determined taking into account the fulfilment of the 70% requirement in the flow-based capacity calculation methodology (i.e. the target model of CACM).</p> <p>Furthermore, MAVIR does not have a tool, the necessary data or an applicable methodology to assess the fulfilment of the 70% requirement in the current (NTC-based) capacity calculation methodology in advance before the allocation – in fact for the determination of the current NTC fulfilment regarding the 70% requirement the foreseen ACER calculations (scheduled for September-October of 2019) are necessary. The eventual structural congestions according to the DA Flow Based CC may be assessed once the relevant data and the ACER compliant common capacity calculation tool are available.</p> <p>In this respect MAVIR could only use the results of the latest Technical Report which does not contain any structural congestion within the Hungarian bidding zone, and we believe that no alternative proposal that is justifiable and sufficiently long-lasting (i.e. equally valid once the FBCC is implemented) can be determined at this point.</p>
Slovenia	ELES	SI	<p>1. A split of the Slovenian bidding zone is not required since Slovenia does not face structural congestions. This can be justified by the low redispatch costs. Besides that, all redispatch costs are a consequence of the congestions on North Italian Border. This approach is consistent with the choice not to apply for an action plan pursuant to the Article 15 of the Electricity Regulation. Moreover, a split would be detrimental for the liquidity of the bidding zone, hence for the quality of the underlying price formation.</p> <p>2. A merge does not appear appropriate at a time where the legislation pushes towards smaller bidding zone and the non-consideration of internal elements in the capacity calculation process. The expected gain in efficiency in the market coupling thanks to the 70% rule of the Electricity Regulation also reduces the need for considering a merge of bidding zone since the grid will already be used as efficiently as possible.</p>
Croatia	HOPS	HR	<p>Croatia, through its transmission system operator (HOPS), and following its obligations from EU legislation, have accomplished satisfying cross-border transmission capacities with the CEE region (Hungary and Slovenia) with satisfying all technical criteria for secure power system operation and safe supply to end consumers. Changing existing BZ configuration, in Croatian case, would result in congestion within the Croatian transmission network and that is the reason why we are standing by the decision that current situation is the most efficient one, single BZ in Croatian control area.</p>
Romania	Transelectrica	RO	<p>With regard to the bidding zone review process, for Romania, there are no alternative bidding zone configurations. This is due to the fact that there are no structural congestions on the long-term run in the transmission network. This assumption is based on the present situation and the Ten Years Network Development Plan of Transelectrica. Currently, the transmission network rated voltage is mainly of 220 kV in the south-western part of the country and most limiting CNEC in the capacity calculation and allocation is the CNE 220 kV double circuit OHL Porțile de Fier – Reșița with contingency the second circuit of the same OHL. The investment projects included in the Ten Years Network Development Plan (https://www.transelectrica.ro/web/tel/plan-perspectiva) of Transelectrica approved by NRA with impact on cross-zonal capacity are:</p> <ul style="list-style-type: none"> • 400 kV OHL Nădab – Oradea Sud (with commissioning date in 2021); • 400 kV OHL Porțile de Fier – Reșița (with commissioning date in 2022); • 400 kV OHL d.c. Reșița – Timișoara – Săcălaz (with commissioning date in 2024); • 400 kV OHL d.c. Timișoara – Săcălaz – Arad (with commissioning date in 2027); • 400 kV OHL Smârdan – Gutinaș (with deadline in 2024); • 400 kV OHL d.c. Cernavodă – Gura Ialomiței - Stâlpu (with commissioning date in 2022). <p>Most of these projects are approved as Projects of Common Interest. As an important information the existing 220 kV double circuit Portile de Fier-Resita will remain functional and the new 400kV OHL Portile de Fier – Resita will be also operational.</p>
Denmark	Energine	DK1	<p>From DK we are not proposing a split of the bidding zones due to the fact that we currently do not see any significant challenges with meeting the 70% requirement. In todays capacity calculation the point of departure is 100% capacity on the network elements and a few dynamic restrictions which will not be influenced by a bidding zone split.</p>
Switzerland	Swissgrid	CH	<p>Switzerland does not propose alternative bidding zone configurations because current congestions will be eliminated by the realization of the Strategic Grid 2025 as stated in the ENTSO-E Technical Report 2018.</p>

Member State	TSO	BZ	Justification
Italy	Terna	IT1	No alternative proposals have been submitted because no relevant internal structural congestions have been detected in the Entso-E Bidding Zone Configuration Technical Report 2018 (except for the ones already considered for the existing Bidding Zone borders with neighboring Countries and within Italy). In addition, it should be highlighted that several internal grid investments are already ongoing in order to further enhance the network for coping with expected future scenarios (as reported in the EntsoE Ten Year Network Development Plan as well as in the Italian network development plan). Finally, it should be worth mentioning that Italy is already subdivided in several Bidding Zones in order to properly reflect internal structural congestions (and this is the only case among the Countries involved in the Central Europe BZRR).

Table 1: Overview of CE BZRR TSOs which did not provide alternative configurations and their justification for doing so

5 Overview of the provided alternative configurations and their justifications

In this section, an overview is given about the alternative configurations that were provided by some of the CE BZRR TSOs.

For the sake of clarity, the argumentations provided reflect the individual positions of APG and TenneT TSO B.V regarding the proposal for Austria and the Netherlands, and the joint position of the TSOs 50 Hz, Amprion, Transnet BW and TenneT TSO GmbH regarding the proposals for Germany.

5.1 Austria

APG has proposed to investigate the following alternative bidding zone configuration:



Figure 1: Proposal of APG for a joint DE-AT bidding zone

The network elements which would form the Bidding Zone Borders of this configuration, are given in Table 2. This list should be combined with the bidding zone borders as included in Table 7.

Configuration “AT-DE Merger”									
Cty-CBk	Bidding Zone Border	TSO1	Station 1	TSO2	Station 2	Voltage level [kV]	Type	Network element Name	New/different compared to status quo?
AT	AT-CH	APG	Westtirol	Swissgrid	Pradella	380	AC	Inn Nord 428	No
AT	AT-CH	APG	Westtirol	Swissgrid	Pradella	380	AC	Inn Sued	No

Configuration “AT-DE Merger”									
								427	
AT	AT-CH	APG	Meiningen	Swissgrid	Bonaduz/M ontlingen	220	AC	Falknis 407	No
AT	AT-CH	APG	Meiningen	Swissgrid	Winkeln	220	AC	Stoss Süd 408	No
AT	AT-CH	APG	Feldkirch	Swissgrid	Eschen	110	AC	Eschen – Feldkirch 197/11	No
AT	AT-CZ	APG	Dürnrohr	CEPS	Slavetice	380	AC	Duernrohr – Slavetice 437	No
AT	AT-CZ	APG	Dürnrohr	CEPS	Slavetice	380	AC	Duernrohr – Slavetice 438	No
AT	AT-CZ	APG	Bisamberg	CEPS	Sokolnice	220	AC	Bisamber g – Sokolnice 243	
AT	AT-CZ	APG	Bisamberg	CEPS	Sokolnice	220	AC	Bisamber g – Sokolnice 244	
AT	AT-HU	APG	Zurndorf	MAVIR	Győr	380	AC	Zurndorf– Győr 439B	
AT	AT-HU	APG	Zurndorf	MAVIR	Szombathel y	380	AC	Zurndorf– Szombath ely 440B	
AT	AT-HU	APG	Wien Südost	MAVIR	Győr	220	AC	Wien Südost – Győr 245	
AT	AT-HU	APG	Neusiedl	MAVIR	Győr	220	AC	Neusiedl – Győr 246B	
AT	AT-IT	APG	Lienz	TERNA	Soverzene	220	AC	Lienz – Soverzen e 261	
AT	AT-SI	APG	Obersielach	ELES	Podlog	220	AC	Obersiela ch – Podlog 247	
AT	AT-SI	APG	Kainachtal	ELES	Maribor	380	AC	Kainachta l – Maribor 1 473	
AT	AT-SI	APG	Kainachtal	ELES	Maribor	380	AC	Kainachta l – Maribor 2 474	
DE	CH-DE	Swissg rid	Asphard	TransnetBW	Zählpunkt TransnetB W	380	AC	Wiesental Süd	
DE	CH-DE	Swissg rid	Asphard	TransnetBW	Kühmoos	380	AC	Wehra	
DE	CH-DE	Swissg rid	Oftringen	TransnetBW	Gurtweil	220	AC	Blau	
DE	CH-DE	Swissg rid	Laufenburg	TransnetBW	Gurtweil	220	AC	Alb Süd	
DE	CH-DE	Swissg rid	Laufenburg	TransnetBW	Kühmoos	380	AC	Heimbach	
DE	CH-DE	Swissg rid	Laufenburg	Amprion	Kühmoos	380	AC	Seelbach	
DE	CH-DE	Swissg rid	Laufenburg	TransnetBW	Kühmoos	380	AC	Murg	
DE	CH-DE	Swissg rid	Laufenburg	Amprion	Tiengen	380	AC	Andelsba ch	

Configuration “AT-DE Merger”									
DE	CH-DE	Swissg rid	Laufenburg	TransnetBW	Kühmoos	220	AC	Eggberg	
DE	CH-DE	Swissg rid	Laufenburg	TransnetBW	Kühmoos	220	AC	Hotzenwald	
DE	CH-DE	Swissg rid	Laufenburg	TransnetBW	Breitematt	110	AC	Trafo 20 Laufenburg	
DE	CH-DE	Swissg rid	Laufenburg	TransnetBW	Trossingen	380	AC	Wutach / Trossingen – Laufenburg rot	
DE	CH-DE	Swissg rid	Beznau	Amprion	Tiengen	220	AC	Aare – Ost	
DE	CH-DE	Swissg rid	Beznau	Amprion	Tiengen	380	AC	Aare – West	No
DE	CZ-DE	CEPS	Prestice	TenneT TSO GmbH	Etzenricht	380	AC	Hradec – Etzenricht 442	No
DE	CZ-DE	CEPS	Hradec	50Hertz	Röhrsdorf	380	AC	Röhrsdorf – Hradec 445	No
DE	CZ-DE	CEPS	Hradec	50Hertz	Röhrsdorf	380	AC	Röhrsdorf – Hradec 446	No
DE	CZ-DE	CEPS	Hradec	TenneT TSO GmbH	Etzenricht	380	AC	Hradec – Etzenricht 441	No
DE	DE-DKE	50Hertz	Bentwisch	Energinet	Bjaeverskov	400	DC	Bentwisch – Bjaeverskov	No
DE	DE-DKW	TenneT TSO GmbH	Jardelund	Energinet	Kassö	380	AC	Jardelund -Kassö1	No
DE	DE-DKW	TenneT TSO GmbH	Flensburg	Energinet	Kassö	220	AC	Flensburg -Kassö rt	No
DE	DE-DKW	TenneT TSO GmbH	Flensburg	Energinet	Ensted	220	AC	Flensburg -Ensted gb	No
DE	DE-DKW	TenneT TSO GmbH	Jardelund	Energinet	Kassö	380	AC	Jardelund -Kassö2	No
DE	DE-FR	TransnetBW	Eichstetten	RTE	Vogelgrun	220	AC	Kaiserstuhl – Nord	No
DE	DE-FR	TransnetBW	Eichstetten	RTE	Muhlbach	380	AC	Ill	No
DE	DE-FR	TransnetBW	TransnetBW Transportnetze	RTE	Sierentz	380	AC	Wiesental Süd	No
DE	DE-FR	Amprion	Ensdorf	RTE	Vigy	380	AC	Vigy 1 – Nord	No
DE	DE-FR	Amprion	Ensdorf	RTE	Vigy	380	AC	Vigy 2 – Süd	No
DE	DE-FR	Amprion	Ensdorf	RTE	St. Avold	220	AC	St. Avold	No
DE	DE-NL	TenneT TSO GmbH	Diele	TenneT TSO B.V.	Meeden	380	AC	Diele – Meeden schwarz	No
DE	DE-NL	TenneT TSO GmbH	Diele	TenneT TSO B.V.	Meeden	380	AC	Diele – Meeden weiß	No
DE	DE-NL	Amprion	Gronau	TenneT TSO B.V.	Hengelo	380	AC	Gronau – Hengelo schwarz	No
DE	DE-NL	Amprion	Oberzier	TenneT TSO B.V.	Maasbracht	380	AC	Selkant weiß	No

Configuration “AT-DE Merger”									
DE	DE-NL	Amprio n	Gronau	TenneT TSO B.V.	Hengelo	380	AC	Gronau – Hengelo weiß	No
DE	DE-NL	Amprio n	Siersdorf	TenneT TSO B.V.	Maasbracht	380	AC	Selfkant schwarz	No
DE	DE-NL	Amprio n	Niederreihn	TenneT TSO B.V.	Doetinchem	380	AC	Niederreih n – Doetinche m schwarz	No
DE	DE-NL	Amprio n	Niederreihn	TenneT TSO B.V.	Doetinchem	380	AC	Niederreih n – Doetinche m weiß	No
DE	DE-PL	50Hert z	Vierraden	PSE Op. SA	Krajnik	220	AC	Vierraden – Krajnik 508	No
DE	DE-PL	50Hert z	Vierraden	PSE Op. SA	Krajnik	220	AC	Vierraden – Krajnik 507	No
DE	DE-PL	50Hert z	Hagenwerder	PSE Op. SA	Mikulowa	380	AC	Hagenwer der – Mikulowa 567	No
DE	DE-PL	50Hert z	Hagenwerder	PSE Op. SA	Mikulowa	380	AC	Hagenwer der – Mikulowa 568	No
DE	DE-SE	Tenne T TSO GmbH	Herrenwyk	Svenska Kraftnät	Arrie	400	DC	Baltic Cable	No

Table 2: Bidding Zone Borders of Configuration AT-DE Merger

General justification

Austria and Germany has formed a joint bidding zone for over 15 years. Due to potential structural congestions in middle Europe, figured out by different entities, a split at the political border of Germany and Austria was under investigation during the first edition of the bidding zone review from 2015 until March 2018.

During May 2017, it was agreed by the NRAs of Austria “E-Control Austria” and Germany “Bundesnetzagentur” to follow a recommendation from ACER from 2015 and to introduce a capacity allocation and congestion management on the common border by 01.10.2018.

As the evaluations presented in the final report of the bidding zone review did not provide sufficient evidence for a modification of or for maintaining of the current BZ configuration, TSOs recommended to maintain the current bidding zone delimitation. Given the lack of clear evidence for or against a split many stakeholders felt affronted and challenged the legal background.

We propose that the common AT-DE bidding zone should be analysed during the official process foreseen for such an investigation, i.e. the bidding zone review of the TSOs, and assessed by the criteria defined in Article 33 of EU Regulation 2015 / 1222, especially if structural congestion influences the delimitation of bidding zones.

5.2 Germany

German TSOs proposed the following three alternative bidding zone configurations for Germany:

- **Configuration 1** consists of a split of the German/Luxemburg bidding zone along the borders of the federal states Bavaria and Baden-Württemberg into a Northern and a Southern bidding zone.
- **Configuration 2** consists of a split of the German/Luxemburg bidding zone approximately along the borders of the federal states Bavaria, Hesse, North Rhine-Westphalia in the south (following the borders of control areas), into a North-Eastern and a South-Western bidding zone.
- **Configuration 3** extends on configuration 2 with an additional split along the border of Schleswig Holstein.

General justification for the three configurations

Germany has planned large-scale investments on grid infrastructure reinforcements that should solve the potential structural congestions in the long term. The proposed splits could potentially help to achieve the 70% minRAM CEP requirement in the transition period until the measures described in the German Grid Development Plan are implemented (especially in case of delays).

Justification for configuration 1 "Two bidding zones, split along BW and BY"

The configuration addresses the fact, that significant congestions in Germany follow a north-south direction as extensive wind generation capacity is located in the north and large consumption centres are found in the south of Germany. The relevance of this configuration for addressing potential structural congestions is reflected in the fact that it was assessed in the first edition of the bidding zone review (ENTSO-E, 2018). Considering that some major grid development projects addressing the discrepancy in generation and consumption between north and south Germany are yet to be realized, the main motivation for analysing this configuration remains.

Justification for configuration 2 "Two bidding zones, North-Eastern/South-Western split"

Similar to the previous configuration, this configuration addresses the north-south direction of the congestions in case of delayed implementation of the measures described in the German Grid Development Plan. This split has proven to effectively reduce congestions in a recently published quantitative analysis focusing on 2025 scenario under consideration of the 70% minRAM CEP requirements¹. The motivation for analysing this configuration is that it better follows the expected congestion locations, which appear between control areas approximately at the borders of Bavaria with Thuringia, and of Hesse and North Rhine Westphalia with Lower Saxony.

Justification for configuration 3 "Three Bidding Zones Split"

The configuration addresses the fact, that due to extensive wind generation in the north, there will be congestions in northern Germany until the complete grid expansion according to the Grid Development Plan is implemented.

The motivation for analysing this configuration is the expectation that market prices in a Bidding Zone of Schleswig-Holstein with extensive wind supply might be very low. The consequence might be that Schleswig-Holstein will then not export to southern Germany but to Denmark and Norway. This might successfully counteract the European north-south flows through Germany. The expectation is, that wind curtailment in Schleswig-Holstein might be reduced, the wind farms might become competitive in the European market and would as such be better integrated into the market.

¹ Ivan Marjanovic, Johannes Henkel, Bernhard Hasche, Nils Engelke, Dirk Biermann and Albert Moser „Neue Strombinnenmarkt-Verordnung: Welche Optionen zur Management von Engpässen gibt es und was bedeuten sie?“, Energiewirtschaftliche Tagesfragen, June 2019

The network elements which would form the Bidding Zone Borders of these configurations, are given in Table 3, 4 and 5.

Configuration DE split 1									
Cty-CBk	Bidding Zone Border	TSO1	Station 1	TSO2	Station 2	Voltage level [kV]	Type	Network element Name	New/different compared to status quo?
D7	D7-D4	Amprion	Maximiliansau	TransnetBW	Kühmoos	380	AC	Maximiliansau - Daxlanden Kühmoos	Yes
D7	D7-D4	Amprion	Maximiliansau	TransnetBW	Kühmoos	380	AC	Maximiliansau - Kühmoos	Yes
D7	D7-D4	Amprion	Mutterstadt	TransnetBW	GKM	220	AC	Mutterstadt - GKM	Yes
D7	D7-D4	Amprion	Rheinau	Amprion	Hoheneck	380	AC	Rheinau - Hoheneck	Yes
D7	D7-D4	Amprion	Pfungstadt	TransnetBW	Weinheim	380	AC	Pfungstadt - Weinheim	Yes
D7	D7-D4	Amprion	Osterath HGUE	TransnetBW	KKP	380	DC	Osterath HGUE - KKP	Yes
D2	D2-D2	TenneT	Großkrotzenburg	TenneT	Berggrheinfeld	380	AC	Großkrotzenburg - Berggrheinfeld	Yes
D2	D2-D2	TenneT	Großkrotzenburg	TenneT	Trennfeld	220	AC	Großkrotzenburg - Trennfeld	Yes
D2	D2-D8	50Hertz	Wolmirstedt	TenneT	Isar	DC	DC	Wolmirstedt - Isar	Yes
D2	D2-D8	50Hertz	Altenfeld	TenneT	Redwitz	380	AC	Altenfeld - Redwitz	Yes
D2	D2-D8	50Hertz	Remptendorf	TenneT	Redwitz	380	AC	Remptendorf - Redwitz	Yes
DE	AT-DE	APG	Westtirol	TransnetBW	Bürs	380	AC	Bürs - Westtirol rot 422	No
DE	AT-DE	APG	St. Peter	TenneT TSO GmbH	Altheim	380	AC	Altheim - St. Peter	Yes
DE	AT-DE	APG	St. Peter	TenneT TSO GmbH	Simbach	380	AC	Simbach - St. Peter	Yes
DE	AT-DE	APG	St. Peter	TenneT TSO GmbH	Pirach	220	AC	Pirach - St. Peter 256	No
DE	AT-DE	APG	St. Peter	TenneT TSO GmbH	Pleinting	220	AC	Pleinting - St. Peter 258	No
DE	AT-DE	APG	Westtirol	Amprion	Kempton	220	AC	Westtirol - Kempton	No
DE	AT-DE	APG	Westtirol	TransnetBW	Bürs	220	AC	Bürs - Westtirol weiß 421	No
DE	AT-DE	APG	Westtirol	Amprion	Leupolz	380	AC	Füssen Ost 412	No
DE	AT-DE	APG	Westtirol	TenneT TSO GmbH	Silz	220	AC	Westtirol - Silz 413	No
DE	AT-DE	APG	Westtirol	TenneT TSO GmbH	Silz	220	AC	Westtirol - Silz 414	No
DE	AT-DE	APG	Westtirol	TenneT TSO GmbH	Silz	220	AC	Westtirol - Silz 274E	No

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DE	AT-DE	APG	Vill	TenneT TSO GmbH	Silz	220	AC	Y-Vill – Silz 273C	No
DE	AT-DE	APG	Vill	TenneT TSO GmbH	Silz	220	AC	Y-Vill – Silz 274C	No
DE	BE-DE	Elia	Lixhe	Amprion	Oberzier	DC	DC	Alegro	No
DE	CH-DE	Swissgrid	Asphard	TransnetBW	Kühmoos	380	AC	Wehra	No
DE	CH-DE	Swissgrid	Oftringen	TransnetBW	Gurtweil	220	AC	Blau	No
DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Gurtweil	220	AC	Alb Süd	No
DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Kühmoos	380	AC	Heimbach	No
DE	CH-DE	Swissgrid	Laufenburg	Amprion	Kühmoos	380	AC	Seelbach	No
DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Kühmoos	380	AC	Murg	No
DE	CH-DE	Swissgrid	Laufenburg	Amprion	Tiengen	380	AC	Andelsbach	No
DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Kühmoos	220	AC	Eggberg	No
DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Kühmoos	220	AC	Hotzenwald	No
DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Trossingen	380	AC	Wutach / Trossingen – Laufenburg rot	No
DE	CH-DE	Swissgrid	Beznau	Amprion	Tiengen	220	AC	Aare – Ost	No
DE	CH-DE	Swissgrid	Beznau	Amprion	Tiengen	380	AC	Aare – West	No
DE	CZ-DE	CEPS	Prestice	TenneT TSO GmbH	Etzenricht	380	AC	Hradec – Etzenricht 442	No
DE	CZ-DE	CEPS	Hradec	50Hertz	Röhrsdorf	380	AC	Röhrsdorf – Hradec 445	No
DE	CZ-DE	CEPS	Hradec	50Hertz	Röhrsdorf	380	AC	Röhrsdorf – Hradec 446	No
DE	CZ-DE	CEPS	Hradec	TenneT TSO GmbH	Etzenricht	380	AC	Hradec – Etzenricht 441	No
DE	DE-DKE	50Hertz	Bentwisch	Energinet	Kontek	380	AC	Bentwisch – kontek	No
DE	DE-DKE	50Hertz	Bentwisch	Energinet	CGS	150	AC	Bentwisch – CGS	No
DE	DE-DKE	50Hertz	Bentwisch	Energinet	Bjaeverskov	400	DC	Bentwisch – Bjaeverskov	No
DE	DE-DK1	TenneT TSO GmbH	Jardelund	Energinet	Kassö	380	AC	Jardelund-Kassö1	No
DE	DE-DK1	TenneT TSO GmbH	Flensburg	Energinet	Kassö	220	AC	Flensburg-Kassö rt	No
DE	DE-DK1	TenneT TSO GmbH	Flensburg	Energinet	Ensted	220	AC	Flensburg-Ensted gb	No
DE	DE-DK1	TenneT TSO GmbH	Jardelund	Energinet	Kassö	380	AC	Jardelund-Kassö2	No
DE	DE-DK1	TenneT TSO GmbH	Klixbüll/Süd	Energinet	Endrup	380	AC	Klixbüll/Süd - Endrup	Yes
DE	DE-FR	TransnetBW	Eichstetten	RTE	Vogelgrun	220	AC	Kaiserstuhl – Nord	No
DE	DE-FR	TransnetBW	Eichstetten	RTE	Muhlbach	380	AC	Ill	No
DE	DE-FR	Amprion	Ensdorf	RTE	Vigy	380	AC	Vigy 1 – Nord	No
DE	DE-FR	Amprion	Ensdorf	RTE	Vigy	380	AC	Vigy 2 – Süd	No
DE	DE-FR	Amprion	Ensdorf	RTE	St. Avold	220	AC	St. Avold	No
DE	DE-NL	TenneT TSO GmbH	Diele	TenneT TSO B.V.	Meeden	380	AC	Diele – Meeden schwarz	No
DE	DE-NL	TenneT TSO GmbH	Diele	TenneT TSO B.V.	Meeden	380	AC	Diele – Meeden	No

								weiß	
DE	DE-NL	Amprion	Gronau	TenneT TSO B.V.	Hengelo	380	AC	Gronau – Hengelo schwarz	No
DE	DE-NL	Amprion	Oberzier	TenneT TSO B.V.	Maasbracht	380	AC	Selfkant weiß	No
DE	DE-NL	Amprion	Gronau	TenneT TSO B.V.	Hengelo	380	AC	Gronau – Hengelo weiß	No
DE	DE-NL	Amprion	Siersdorf	TenneT TSO B.V.	Maasbracht	380	AC	Selfkant schwarz	No
DE	DE-NL	Amprion	Niederreihn	TenneT TSO B.V.	Doetinchem	380	AC	Niederreihn – Doetinchem schwarz	No
DE	DE-NL	Amprion	Niederreihn	TenneT TSO B.V.	Doetinchem	380	AC	Niederreihn – Doetinchem weiß	No
DE	DE-PL	50Hertz	Vierraden	PSE Op. SA	Krajnik	380	AC	Vierraden – Krajnik 508	No
DE	DE-PL	50Hertz	Vierraden	PSE Op. SA	Krajnik	380	AC	Vierraden – Krajnik 507	No
DE	DE-PL	50Hertz	Hagenwerder	PSE Op. SA	Mikulowa	380	AC	Hagenwerder – Mikulowa 567	No
DE	DE-PL	50Hertz	Hagenwerder	PSE Op. SA	Mikulowa	380	AC	Hagenwerder – Mikulowa 568	No
DE	DE-SE	TenneT TSO GmbH	Herrenwyk	Svenska Kraftnät	Arrie	400	DC	Baltic Cable	No
DE	DE-AT	Amprion	Stich 403A	APG	Werben	220	AC	Stich Bludenz West 403A	No
DE	DE-AT	APG	Walgauwerk	TransnetBW	Bürs	220	AC	Bürs - Walgauwerk orange 405A	No
DE	DE-AT	APG	Meiningen	TransnetBW	Bürs	220	AC	Bürs - Meiningen grün 406A	No
DE	DE-AT	Amprion	Stich 404A	APG	Werben	220	AC	Stich Dellmensingen Ost 404A	No
DE	DE-NO	TenneT TSO GmbH	Wilster/West	Stattnett	Tonstad	525	DC	Wilster/West - Tonstad	Yes
DE	DE-GB	TenneT TSO GmbH	Fedderwarden	NeuConnect	Großbritannien	?	DC	Fedderwarden - GB	Yes
LU	LU-BE	Creos	Schiffange	ELIA	Aubange	220	AC	Aubange - PST Schiffange	No

Table 3: Bidding Zone Borders of configuration DE Split 1

Configuration DE split 2									
Cty-CBk	Bidding Zone Border	TSO1	Station 1	TSO2	Station 2	Voltage level [kV]	Type	Network element Name	New/different compared to status quo?
D2	D2-D7	TenneT	Dörpen/West	Amprion	Niederrhein	380	AC	Dörpen/West - Niederrhein	Yes
D2	D2-D7	TenneT	Dörpen/West	Amprion	Hanekenfähr	380	AC	Dörpen/West -	Yes

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								Hanekenfähr	
D2	D2-D7	TenneT	Niederlange n	Amprion	Meppen	380	AC	Niederlange n - Meppen	Yes
D2	D2-D7	TenneT	Cappeln/We st	Amprion	Merzen	380	AC	Cappeln/We st - Merzen	Yes
D2	D2-D7	TenneT	Ganderkese e	Amprion	St. Hülfe	380	AC	Ganderkese e - St. Hülfe	Yes
D2	D2-D7	TenneT	Ohlensehlen	Amprion	Wehrendorf	380	AC	Ohlensehlen - Wehrendorf	Yes
D2	D2-D7	TenneT	Bechterdisse n	Amprion	Gütersloh	380	AC	Bechterdisse n - Gütersloh	Yes
D2	D2-D2	TenneT	Bechterdisse n	Tennet	Elsen	380	AC	Bechterdisse n - Elsen	Yes
D2	D2-D2	TenneT	Grohnde	Tennet	Würgassen	380	AC	Grohnde - Würgassen	Yes
D2	D2-D2	TenneT	Lamspringe	Tennet	Hardeggen	380	AC	Lamspringe - Hardeggen	Yes
D2	D2-D8	50Hertz	Wolmirstedt	TenneT	Isar	DC	DC	Wolmirstedt - Isar	Yes
D2	D2-D8	TenneT	Mecklar	50Hertz	Vieselbach	380	AC	Mecklar - Vieselbach	Yes
D2	D2-D8	50Hertz	Altenfeld	Tennet	Redwitz	380	AC	Altenfeld - Redwitz	Yes
D2	D2-D8	50Hertz	Remptendor f	Tennet	Redwitz	380	AC	Remptendor f - Redwitz	Yes
D2	D2-D7	TenneT	Emden/Ost	Amprion	Osterath HGUE	DC	DC	Emden/Ost - Osterath HGUE	Yes
DE	AT-DE	APG	Westtirol	TransnetBW	Bürs	380	AC	Bürs – Westtirol rot 422	No
DE	AT-DE	APG	St. Peter	TenneT TSO GmbH	Altheim	380	AC	Altheim – St. Peter	Yes
DE	AT-DE	APG	St. Peter	TenneT TSO GmbH	Simbach	380	AC	Simbach – St. Peter	Yes
DE	AT-DE	APG	St. Peter	TenneT TSO GmbH	Pirach	220	AC	Pirach – St. Peter 256	No
DE	AT-DE	APG	St. Peter	TenneT TSO GmbH	Pleinting	220	AC	Pleinting – St. Peter 258	No
DE	AT-DE	APG	Westtirol	Amprion	Kempton	220	AC	Westtirol - Kempton	No
DE	AT-DE	APG	Westtirol	TransnetBW	Bürs	220	AC	Bürs – Westtirol weiß 421	No
DE	AT-DE	APG	Westtirol	Amprion	Leupolz	380	AC	Füssen Ost 412	No
DE	AT-DE	APG	Westtirol	TenneT TSO GmbH	Silz	220	AC	Westtirol – Silz 413	No
DE	AT-DE	APG	Westtirol	TenneT TSO GmbH	Silz	220	AC	Westtirol – Silz 414	No
DE	AT-DE	APG	Westtirol	TenneT TSO GmbH	Silz	220	AC	Westtirol – Silz 274E	No
DE	AT-DE	APG	Vill	TenneT TSO GmbH	Silz	220	AC	Y-VIII – Silz 273C	No
DE	AT-DE	APG	Vill	TenneT TSO GmbH	Silz	220	AC	Y-VIII – Silz 274C	No
DE	BE-DE	Elia	Lixhe	Amprion	Oberzier	DC	DC	Alegro	No
DE	CH-DE	Swissgrid	Asphard	TransnetBW	Kühmoos	380	AC	Wehra	No
DE	CH-DE	Swissgrid	Oftringen	TransnetBW	Gurtweil	220	AC	Blau	No
DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Gurtweil	220	AC	Alb Süd	No

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DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Kühmoos	380	AC	Heimbach	No
DE	CH-DE	Swissgrid	Laufenburg	Amprion	Kühmoos	380	AC	Seelbach	No
DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Kühmoos	380	AC	Murg	No
DE	CH-DE	Swissgrid	Laufenburg	Amprion	Tiengen	380	AC	Andelsbach	No
DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Kühmoos	220	AC	Eggberg	No
DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Kühmoos	220	AC	Hotzenwald	No
DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Trossingen	380	AC	Wutach / Trossingen – Laufenburg rot	No
DE	CH-DE	Swissgrid	Beznau	Amprion	Tiengen	220	AC	Aare – Ost	No
DE	CH-DE	Swissgrid	Beznau	Amprion	Tiengen	380	AC	Aare – West	No
DE	CZ-DE	CEPS	Prestice	TenneT TSO GmbH	Etzenricht	380	AC	Hradec – Etzenricht 442	No
DE	CZ-DE	CEPS	Hradec	50Hertz	Röhrsdorf	380	AC	Röhrsdorf – Hradec 445	No
DE	CZ-DE	CEPS	Hradec	50Hertz	Röhrsdorf	380	AC	Röhrsdorf – Hradec 446	No
DE	CZ-DE	CEPS	Hradec	TenneT TSO GmbH	Etzenricht	380	AC	Hradec – Etzenricht 441	No
DE	DE-DKE	50Hertz	Bentwisch	Energinet	Kontek	380	AC	Bentwisch – kontek	No
DE	DE-DKE	50Hertz	Bentwisch	Energinet	CGS	150	AC	Bentwisch – CGS	No
DE	DE-DKE	50Hertz	Bentwisch	Energinet	Bjaeverskov	400	DC	Bentwisch – Bjaeverskov	No
DE	DE-DK1	TenneT TSO GmbH	Jardelund	Energinet	Kassö	380	AC	Jardelund- Kassö1	No
DE	DE-DK1	TenneT TSO GmbH	Flensburg	Energinet	Kassö	220	AC	Flensburg- Kassö rt	No
DE	DE-DK1	TenneT TSO GmbH	Flensburg	Energinet	Ensted	220	AC	Flensburg- Ensted gb	No
DE	DE-DK1	TenneT TSO GmbH	Jardelund	Energinet	Kassö	380	AC	Jardelund- Kassö2	No
DE	DE-DK1	TenneT TSO GmbH	Klixbüll/Süd	Energinet	Endrup	380	AC	Klixbüll/Süd - Endrup	Yes
DE	DE-FR	TransnetBW	Eichstetten	RTE	Vogelgrun	220	AC	Kaiserstuhl – Nord	No
DE	DE-FR	TransnetBW	Eichstetten	RTE	Muhlbach	380	AC	Ill	No
DE	DE-FR	Amprion	Ensdorf	RTE	Vigy	380	AC	Vigy 1 – Nord	No
DE	DE-FR	Amprion	Ensdorf	RTE	Vigy	380	AC	Vigy 2 – Süd	No
DE	DE-FR	Amprion	Ensdorf	RTE	St. Avold	220	AC	St. Avold	No
DE	DE-NL	TenneT TSO GmbH	Diele	TenneT TSO B.V.	Meeden	380	AC	Diele – Meeden schwarz	No
DE	DE-NL	TenneT TSO GmbH	Diele	TenneT TSO B.V.	Meeden	380	AC	Diele – Meeden weiß	No
DE	DE-NL	Amprion	Gronau	TenneT TSO B.V.	Hengelo	380	AC	Gronau – Hengelo schwarz	No
DE	DE-NL	Amprion	Oberzier	TenneT TSO B.V.	Maasbracht	380	AC	Selfkant weiß	No
DE	DE-NL	Amprion	Gronau	TenneT TSO B.V.	Hengelo	380	AC	Gronau – Hengelo weiß	No
DE	DE-NL	Amprion	Siersdorf	TenneT TSO	Maasbracht	380	AC	Selfkant	No

				B.V.				schwarz	
DE	DE-NL	Amprion	Niederreihn	TenneT TSO B.V.	Doetinchem	380	AC	Niederreihn – Doetinchem schwarz	No
DE	DE-NL	Amprion	Niederreihn	TenneT TSO B.V.	Doetinchem	380	AC	Niederreihn – Doetinchem weiß	No
DE	DE-PL	50Hertz	Vierraden	PSE Op. SA	Krajnik	380	AC	Vierraden – Krajnik 508	No
DE	DE-PL	50Hertz	Vierraden	PSE Op. SA	Krajnik	380	AC	Vierraden – Krajnik 507	No
DE	DE-PL	50Hertz	Hagenwerde r	PSE Op. SA	Mikulowa	380	AC	Hagenwerde r – Mikulowa 567	No
DE	DE-PL	50Hertz	Hagenwerde r	PSE Op. SA	Mikulowa	380	AC	Hagenwerde r – Mikulowa 568	No
DE	DE-SE	TenneT TSO GmbH	Herrenwyk	Svenska Kraftnät	Arrie	400	DC	Baltic Cable	No
DE	DE-AT	Amprion	Stich 403A	APG	Werben	220	AC	Stich Bludenz West 403A	No
DE	DE-AT	APG	Walgauwerk	TransnetBW	Bürs	220	AC	Bürs - Walgauwerk orange 405A	No
DE	DE-AT	APG	Meiningen	TransnetBW	Bürs	220	AC	Bürs - Meiningen grün 406A	No
DE	DE-AT	Amprion	Stich 404A	APG	Werben	220	AC	Stich Dellmensing en Ost 404A	No
DE	DE-NO	TenneT TSO GmbH	Wilster/Wes t	Stattnett	Tonstad	525	DC	Wilster/Wes t - Tonstad	Yes
DE	DE-GB	TenneT TSO GmbH	Fedderward en	NeuConnect	Großbritannien	?	DC	Fedderwade n - GB	Yes
LU	LU-BE	Creos	Schiffflange	ELIA	Aubange	220	AC	Aubange - PST Schiffflange	No

Table 4: Bidding Zone Borders of configuration DE Split 2

Configuration DE split 3									
Cty-CBk	Bidding Zone Border	TSO1	Station 1	TSO2	Station 2	Voltage level [kV]	Type	Network element Name	New/different compared to status quo?
D2	D2-D7	TenneT	Dörpen/Wes t	Amprion	Niederrhein	380	AC	Dörpen/Wes t - Niederrhein	Yes
D2	D2-D7	TenneT	Dörpen/Wes t	Amprion	Hanekenfähr	380	AC	Dörpen/Wes t - Hanekenfähr	Yes
D2	D2-D7	TenneT	Niederlange n	Amprion	Meppen	380	AC	Niederlange n - Meppen	Yes
D2	D2-D7	TenneT	Cappeln/We st	Amprion	Merzen	380	AC	Cappeln/We st - Merzen	Yes
D2	D2-D7	TenneT	Ganderkesee	Amprion	St. Hülfe	380	AC	Ganderkesee - St. Hülfe	Yes
D2	D2-D7	TenneT	Ohlensehlen	Amprion	Wehrendorf	380	AC	Ohlensehlen - Wehrendorf	Yes

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D2	D2-D7	TenneT	Bechterdisse n	Amprion	Gütersloh	380	AC	Bechterdisse n - Gütersloh	Yes
D2	D2-D2	TenneT	Bechterdisse n	Tennet	Elsen	380	AC	Bechterdisse n - Elsen	Yes
D2	D2-D2	TenneT	Grohnde	Tennet	Würgassen	380	AC	Grohnde - Würgassen	Yes
D2	D2-D2	TenneT	Lamspringe	Tennet	Hardeggen	380	AC	Lamspringe - Hardeggen	Yes
D2	D2-D8	50Hertz	Wolmirstedt	TenneT	Isar	DC	DC	Wolmirstedt - Isar	Yes
D2	D2-D8	TenneT	Mecklar	50Hertz	Vieselbach	380	AC	Mecklar - Vieselbach	Yes
D2	D2-D8	50Hertz	Altenfeld	Tennet	Redwitz	380	AC	Altenfeld - Redwitz	Yes
D2	D2-D8	50Hertz	Remptendor f	Tennet	Redwitz	380	AC	Remptendor f - Redwitz	Yes
D2	D2-D7	TenneT	Emden/Ost	Amprion	Osterath HGUE	DC	DC	Emden/Ost - Osterath HGUE	Yes
D2	D2-D8	TenneT	Brunsbüttel	50Hertz	Brunsbüttel	380	AC	Brunsbüttel - Brunsbüttel	Yes
D2	D2-D8	TenneT	Audorf/Süd	50Hertz	Hamburg/Nord	380	AC	Audorf/Süd - Hamburg/No rd	Yes
D2	D2-D8	TenneT	Hamburg/N ord	50Hertz	Hamburg/Nord	220/380	AC	Hamburg/No rd - Hamburg/No rd	Yes
D2	D2-D2	TenneT	Wilster/Wes t	TenneT	Stade/West	380	AC	Wilster/Wes t - Stade/West	Yes
D2	D2-D2	TenneT	Kummerfeld	TenneT	Dollern	380	AC	Kummerfeld - Dollern	Yes
DE	AT-DE	APG	Westtirol	TransnetBW	Bürs	380	AC	Bürs – Westtirol rot 422	No
DE	AT-DE	APG	St. Peter	TenneT TSO GmbH	Altheim	380	AC	Altheim – St. Peter	Yes
DE	AT-DE	APG	St. Peter	TenneT TSO GmbH	Simbach	380	AC	Simbach – St. Peter	Yes
DE	AT-DE	APG	St. Peter	TenneT TSO GmbH	Pirach	220	AC	Pirach – St. Peter 256	No
DE	AT-DE	APG	St. Peter	TenneT TSO GmbH	Pleinting	220	AC	Pleinting – St. Peter 258	No
DE	AT-DE	APG	Westtirol	Amprion	Kempton	220	AC	Westtirol - Kempton	No
DE	AT-DE	APG	Westtirol	TransnetBW	Bürs	220	AC	Bürs – Westtirol weiß 421	No
DE	AT-DE	APG	Westtirol	Amprion	Leupolz	380	AC	Füssen Ost 412	No
DE	AT-DE	APG	Westtirol	TenneT TSO GmbH	Silz	220	AC	Westtirol – Silz 413	No
DE	AT-DE	APG	Westtirol	TenneT TSO GmbH	Silz	220	AC	Westtirol – Silz 414	No
DE	AT-DE	APG	Westtirol	TenneT TSO GmbH	Silz	220	AC	Westtirol – Silz 274E	No
DE	AT-DE	APG	Vill	TenneT TSO GmbH	Silz	220	AC	Y-Vill – Silz 273C	No
DE	AT-DE	APG	Vill	TenneT TSO GmbH	Silz	220	AC	Y-Vill – Silz 274C	No
DE	BE-DE	Elia	Lixhe	Amprion	Oberzier	DC	DC	Alegro	No
DE	CH-DE	Swissgrid	Asphard	TransnetBW	Kühmoos	380	AC	Wehra	No
DE	CH-DE	Swissgrid	Oftringen	TransnetBW	Gurtweil	220	AC	Blau	No

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DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Gurtweil	220	AC	Alb Süd	No
DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Kühmoos	380	AC	Heimbach	No
DE	CH-DE	Swissgrid	Laufenburg	Amprion	Kühmoos	380	AC	Seelbach	No
DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Kühmoos	380	AC	Murg	No
DE	CH-DE	Swissgrid	Laufenburg	Amprion	Tiengen	380	AC	Andelsbach	No
DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Kühmoos	220	AC	Eggberg	No
DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Kühmoos	220	AC	Hotzenwald	No
DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Trossingen	380	AC	Wutach / Trossingen – Laufenburg rot	No
DE	CH-DE	Swissgrid	Beznau	Amprion	Tiengen	220	AC	Aare – Ost	No
DE	CH-DE	Swissgrid	Beznau	Amprion	Tiengen	380	AC	Aare – West	No
DE	CZ-DE	CEPS	Prestice	TenneT TSO GmbH	Etzenricht	380	AC	Hradec – Etzenricht 442	No
DE	CZ-DE	CEPS	Hradec	50Hertz	Röhrsdorf	380	AC	Röhrsdorf – Hradec 445	No
DE	CZ-DE	CEPS	Hradec	50Hertz	Röhrsdorf	380	AC	Röhrsdorf – Hradec 446	No
DE	CZ-DE	CEPS	Hradec	TenneT TSO GmbH	Etzenricht	380	AC	Hradec – Etzenricht 441	No
DE	DE-DKE	50Hertz	Bentwisch	Energinet	Kontek	380	AC	Bentwisch – kontek	No
DE	DE-DKE	50Hertz	Bentwisch	Energinet	CGS	150	AC	Bentwisch – CGS	No
DE	DE-DKE	50Hertz	Bentwisch	Energinet	Bjaeverskov	400	DC	Bentwisch – Bjaeverskov	No
DE	DE-DK1	TenneT TSO GmbH	Jardelund	Energinet	Kassö	380	AC	Jardelund- Kassö1	No
DE	DE-DK1	TenneT TSO GmbH	Flensburg	Energinet	Kassö	220	AC	Flensburg- Kassö rt	No
DE	DE-DK1	TenneT TSO GmbH	Flensburg	Energinet	Ensted	220	AC	Flensburg- Ensted gb	No
DE	DE-DK1	TenneT TSO GmbH	Jardelund	Energinet	Kassö	380	AC	Jardelund- Kassö2	No
DE	DE-DK1	TenneT TSO GmbH	Klixbüll/Süd	Energinet	Endrup	380	AC	Klixbüll/Süd - Endrup	Yes
DE	DE-FR	TransnetBW	Eichstetten	RTE	Vogelgrun	220	AC	Kaiserstuhl – Nord	No
DE	DE-FR	TransnetBW	Eichstetten	RTE	Muhlbach	380	AC	Ill	No
DE	DE-FR	Amprion	Ensdorf	RTE	Vigy	380	AC	Vigy 1 – Nord	No
DE	DE-FR	Amprion	Ensdorf	RTE	Vigy	380	AC	Vigy 2 – Süd	No
DE	DE-FR	Amprion	Ensdorf	RTE	St. Avold	220	AC	St. Avold	No
DE	DE-NL	TenneT TSO GmbH	Diele	TenneT TSO B.V.	Meeden	380	AC	Diele – Meeden schwarz	No
DE	DE-NL	TenneT TSO GmbH	Diele	TenneT TSO B.V.	Meeden	380	AC	Diele – Meeden weiß	No
DE	DE-NL	Amprion	Gronau	TenneT TSO B.V.	Hengelo	380	AC	Gronau – Hengelo schwarz	No
DE	DE-NL	Amprion	Oberzier	TenneT TSO B.V.	Maasbracht	380	AC	Selfkant weiß	No
DE	DE-NL	Amprion	Gronau	TenneT TSO B.V.	Hengelo	380	AC	Gronau – Hengelo weiß	No

DE	DE-NL	Amprion	Siersdorf	TenneT TSO B.V.	Maasbracht	380	AC	Selfkant schwarz	No
DE	DE-NL	Amprion	Niederreihn	TenneT TSO B.V.	Doetinchem	380	AC	Niederreihn – Doetinchem schwarz	No
DE	DE-NL	Amprion	Niederreihn	TenneT TSO B.V.	Doetinchem	380	AC	Niederreihn – Doetinchem weiß	No
DE	DE-PL	50Hertz	Vierraden	PSE Op. SA	Krajnik	220	AC	Vierraden – Krajnik 508	No
DE	DE-PL	50Hertz	Vierraden	PSE Op. SA	Krajnik	220	AC	Vierraden – Krajnik 507	No
DE	DE-PL	50Hertz	Hagenwerder	PSE Op. SA	Mikulowa	380	AC	Hagenwerder – Mikulowa 567	No
DE	DE-PL	50Hertz	Hagenwerder	PSE Op. SA	Mikulowa	380	AC	Hagenwerder – Mikulowa 568	No
DE	DE-SE	TenneT TSO GmbH	Herrenwyk	Svenska Kraftnät	Arrie	400	DC	Baltic Cable	No
DE	DE-AT	Amprion	Stich 403A	APG	Werben	220	AC	Stich Bludenz West 403A	No
DE	DE-AT	APG	Walgauwerk	TransnetBW	Bürs	220	AC	Bürs - Walgauwerk orange 405A	No
DE	DE-AT	APG	Meiningen	TransnetBW	Bürs	220	AC	Bürs - Meiningen grün 406A	No
DE	DE-AT	Amprion	Stich 404A	APG	Werben	220	AC	Stich Dellmensing en Ost 404A	No
DE	DE-NO	TenneT TSO GmbH	Wilster/West	Stattnett	Tonstad	525	DC	Wilster/West - Tonstad	Yes
DE	DE-GB	TenneT TSO GmbH	Fedderwarden	NeuConnect	Großbritannien	?	DC	Fedderwarden - GB	Yes
LU	LU-BE	Creos	Schiffflange	ELIA	Aubange	220	AC	Aubange - PST Schiffflange	No

Table 5: Bidding Zone Borders of configuration DE Split 3

However, since no agreement could be found on the BZRR level for the reasons set forth under Article 6, the German TSOs have decided to withdraw the alternative configurations described above and consequently, to provide only the status quo configuration for Germany.

5.3 The Netherlands

TenneT TSO B.V. proposed to investigate a split of the current bidding zone NL into three different bidding zones: NL1, NL2 and NL3, as depicted in Figure 2.



Figure 2: Proposal of TenneT TSO B.V. for a split of The Netherlands into three bidding zones.

The network elements which would form the Bidding Zone Borders of this configuration, are given in Table 6. This list should be combined with the bidding zone borders as included in Table 7; the bidding zone borders which are new compared to the bidding zone borders of Table 7 are marked as "New", the bidding zone borders which are changed because of the split are marked as "Changed".

Configuration: NL split										
Cty-CBk	Bidding Zone Border	TSO1	Station 1	TSO2	Station 2	Voltage level [kV]	Type	Network element Name	New/ different compared to status quo?	
NL	NL1-NL2	TenneT B.V.	TSO Lelystad	TenneT B.V.	TSO Ens	380	AC	Lelystad-Ens 380 Wit	New	
NL	NL1-NL2	TenneT B.V.	TSO Lelystad	TenneT B.V.	TSO Ens	380	AC	Lelystad-Ens 380 Zwart	New	
NL	NL1-NL2	TenneT B.V.	TSO Doetinchem	TenneT B.V.	TSO Hengelo	380	AC	Doetinchem-Hengelo 380 Wit	New	
NL	NL1-NL2	TenneT B.V.	TSO Doetinchem	TenneT B.V.	TSO Hengelo	380	AC	Doetinchem-Hengelo 380 Zwart	New	
NL	NL2–NL3	TenneT B.V.	TSO Boxmeer	TenneT B.V.	TSO Dodewaard	380	AC	Boxmeer – Dodewaard 380 Zwart	New	
NL	NL2–NL3	TenneT B.V.	TSO Maasbracht	TenneT B.V.	TSO Dodewaard	380	AC	Maasbracht – Dodewaard 380 Zwart	New	
NL	NL2-NL3	TenneT B.V.	TSO Krimpen a/d IJssel	TenneT B.V.	TSO Geertruidenberg	380	AC	Krimpen a/d IJssel–Geertruidenberg 380 Wit	New	
NL	NL2-NL3	TenneT B.V.	TSO Krimpen a/d IJssel	TenneT B.V.	TSO Geertruidenberg	380	AC	Krimpen a/d IJssel–Geertruidenberg 380 Zwart	New	
NL	BE-NL3	ELIA	Zandvliet	TenneT B.V.	TSO Rilland	380	AC	Zandvliet – Rilland 380 Grey/29	Changed ²	
NL	BE-NL3	ELIA	Zandvliet	TenneT B.V.	TSO Rilland	380	AC	Zandvliet – Rilland 380 White/30	Changed ²	
NL	BE-NL3	ELIA	Van Eyck	TenneT B.V.	TSO Maasbracht	380	AC	Maasbracht - Van Eyck 380 Black/27	Changed	
NL	BE-NL3	ELIA	Van Eyck	TenneT B.V.	TSO Maasbracht	380	AC	Maasbracht - Van Eyck 380 White/28	Changed	
NL	DE-NL1	TenneT GmbH	TSO Diele	TenneT B.V.	TSO Meeden	380	AC	Diele – Meeden 380 Wit	Changed	
NL	DE-NL1	TenneT GmbH	TSO Diele	TenneT B.V.	TSO Meeden	380	AC	Diele – Meeden 380 Zwart	Changed	
NL	DE-NL1	Amprion	Gronau	TenneT B.V.	TSO Hengelo	380	AC	Gronau – Hengelo 380 Wit	Changed	
NL	DE-NL1	Amprion	Gronau	TenneT B.V.	TSO Hengelo	380	AC	Gronau – Hengelo 380 Zwart	Changed	
NL	DE-NL3	Amprion	Oberzier	TenneT B.V.	TSO Maasbracht	380	AC	Maasbracht - Oberzier 380 Wit	Changed	
NL	DE-NL3	Amprion	Siersdorf	TenneT B.V.	TSO Maasbracht	380	AC	Maasbracht – Siersdorf 380 Zwart	Changed	
NL	DE-NL2	Amprion	Niederrhein	TenneT B.V.	TSO Doetinchem	380	AC	Doetinchem - Niederrhein 380 Wit	Changed	
NL	DE-NL2	Amprion	Niederrhein	TenneT B.V.	TSO Doetinchem	380	AC	Doetinchem - Niederrhein 380 Zwart	Changed	
NL	NL2-UK	TenneT B.V.	TSO Maasvlakte	National Grid	Isle of Grain	450	DC	Maasvlakte – Isle of Grain (BritNed)	Changed	
NL	NL1-NO	TenneT B.V.	TSO Eemshaven	Stattned	Feda	450	DC	Eemshaven – Feda (NorNed)	Changed	
NL	NL1–DK1	TenneT B.V.	TSO Eemshaven	Energinet	Endrup	320	DC	COBRACable	Changed	

Table 6: Bidding Zone Borders of configuration NL Split

² Note that these network elements replace the current network elements "Zandvliet – Geertruidenberg" and "Zandvliet-Borssele", because of the substation "Rilland" which will gradually come in operation from Q4 2019.

General justification

The main reason for TenneT TSO B.V. to propose to investigate a split of the current single Dutch bidding zone is to investigate to what extent a bidding zone split enables TenneT TSO B.V. to reach the 70% target as defined in article 16(8) the CEP IME regulation, and what would be the resulting effects on market efficiency. By splitting the Netherlands in multiple bidding zones, flows between generators and loads in the different parts of the Netherlands are no longer the result from transactions internal to bidding zones, but are instead the result of market transactions between the bidding zones resulting from capacity allocation via the day-ahead and intraday market coupling process. TenneT TSO B.V. expects that this change provides a positive contribution to its ability to comply with the IME regulation obligation to offer minimum levels of available capacity for cross-zonal trade, while also respecting operational security limits.

An investigation of a Dutch split into three bidding zones is justified by the following reasons:

- Two main starting points were defined to determine appropriate alternative bidding zone configurations for the Netherlands:
 - Firstly, congestions that are expected in the target year studied in the bidding zone review serve as the main basis for defining new bidding zone borders.
 - Secondly, making 150 kV network elements into cross-border elements is not preferred due to reasons of operational security, as the 150 kV network has significantly less capacity than the 380 kV grid and there is a lack of available remedial actions to effectively manage flows on this voltage level.
- TenneT TSO B.V. observes that the typical electricity flow through its grid is from the north to the south, and expects that this will remain to be the case in the future considered for the bidding zone review. In order to improve the ability to manage these flows via the capacity calculation and capacity allocation processes and reduce the dependence on costly remedial actions, TenneT TSO B.V. is of the opinion that it could be beneficial to make the northern part of the Dutch electricity grid into a separate bidding zone (NL1 in Figure 2). By doing so, electricity flows generated by conventional power stations at the Eemshaven region, onshore and offshore wind farms, and large-scale PV installations in the NL1 zone compete with cross-border flows (via NorNed, COBRACable, and DE-NL interconnectors) via the market coupling process for access to capacity towards important load centres in the Netherlands, such as in the provinces Noord-Holland and Zuid-Holland located in NL2. The loads and generators in the north of the Netherlands can relatively easily be positioned in a separate bidding zone by making two 380 kV network elements, being Lelystad-Ens and Doetinchem-Hengelo, into cross-border elements.
- TenneT TSO B.V. has identified two important and currently regularly congested 380 kV network elements Lelystad-Ens and Krimpen-Geertruidenberg. Despite planned and foreseen grid investments these are expected to remain to be congested for the target year considered in this bidding zone review, certainly under consideration of the 70% provision of the IME regulation. Therefore these network elements were selected to become cross-border elements in the alternative configuration to be investigated.
- In order to make Krimpen-Geertruidenberg into a cross-border element, it needs to be combined with another network element to complete the bidding zone border. The 380 kV network element of Dodewaard-Boxmeer is for TenneT TSO B.V. the most appropriate network element to combine with Krimpen-Geertruidenberg to become a cross-border element. This split creates 3 horizontal bidding zones that could effectively improve the control over north-south flows through the capacity calculation and market coupling processes. Furthermore, combining Krimpen-Geertruidenberg with Dodewaard-Boxmeer enables to separate zone NL3 from zone NL2 by only making two 380 kV lines into cross-border elements without the necessity to split over 150kV network elements. Besides the issues 150 kV network elements as cross-border elements, it would be especially difficult to do so for 150 kV network elements in the middle of the Netherlands, as this is strongly meshed from east to west. Therefore, it is not possible for TenneT TSO B.V. to

separate east and west of the Netherlands in different bidding zones and unambiguously assign load and production to one of these bidding zones.

- This configuration contains a relatively balanced amount of generation and consumption within each bidding zone.
- The proposed splits are expected to provide beneficial local incentives for future investments in additional loads (e.g. for power to gas) in those areas where a surplus of renewable energy is expected due to a significant increase of RES generation (such as offshore wind). Moreover, this bidding zone configuration is expected to create incentives to invest in demand response, storage or generation in those areas where a reduction of conventional fossil-fuelled generation is expected.
- Furthermore, price signals from multiple bidding zones are expected to have a positive effect on social welfare, considering that less costs are incurred to perform costly remedial actions such as redispatch.
- This configuration separates the Netherlands mostly according to the borders of its provinces, which are also the basis for Regional Energy Strategies under development in the Netherlands according to the *National Climate Agreement* for the overall purpose of delivering the energy transition.

6 Explanation why the TSOs of the BZRR CE could not come to an agreement on a set of configurations

In this section, an explanation is provided why the BZRR CE TSOs could not come to a set of alternative bidding zone configurations to be proposed for investigation in the next bidding zone review, on the basis of the individual proposals and argumentation provided as described in section 4 and section 5 of this document.

In total, only for 3 of the 15 bidding zones of the BZRR CE alternative bidding zone configurations were proposed by the individual TSOs. These were:

- A split of the Bidding Zone "The Netherlands" in three bidding zones
- Three possible splits for the Bidding Zone "Germany / Luxembourg" in either two or three bidding zones
- A merger of the bidding zones "Austria" and "Germany / Luxembourg".

The TSOs of the BZRR CE TSOs discussed intensively the individual proposals but were not able to combine them into a set of configurations which was acceptable for all TSOs of the BZRR CE to be investigated by them in the bidding zone review process. Below, the main reasons why it was not possible to come to an agreement on a set of configurations have been set out:

- Some TSOs considered the proposed configuration of the merger of bidding zones "Austria" and "Germany / Luxembourg" not appropriate because this would increase unscheduled flows through other bidding zones and would make it more difficult for the TSOs of the affected bidding zones to comply with the 70% criterion of Article 16(8) of the IME regulation.
- Some TSOs considered that in the framework of a pan European bidding zone review, it would not be appropriate for the BZRR CE to focus only on alternative configurations of a few bidding zones on the basis of the individual proposal of their TSOs, while alternative configurations of many of the other bidding zones in the BZRR CE would not be investigated at all. Only a balanced investigation of alternative configurations for the majority of the Bidding Zones in central Europe would explore all relevant options on a fair and equal basis.
- At least a configuration which includes a split of all the larger bidding zones in the BZRR CE was missing for some TSOs. On the other hand, some TSOs considered that with regard to Articles 14(1) and 14(3) of the IME regulation, the geographical size of a bidding zone is not a valid criterion for a split and that only the existence of structural congestions in the time horizon of the study was relevant.
- Some TSOs considered that the set was not balanced, as a small Member State such as the Netherlands proposed to investigate an alternative bidding zone configuration while other Member States with comparable levels of congestion did not propose to investigate an alternative bidding zone configuration, and that this set would therefore not be acceptable for approval by the competent regulatory authorities.
- Some TSOs considered that the size of the BZRR CE and involvement of all the TSOs of this BZRR would not be appropriate to study alternative bidding zone configurations in only a few member states. In case only these splits would have to be analysed, a more efficient set-up with a narrower scope and more limited number of TSOs would be sufficient to assess the alternative configurations and be more appropriate.
- Some TSOs considered that investigating alternative bidding zone configuration in the next bidding zone review process is not appropriate, as across Europe "Action Plans" according to article 15 of

the IME Regulation are to be instigated which will have a severe but yet unknown impact on the future electricity grid and electricity market.

Annex 1: List of the network elements which form the Bidding Zone Borders in the Status Quo configuration

Configuration 1 "Status Quo"								
Cty-CBk	Bidding Zone Border	TSO1	Station 1	TSO2	Station 2	Voltage level [kV]	Type	Network element Name
AT	AT-CH	APG	Westtirol	Swissgrid	Pradella	380	AC	Inn Nord 428
AT	AT-CH	APG	Westtirol	Swissgrid	Pradella	380	AC	Inn Sued 427
AT	AT-CH	APG	Meiningen	Swissgrid	Bonaduz/Montlingen	220	AC	Falknis 407
AT	AT-CH	APG	Meiningen	Swissgrid	Winkeln	220	AC	Stoss Süd 408
AT	AT-CH	APG	Feldkirch	Swissgrid	Eschen	110	AC	Eschen – Feldkirch 197/11
AT	AT-CZ	APG	Dürnrohr	CEPS	Slavetice	380	AC	Duernrohr – Slavetice 437
AT	AT-CZ	APG	Dürnrohr	CEPS	Slavetice	380	AC	Duernrohr – Slavetice 438
AT	AT-CZ	APG	Bisamberg	CEPS	Sokolnice	220	AC	Bisamberg – Sokolnice 243
AT	AT-CZ	APG	Bisamberg	CEPS	Sokolnice	220	AC	Bisamberg – Sokolnice 244
AT	AT-DE	APG	Westtirol	Transnet BW	Bürs	380	AC	Bürs – Westtirol rot 422
AT	AT-DE	APG	Westtirol	Transnet BW	Bürs	220	AC	Bürs – Westtirol weiß 421
AT	AT-DE	APG	Westtirol	Amprion	Memmingen	220	AC	Füssen West 411
AT	AT-DE	APG	St. Peter	TenneT GmbH TSO	Pleinting	220	AC	Pleinting – St. Peter 258
AT	AT-DE	APG	St. Peter	TenneT GmbH TSO	Pirach	220	AC	Pirach – St. Peter 256
AT	AT-DE	APG	St. Peter	TenneT GmbH TSO	Altheim	220	AC	Altheim – St. Peter 233
AT	AT-DE	APG	St. Peter	TenneT GmbH TSO	Simbach	220	AC	Simbach – St. Peter 230
AT	AT-DE	APG	Westtirol	Amprion	Leupolz	380	AC	Füssen Ost 412
AT	AT-DE	APG	Braunau	TenneT GmbH TSO	Neuötting	110	AC	Braunau - Neuötting 199/3
AT	AT-DE	APG	Braunau	TenneT GmbH TSO	Stammham	110	AC	Braunau - Stammham 199/4
AT	AT-DE	APG	St.Peter	TenneT GmbH TSO	Ering	110	AC	Ering - St. Peter 182/5
AT	AT-DE	APG	St.Peter	TenneT GmbH TSO	Ering	110	AC	Ering - St. Peter 182/6
AT	AT-DE	APG	Antiesenhofen	TenneT GmbH TSO	Egglfing	110	AC	Egglfing - Antiesenhofen 188/3b
AT	AT-DE	APG	St.Peter	TenneT GmbH TSO	Egglfing	110	AC	Egglfing - St. Peter 188/5
AT	AT-DE	APG	Aigerding	TenneT GmbH TSO	Passau-Ingling	110	AC	Passau-Ingling - Aigerding 188/1
AT	AT-DE	APG	Ebbs	TenneT GmbH TSO	Oberaudorf	110	AC	Oberaudorf - Ebbs 176/7
AT	AT-DE	APG	Kufstein	TenneT GmbH TSO	Oberaudorf	110	AC	Oberaudorf - Kufstein 176/6
AT	AT-DE	APG	Westtirol	TenneT GmbH TSO	Silz	220	AC	Westtirol – Silz 413

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AT	AT-DE	APG	Westtirol	TenneT GmbH	TSO	Silz	220	AC	Westtirol – Silz 414
AT	AT-DE	APG	Westtirol	TenneT GmbH	TSO	Silz	220	AC	Westtirol – Silz 274E
AT	AT-DE	APG	Vill	TenneT GmbH	TSO	Silz	220	AC	Y-Vill – Silz 273C
AT	AT-DE	APG	Vill	TenneT GmbH	TSO	Silz	220	AC	Y-Vill – Silz 274C
AT	AT-DE	APG	Ranna	TenneT GmbH	TSO	Hauzenberg	110	AC	Ranna – Hauzenberg 156/1
AT	AT-DE	APG	St. Jakob	Transnet BW		Bürs	110	AC	St. Jakob – Bürs 172/8
AT	AT-DE	APG	Rauz	Transnet BW		Bürs	110	AC	Rauz – Bürs 172/9
AT	AT-DE	APG	Werben	Amprion		Stich 403A	220	AC	Stich Bludenz West 403A
AT	AT-DE	APG	Walgauwerk	Transnet BW		Bürs	220	AC	Bürs - Walgauwerk orange 405A
AT	AT-DE	APG	Meiningen	Transnet BW		Bürs	220	AC	Bürs - Meiningen grün 406A
AT	AT-DE	APG	Nenzing	Transnet BW		Bürs	110	AC	Bürs-Nenzing weiss 197/2
AT	AT-DE	APG	Bürs VKW	Transnet BW		Bürs	110	AC	Bürs - Bürs-VKW rot 197/10
AT	AT-DE	APG	Werben	Amprion		Stich 404A	220	AC	Stich Dellmensingen Ost 404A
AT	AT-HU	APG	Zurndorf	MAVIR		Győr	380	AC	Zurndorf– Győr 439B
AT	AT-HU	APG	Zurndorf	MAVIR		Szombathely	380	AC	Zurndorf– Szombathely 440B
AT	AT-HU	APG	Wien Südost	MAVIR		Győr	220	AC	Wien Südost – Győr 245
AT	AT-HU	APG	Neusiedl	MAVIR		Győr	220	AC	Neusiedl – Győr 246B
AT	AT-IT	APG	Lienz	TERNA		Soverzene	220	AC	Lienz – Soverzene 261
AT	AT-SI	APG	Obersielach	ELES		Podlog	220	AC	Obersielach – Podlog 247
AT	AT-SI	APG	Kainachtal	ELES		Maribor	380	AC	Kainachtal – Maribor 1 473
AT	AT-SI	APG	Kainachtal	ELES		Maribor	380	AC	Kainachtal – Maribor 2 474
BE	BE-DE	ELIA	Lixhe	Amprion		Oberzier	DC	DC	Alegro
BE	BE-FR	ELIA	Monceau	RTE		Chooz	220	AC	Chooz – Monceau
BE	BE-FR	ELIA	Avelgem	RTE		Avelin	380	AC	Avelin – Avelgem
BE	BE-FR	ELIA	Achène	RTE		Lonny	380	AC	Lonny – Achène
BE	BE-FR	ELIA	Aubange	RTE		Moulaine	220	AC	Moulaine – Aubange 1
BE	BE-FR	ELIA	Aubange	RTE		Moulaine	220	AC	Moulaine – Aubange 2
BE	BE-FR	ELIA	Avelgem	RTE		Mastaing	380	AC	Avelgem – Mastaing
BE	BE-FR	ELIA	Momignie 1	RTE		Fourmie	63	AC	Fourmie – Momignie 1
BE	BE-FR	ELIA	Momignie 2	RTE		Fourmie	63	AC	Fourmie – Momignie 2
BE	BE-NL	ELIA	Zandvliet	TenneT B.V.	TSO	Geertruidenberg	380	AC	Zandvliet – Geertruidenberg
BE	BE-NL	ELIA	Zandvliet	TenneT B.V.	TSO	Borssele	380	AC	Zandvliet – Borssele

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BE	BE-NL	ELIA	Van Eyck L27	TenneT TSO B.V.	Maasbracht	380	AC	Van Eyck White – Maasbracht
BE	BE-NL	ELIA	Van Eyck L28	TenneT TSO B.V.	Maasbracht	380	AC	Van Eyck Black – Maasbracht
BE	BE-UK	ELIA	Gezelle	NGET	Richborough	400	DC	Nemo Link Interconnector
BE	LU-BE	CREOS	Schiffflange	ELIA	Schiffflange	220	AC	Schiffflange PST – Schiffflange
CZ	CZ-AT	CEPS	Sokolnice	APG	Bisamberg	220	AC	Sokolnice-Bisamberg 244
CZ	CZ-AT	CEPS	Slavetice	APG	Dürnröhr	400	AC	Slavetice-Dürnröhr 437
CZ	CZ-AT	CEPS	Slavetice	APG	Dürnröhr	400	AC	Slavetice-Dürnröhr 438
CZ	CZ-AT	CEPS	Sokolnice	APG	Bisamberg	220	AC	Sokolnice-Bisamberg 243
CZ	CZ-DE	CEPS	Hradec	TenneT TSO GmbH	Etzenricht	400	AC	Hradec-Etzenricht 441
CZ	CZ-DE	CEPS	Prestice	TenneT TSO GmbH	Etzenricht	400	AC	Prestice-Etzenricht 442
CZ	CZ-DE	CEPS	Hradec	50Hertz	Rohrsdorf	400	AC	Hradec-Röhrsdorf 445
CZ	CZ-DE	CEPS	Hradec	50Hertz	Rohrsdorf	400	AC	Hradec-Röhrdorf 446
CZ	CZ-PL	CEPS	Lískovec	PSE Op. SA	Bujaków	220	AC	Bujaków – Lískovec 245
CZ	CZ-PL	CEPS	Lískovec	PSE Op. SA	Kopanina	220	AC	Kopanina – Lískovec 246
CZ	CZ-PL	CEPS	Albrechtice	PSE Op. SA	Dobrzeń	400	AC	Dobrzeń – Albrechtice 443
CZ	CZ-PL	CEPS	Nošovice	PSE Op. SA	Wielopole	400	AC	Wielopole – Nošovice 444
CZ	CZ-SK	CEPS	Sokolnice	SEPS	Stupava	400	AC	Sokolnice-Stupava 497
CZ	CZ-SK	CEPS	Nošovice	SEPS	Varin	400	AC	Nošovice- Varin 404
CZ	CZ-SK	CEPS	Lískovec	SEPS	P.Bystrica	220	AC	Lískovec-P.Bystrica 270
CZ	CZ-SK	CEPS	Sokolnice	SEPS	Křižovany	400	AC	Sokolnice- Křižovany 424
CZ	CZ-SK	CEPS	Sokolnice	SEPS	Senica	220	AC	Sokolnice-Senica 280
CH	CH-AT	Swissgrid	Pradella	APG	Westtirol	380	AC	Inn Sued
CH	CH-AT	Swissgrid	Pradella	APG	Westtirol	380	AC	Inn Nord
CH	CH-AT	Swissgrid	Eschen	APG	Feldkirch	110	AC	Eschen – Feldkirch
CH	CH-AT	Swissgrid	Rüthi	APG	Meiningen	220	AC	Schwarz
CH	CH-AT	Swissgrid	Rüthi	APG	Meiningen	220	AC	Rot
CH	CH-DE	Swissgrid	Asphard	TransnetBW	Kühmoos	380	AC	Wehra
CH	CH-DE	Swissgrid	Laufenburg	TransnetBW	Breitematt	110	AC	Trafo 20 Laufenburg
CH	CH-DE	Swissgrid	Laufenburg	Amprion	Tiengen	380	AC	Andelsbach
CH	CH-DE	Swissgrid	Laufenburg	Amprion	Kühmoos	380	AC	Seelbach
CH	CH-DE	Swissgrid	Laufenburg	TransnetBW	Kühmoos	220	AC	Eggberg
CH	CH-DE	Swissgrid	Oftringen	TransnetBW	Gurtweil	220	AC	Blau
CH	CH-DE	Swissgrid	Laufenburg	TransnetBW	Kühmoos	220	AC	Hotzenwald
CH	CH-DE	Swissgrid	Laufenburg	TransnetBW	Gurtweil	220	AC	Alb Süd

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CH	CH-DE	Swissgrid	Laufenburg	TransnetBW	Trossingen	380	AC	Wutach / Trossingen – Laufenburg rot
CH	CH-DE	Swissgrid	Laufenburg	TransnetBW	Kühmoos	380	AC	Heimbach
CH	CH-DE	Swissgrid	Laufenburg	TransnetBW	Kühmoos	380	AC	Murg
CH	CH-DE	Swissgrid	Beznau	Amprion	Tiengen	380	AC	Aare – West
CH	CH-DE	Swissgrid	Beznau	Amprion	Tiengen	220	AC	Aare – Ost
CH	CH-FR	Swissgrid	Vallorcine	RTE	Pressy	220	AC	
CH	CH-FR	Swissgrid	Bassecourt	RTE	Sierentz	380	AC	
CH	CH-FR	Swissgrid	Bassecourt	RTE	Mambelin	380	AC	
CH	CH-FR	Swissgrid	Riddes	RTE	Cornier	220	AC	Morgins Sud
CH	CH-FR	Swissgrid	Laufenburg	RTE	Sierentz	380	AC	Wiesental Nord
CH	CH-FR	Swissgrid	Verbois	RTE	Genissiat	220	AC	1
CH	CH-FR	Swissgrid	Verbois	RTE	Bois-Tollot	380	AC	
CH	CH-FR	Swissgrid	St. Triphon	RTE	Cornier	220	AC	Morgins Nord
CH	CH-FR	Swissgrid	Verbois	RTE	Genissiat	220	AC	2
CH	CH-FR	Swissgrid	Romanel	RTE	Bois-Tollot	380	AC	
CH	CH-IT	Swissgrid	Airolo	TERNA	Ponte	220	AC	San Giacomo
CH	CH-IT	Swissgrid	Lavorgo	TERNA	Musignano	380	AC	
CH	CH-IT	Swissgrid	Gorduno	TERNA	Mese	220	AC	Jorio
CH	CH-IT	Swissgrid	Soazza	TERNA	Bulciago	380	AC	Forcola
CH	CH-IT	Swissgrid	Riddes	TERNA	Avisse	220	AC	Bernard Ouest
CH	CH-IT	Swissgrid	Riddes	TERNA	Valpelline	220	AC	Bernard Est
CH	CH-IT	Swissgrid	Serra	TERNA	Pallanzeno	220	AC	Monscera
CH	CH-IT	Swissgrid	Robbia	TERNA	San Fiorano	380	AC	Sassalbo
CH	CH-IT	Swissgrid	Robbia	TERNA	Gorlago	380	AC	Vartegna [1]
CH	CH-IT	Swissgrid	Mendrisio	TERNA	Cagno	380	AC	
CH	CH-IT	Swissgrid	Campocologno	TERNA	Tirano	150	AC	
CH	CH-IT	Swissgrid	Campocologno	TERNA	Villa di Tirano	132	AC	
DE	AT-DE	APG	Westtirol	TransnetBW	Bürs	380	AC	Bürs – Westtirol rot 422
DE	AT-DE	APG	St. Peter	TenneT TSO GmbH	Altheim	220	AC	Altheim – St. Peter 233
DE	AT-DE	APG	St. Peter	TenneT TSO GmbH	Simbach	220	AC	Simbach – St. Peter 230
DE	AT-DE	APG	St. Peter	TenneT TSO GmbH	Pirach	220	AC	Pirach – St. Peter 256
DE	AT-DE	APG	St. Peter	TenneT TSO GmbH	Pleinting	220	AC	Pleinting – St. Peter 258
DE	AT-DE	APG	Westtirol	Amprion	Kempton	220	AC	Westtirol - Kempton
DE	AT-DE	APG	Westtirol	TransnetBW	Bürs	220	AC	Bürs – Westtirol weiß 421
DE	AT-DE	APG	Westtirol	Amprion	Leupolz	380	AC	Füssen Ost 412
DE	AT-DE	APG	Braunau	TenneT TSO GmbH	Neuötting	110	AC	Braunau - Neuötting 199/3
DE	AT-DE	APG	St. Peter	TenneT TSO GmbH	Ranna	110	AC	Ranna (Bedarfsübergabestelle) 147 (156/1)

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DE	AT-DE	APG	St.Peter	TenneT GmbH TSO	Ranna	110	AC	Ranna (Bedarfsübergabestelle) 147 (156/2)
DE	AT-DE	APG	Braunau	TenneT GmbH TSO	Stammham	110	AC	Braunau - Stammham 199/4
DE	AT-DE	APG	St.Peter	TenneT GmbH TSO	Ering	110	AC	Ering - St. Peter 182/5
DE	AT-DE	APG	St.Peter	TenneT GmbH TSO	Ering	110	AC	Ering - St. Peter 182/6
DE	AT-DE	APG	Antiesenhofen	TenneT GmbH TSO	Egglfing	110	AC	Egglfing - Antiesenhofen 188/3b
DE	AT-DE	APG	St.Peter	TenneT GmbH TSO	Egglfing	110	AC	Egglfing - St. Peter 188/5
DE	AT-DE	APG	Aigerding	TenneT GmbH TSO	Passau-Ingling	110	AC	Passau-Ingling - Aigerding 188/1
DE	AT-DE	APG	Westtirol	TenneT GmbH TSO	Silz	220	AC	Westtirol – Silz 413
DE	AT-DE	APG	Westtirol	TenneT GmbH TSO	Silz	220	AC	Westtirol – Silz 414
DE	AT-DE	APG	Westtirol	TenneT GmbH TSO	Silz	220	AC	Westtirol – Silz 274E
DE	AT-DE	APG	Vill	TenneT GmbH TSO	Silz	220	AC	Y-Vill – Silz 273C
DE	AT-DE	APG	Vill	TenneT GmbH TSO	Silz	220	AC	Y-Vill – Silz 274C
DE	AT-DE	APG	Ebbs	TenneT GmbH TSO	Oberaudorf	110	AC	Oberaudorf - Ebbs 176/7
DE	AT-DE	APG	Kufstein	TenneT GmbH TSO	Oberaudorf	110	AC	Oberaudorf - Kufstein 176/6
DE	AT-DE	APG	St. Jakob	TransnetBW	Bürs	110	AC	St. Jakob – Bürs 172/8
DE	AT-DE	APG	Rauz	TransnetBW	Bürs	110	AC	Rauz – Bürs 172/9
DE	BE-DE	ELIA	Lixhe	Amprion	Oberzier	DC	DC	Alegro
DE	CH-DE	Swissgrid	Asphard	TransnetBW	Kühmoos	380	AC	Wehra
DE	CH-DE	Swissgrid	Oftringen	TransnetBW	Gurtweil	220	AC	Blau
DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Gurtweil	220	AC	Alb Süd
DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Kühmoos	380	AC	Heimbach
DE	CH-DE	Swissgrid	Laufenburg	Amprion	Kühmoos	380	AC	Seelbach
DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Kühmoos	380	AC	Murg
DE	CH-DE	Swissgrid	Laufenburg	Amprion	Tiengen	380	AC	Andelsbach
DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Kühmoos	220	AC	Eggberg
DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Kühmoos	220	AC	Hotzenwald
DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Breitematt	110	AC	Trafo 20 Laufenburg
DE	CH-DE	Swissgrid	Laufenburg	TransnetBW	Trossingen	380	AC	Wutach / Trossingen – Laufenburg rot
DE	CH-DE	Swissgrid	Beznau	Amprion	Tiengen	220	AC	Aare – Ost
DE	CH-DE	Swissgrid	Beznau	Amprion	Tiengen	380	AC	Aare – West
DE	CZ-DE	CEPS	Prestice	TenneT GmbH TSO	Etzenricht	380	AC	Hradec – Etzenricht 442
DE	CZ-DE	CEPS	Hradec	50Hertz	Röhrsdorf	380	AC	Röhrsdorf – Hradec 445
DE	CZ-DE	CEPS	Hradec	50Hertz	Röhrsdorf	380	AC	Röhrsdorf – Hradec 446
DE	CZ-DE	CEPS	Hradec	TenneT GmbH TSO	Etzenricht	380	AC	Hradec – Etzenricht 441

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DE	DE-DKE	50Hertz	Bentwisch	Energinet	Bjaeverskov	400	DC	Bentwisch Bjaeverskov	–
DE	DE-DKE	50Hertz	Bentwisch	Energinet	Kontek	380	AC	Bentwisch Bjaeverskov	–
DE	DE-DKE	50Hertz	Bentwisch	Energinet	CGS	150	AC	Bentwisch Bjaeverskov	–
DE	DE-DK1	TenneT TSO GmbH	Jardelund	Energinet	Kassö	380	AC	Jardelund-Kassö1	
DE	DE-DK1	TenneT TSO GmbH	Flensburg	Energinet	Kassö	220	AC	Flensburg-Kassö rt	
DE	DE-DK1	TenneT TSO GmbH	Flensburg	Energinet	Ensted	220	AC	Flensburg-Ensted gb	
DE	DE-DK1	TenneT TSO GmbH	Jardelund	Energinet	Kassö	380	AC	Jardelund-Kassö2	
DE	DE-FR	TransnetBW	Eichstetten	RTE	Vogelgrun	220	AC	Kaiserstuhl – Nord	
DE	DE-FR	TransnetBW	Eichstetten	RTE	Muhlbach	380	AC	Ill	
DE	DE-FR	Amprion	Ensdorf	RTE	Vigy	380	AC	Vigy 1 – Nord	
DE	DE-FR	Amprion	Ensdorf	RTE	Vigy	380	AC	Vigy 2 – Süd	
DE	DE-FR	Amprion	Ensdorf	RTE	St. Avold	220	AC	St. Avold	
DE	DE-NL	TenneT TSO GmbH	Diele	TenneT TSO B.V.	Meeden	380	AC	Diele – Meeden schwarz	
DE	DE-NL	TenneT TSO GmbH	Diele	TenneT TSO B.V.	Meeden	380	AC	Diele – Meeden weiß	
DE	DE-NL	Amprion	Gronau	TenneT TSO B.V.	Hengelo	380	AC	Gronau – Hengelo schwarz	
DE	DE-NL	Amprion	Oberzier	TenneT TSO B.V.	Maasbracht	380	AC	Selfkant weiß	
DE	DE-NL	Amprion	Gronau	TenneT TSO B.V.	Hengelo	380	AC	Gronau – Hengelo weiß	
DE	DE-NL	Amprion	Siersdorf	TenneT TSO B.V.	Maasbracht	380	AC	Selfkant schwarz	
DE	DE-NL	Amprion	Niederreihn	TenneT TSO B.V.	Doetinchem	380	AC	Niederreihn Doetinchem schwarz	–
DE	DE-NL	Amprion	Niederreihn	TenneT TSO B.V.	Doetinchem	380	AC	Niederreihn Doetinchem weiß	–
DE	DE-PL	50Hertz	Vierraden	PSE Op. SA	Krajnik	220	AC	Vierraden – Krajnik 508	
DE	DE-PL	50Hertz	Vierraden	PSE Op. SA	Krajnik	220	AC	Vierraden – Krajnik 507	
DE	DE-PL	50Hertz	Hagenwerder	PSE Op. SA	Mikulowa	380	AC	Hagenwerder Mikulowa 567	–
DE	DE-PL	50Hertz	Hagenwerder	PSE Op. SA	Mikulowa	380	AC	Hagenwerder Mikulowa 568	–
DE	DE-SE	TenneT TSO GmbH	Herrenwyk	Svenska Kraftnät	Arrie	400	DC	Baltic Cable	
DE	DE-AT	Amprion	Stich 403A	APG	Werben	220	AC	Stich Bludenz West 403A	
DE	DE-AT	APG	Walgauwerk	TransnetBW	Bürs	220	AC	Bürs - Walgauwerk orange 405A	
DE	DE-AT	APG	Meiningen	TransnetBW	Bürs	220	AC	Bürs - Meiningen grün 406A	
DE	DE-AT	APG	Nenzing	TransnetBW	Bürs	110	AC	Bürs-Nenzing weiss 197/2	
DE	DE-AT	APG	Bürs VKW	TransnetBW	Bürs	110	AC	Bürs - Bürs-VKW rot 197/10	
DE	DE-AT	Amprion	Stich 404A	APG	Werben	220	AC	Stich Dellmensingen Ost 404A	
DK1	DE-DK1	TenneT TSO GmbH	Flensburg	Energinet	Ensted	220	AC	Flensburg-Ensted gb	

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DK1	DE-DK1	TenneT TSO GmbH	Audorf	Energinet	Kassö	380	AC	Audorf-Kassö 2/bl
DK1	DE-DK1	TenneT TSO GmbH	Audorf	Energinet	Kassö	380	AC	Audorf-Kassö 1/gn
DK1	DE-DK1	TenneT TSO GmbH	Flensburg	Energinet	Kassö	220	AC	Flensburg-Kassö rt
DK1	DK1-SE	Energinet	400 kV Vester Hassing	Svenska Kraftnät	132 kV Lindome	250	DC	HVDC Kontiskan 2
DK1	DK1-SE	Energinet	400 kV Vester Hassing	Svenska Kraftnät	400 kV Lindome	250	DC	HVDC Kontiskan 1
DK1	DK1-NL	Energinet	Endrup	TenneT TSO B.V.	Eemshaven	320	DC	COBRACable
DK1	DK1-NO	Energinet	150 kV Tjele	Statnett	300 kV Kr.sand	250	DC	HVDC Skagerrak 1
DK1	DK1-NO	Energinet	150 kV Tjele	Statnett	300 kV Kr.sand	250	DC	HVDC Skagerrak 2
DK1	DK1-NO	Energinet	400 kV Tjele	Statnett	300 kV Kr.sand	350	DC	HVDC Skagerrak 3
FR	BE-FR	ELIA	Avelgem	RTE	Avelin	400	AC	Avelin – Avelgem
FR	BE-FR	ELIA	Aubange	RTE	Moulaine	220	AC	Moulaine – Aubange
FR	BE-FR	ELIA	Aubange	RTE	Mont St Martin	220	AC	Aubange – Mont Saint Martin
FR	BE-FR	ELIA	Achène	RTE	Lonny	400	AC	Lonny – Achène
FR	BE-FR	ELIA	Jamiolle	RTE	Chooz	220	AC	Chooz – Jamiolle
FR	BE-FR	ELIA	Avelgem	RTE	Mastaing	380	AC	Avelgem-Mastaing
FR	BE-FR	ELIA	Momignie 1	RTE	Fourmie	63	AC	Fourmie – Momignie 1
FR	BE-FR	ELIA	Momignie 2	RTE	Fourmie	63	AC	Fourmie – Momignie 2
FR	CH-FR	Swissgrid	Vallorcine	RTE	Pressy	220	AC	
FR	CH-FR	Swissgrid	Bassecourt	RTE	Mambelin	400	AC	
FR	CH-FR	Swissgrid	Bassecourt	RTE	Sierentz	400	AC	
FR	CH-FR	Swissgrid	Riddes	RTE	Cornier	220	AC	Morgins Sud
FR	CH-FR	Swissgrid	Laufenburg	RTE	Sierentz	400	AC	Wiesental Nord
FR	CH-FR	Swissgrid	St. Triphon	RTE	Cornier	220	AC	Morgins Nord
FR	CH-FR	Swissgrid	Verbois	RTE	Genissiat	220	AC	1
FR	CH-FR	Swissgrid	Verbois	RTE	Genissiat	220	AC	2
FR	CH-FR	Swissgrid	Chamoson	RTE	Bois-Tollot	400	AC	
FR	CH-FR	Swissgrid	Verbois	RTE	Bois-Tollot	400	AC	
FR	DE-FR	TransnetBW	Eichstetten	RTE	Vogelgrun	220	AC	Kaiserstuhl – Nord
FR	DE-FR	TransnetBW	Eichstetten	RTE	Muhlbach	400	AC	Ill
FR	DE-FR	Amprion	Ensdorf	RTE	St. Avold	220	AC	St. Avold
FR	DE-FR	Amprion	Ensdorf	RTE	Vigy	400	AC	Vigy - 1N
FR	DE-FR	Amprion	Ensdorf	RTE	Vigy	400	AC	Vigy - 2S
FR	ES-FR	REE	Vic	RTE	Baixais	400	AC	
FR	ES-FR	REE	Benos	RTE	Lac Doo	150	AC	
FR	ES-FR	REE	Irun	RTE	Errondenia	150	AC	
FR	ES-FR	REE	Hernani	RTE	Argia	400	AC	
FR	ES-FR	REE	Arkale	RTE	Argia	220	AC	
FR	ES-FR	REE	Biescas	RTE	Pragneres	220	AC	
FR	ES-FR	REE	Santa Llogaia	RTE	Baixais	320	DC	Santa Llogaia – Baixas 1

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FR	ES-FR	REE	Santa Llogaia	RTE	Baixas	320	DC	Santa Llogaia – Baixas 2
FR	FR-IT	RTE	Albertville	TERNA	Rondissone	400	AC	2
FR	FR-IT	RTE	Albertville	TERNA	Rondissone	400	AC	1
FR	FR-IT	RTE	Menton	TERNA	Camporosso	220	AC	
FR	FR-IT	RTE	Villarodin	TERNA	Venaus (Venalzio)	400	AC	
FR	FR-UK	RTE	Mandarins	NGC	Sellindge	270	DC	1
FR	FR-UK	RTE	Mandarins	NGC	Sellindge	270	DC	2
HR	HR-BA	HOPS	ERNESTINOVO	NOSBIH	UGLJEVIK	400	AC	ERNESTINOVO-UGLJEVIK
HR	HR-BA	HOPS	KONJSKO	NOSBIH	MOSTAR	400	AC	KONJSKO-MOSTAR
HR	HR-BA	HOPS	ĐAKOVO	NOSBIH	TUZLA	220	AC	ĐAKOVO-TUZLA
HR	HR-BA	HOPS	ĐAKOVO	NOSBIH	GRADAČAC	220	AC	ĐAKOVO-GRADAČAC
HR	HR-BA	HOPS	ZAKUČAC	NOSBIH	MOSTAR	220	AC	ZAKUČAC-MOSTAR
HR	HR-BA	HOPS	MEĐURIČ	NOSBIH	PRIJEDOR	220	AC	MEĐURIČ-PRIJEDOR
HR	HR-HU	HOPS	ŽERJAVINEC	MAVIR	HÉVÍZ 1	400	AC	ŽERJAVINEC-HÉVÍZ 1
HR	HR-HU	HOPS	ŽERJAVINEC	MAVIR	HÉVÍZ 2	400	AC	ŽERJAVINEC-HÉVÍZ 2
HR	HR-RS	HOPS	ERNESTINOVO	EMS	SR.MITROVICA 2	400	AC	ERNESTINOVO-SR.MITROVICA 2
HR	HR-SI	HOPS	MELINA	ELES	DIVAČA	400	AC	MELINA-DIVAČA
HR	HR-SI	HOPS	TUMBRI	ELES	KRŠKO 1	400	AC	TUMBRI-KRŠKO 1
HR	HR-SI	HOPS	TUMBRI	ELES	KRŠKO 2	400	AC	TUMBRI-KRŠKO 2
HR	HR-SI	HOPS	PEHLIN	ELES	DIVAČA	220	AC	PEHLIN-DIVAČA
HR	HR-SI	HOPS	ŽERJAVINEC	ELES	CIRKOVCE	220	AC	ŽERJAVINEC-CIRKOVCE
HR	HR-BA	HOPS	PLAT	NOSBIH	TREBINJE	220	AC	PLAT-TREBINJE
HR	HR-BA	HOPS	SISAK	NOSBIH	PRIJEDOR	220	AC	SISAK-PRIJEDOR
HR	HR-BA	HOPS	GRAČAC	NOSBIH	KULEN VAKUF	110	AC	GRAČAC-KULEN VAKUF
HR	HR-BA	HOPS	SLAVONSKI BROD 2	NOSBIH	BOSANSKI BROD	110	AC	SLAVONSKI BROD 2- BOSANSKI BROD
HR	HR-BA	HOPS	IMOTSKI	NOSBIH	GRUDE	110	AC	IMOTSKI-GRUDE
HR	HR-BA	HOPS	STON	NOSBIH	NEUM	110	AC	STON-NEUM
HR	HR-BA	HOPS	OPUZEN	NOSBIH	NEUM	110	AC	OPUZEN-NEUM
HR	HR-BA	HOPS	OPUZEN	NOSBIH	ČAPLJINA	110	AC	OPUZEN-ČAPLJINA
HR	HR-BA	HOPS	KOMOLAC	NOSBIH	TREBINJE	110	AC	KOMOLAC-TREBINJE
HR	HR-BA	HOPS	BUSKO BLATO	NOSBIH	LIVNO	110	AC	BUSKO BLATO-LIVNO
HR	HR-BA	HOPS	VRGORAC	NOSBIH	LJUBUŠKI	110	AC	VRGORAC-LJUBUŠKI
HR	HR-BA	HOPS	ŽUPANJA	NOSBIH	ORAŠJE	110	AC	ŽUPANJA-ORAŠJE
HR	HR-BA	HOPS	KNIN	NOSBIH	BOSANSKO GRAHOVO	110	AC	KNIN - BOSANSKO GRAHOVO

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HR	HR-RS	HOPS	BELI MANASTIR	EMS	APATIN	110	AC	BELI MANASTIR-APATIN
HR	HR-RS	HOPS	NIJEMCI	EMS	ŠID	110	AC	NIJEMCI-ŠID
HR	HR-SI	HOPS	MATULJI	ELES	ILIRSKA BISTRICA	110	AC	MATULJI-ILIRSKA BISTRICA
HR	HR-SI	HOPS	BUJE	ELES	KOPER	110	AC	BUJE-KOPER
HR	HR-SI	HOPS	NEDELJANEC	ELES	FORMIN	110	AC	NEDELJANEC-FORMIN
HR	HR-HU	HOPS	ERNESTINOVO	MAVIR	PÉCS	400	AC	ERNESTINOVO - PÉCS 1
HR	HR-HU	HOPS	ERNESTINOVO	MAVIR	PÉCS	400	AC	ERNESTINOVO - PÉCS 2
HU	HU-AT	MAVIR	Győr	APG	Neusiedl	220	AC	Győr -Neusiedl 246B
HU	HU-AT	MAVIR	Győr	APG	Wien-Südost	220	AC	Győr - Wien-Südost 245
HU	HU-AT	MAVIR	Győr	APG	Zurndorf	400	AC	Győr - Zurndorf 439B
HU	HU-AT	MAVIR	Szombathely	APG	Zurndorf	400	AC	Szombathely - Zurndorf440B
HU	HU-HR	MAVIR	Hévíz	HEP-OPS	Žerjavinec	400	AC	Hévíz -Žerjavinec II.
HU	HU-HR	MAVIR	Hévíz	HEP-OPS	Žerjavinec	400	AC	Hévíz -Žerjavinec I.
HU	HU-HR	MAVIR	Pécs	HEP-OPS	Ernestinovo	400	AC	Pécs-Ernestinovo I.
HU	HU-HR	MAVIR	Pécs	HEP-OPS	Ernestinovo	400	AC	Pécs-Ernestinovo II.
HU	HU-HR	MAVIR	Siklós	HEP-OPS	Donji Miholjac	120	AC	Siklós-Donji Miholjac / not considered
HU	HU-HR	MAVIR	Lenti	HEP-OPS	Nedeljanec	120	AC	Lenti-Nedeljanec / not considered
HU	HU-RO	MAVIR	Sándorfalva	Transelectrica	Arad	400	AC	Sándorfalva-Arad
HU	HU-RO	MAVIR	Békéscsaba	Transelectrica	Nadab	400	AC	Békéscsaba-Nadab
HU	HU-RS	MAVIR	Sándorfalva	EMS	Subotica	400	AC	Sándorfalva-Subotica
HU	HU-SK	MAVIR	Győr	SEPS	Gabčíkovo	400	AC	Győr-Gabčíkovo
HU	HU-SK	MAVIR	Göd	SEPS	Levice	400	AC	Göd-Levice
HU	HU-UA	MAVIR	Albertirsa	Ukrenergo	Zahidno Ukrainka	750	AC	Albertirsa- Zahidno Ukrainka
HU	HU-UA	MAVIR	Sajószöged	Ukrenergo	Mukachevo	400	AC	Sajószöged-Mukachevo
HU	HU-UA	MAVIR	Kisvárd	Ukrenergo	Mukachevo	220	AC	Kisvárd-Mukachevo
HU	HU-UA	MAVIR	Tiszaöl	Ukrenergo	Mukachevo	220	AC	Tiszaöl-Mukachevo
IT	AT-IT	APG	Lienz	TERNA	Soverzene	220	AC	Lienz – Soverzene
IT	IT-AT	Terna	Tarvisio	APG	Arnoldstein	132	AC	Tarvisio-Arnoldstein
IT	CH-IT	Swissgrid	Airolo	TERNA	Ponte	220	AC	San Giacomo
IT	CH-IT	Swissgrid	Lavorgo	TERNA	Musignano	380	AC	
IT	CH-IT	Swissgrid	Gorduno	TERNA	Mese	220	AC	Jorio
IT	CH-IT	Swissgrid	Riddes	TERNA	Valpelline	220	AC	Bernard Est
IT	CH-IT	Swissgrid	Riddes	TERNA	Avise	220	AC	Bernard Ouest
IT	CH-IT	Swissgrid	Soazza	TERNA	Bulciago	380	AC	Forcola

Annex 1: Considerations on Bidding Zone Review
Region “Central Europe” Bidding Zone
configurations

IT	CH-IT	Swissgrid	Serra	TERNA	Pallanzeno	220	AC	Monscera
IT	CH-IT	Swissgrid	Robbia	TERNA	San Fiorano	380	AC	Sassalbo[2]
IT	CH-IT	Swissgrid	Robbia	TERNA	Gorlago	380	AC	Vartegna
IT	CH-IT	Swissgrid	Mendrisio	TERNA	Cagno	380	AC	
IT	CH-IT	Swissgrid	Campocologno	TERNA	Tirano	150	AC	
IT	CH-IT	Swissgrid	Campocologno	TERNA	Villa di Tirano	132	AC	
IT	FR-IT	RTE	Z Menton	TERNA	Camporosso	220	AC	
IT	FR-IT	RTE	Albertville	TERNA	Rondissone	400	AC	1
IT	FR-IT	RTE	Albertville	TERNA	Rondissone	400	AC	2
IT	FR-IT	RTE	Villarodin	TERNA	Venalzio (Venaus)	400	AC	
IT	IT-SI	TERNA	Redipuglia	ELES	Divaca	380	AC	
IT	IT-SI	TERNA	Padriciano	ELES	Divaca	220	AC	
LU	LU-BE	Creos	Schiffflange	ELIA	Aubange	220	AC	Aubange - PST Schiffflange
NL	BE-NL	ELIA	Zandvliet	TenneT B.V. TSO	Geertruidenberg	380	AC	Zandvliet - Geertruidenberg
NL	BE-NL	ELIA	Zandvliet	TenneT B.V. TSO	Borssele	380	AC	Zandvliet – Borssele
NL	BE-NL	ELIA	Van Eyck	TenneT B.V. TSO	Maasbracht	380	AC	Van Eyck White - Maasbracht
NL	BE-NL	ELIA	Van Eyck	TenneT B.V. TSO	Maasbracht	380	AC	Van Eyck Black - Maasbracht
NL	DE-NL	TenneT GmbH TSO	Diele	TenneT B.V. TSO	Meeden	380	AC	Diele – Meeden weiß
NL	DE-NL	TenneT GmbH TSO	Diele	TenneT B.V. TSO	Meeden	380	AC	Diele – Meeden schwarz
NL	DE-NL	Amprion	Gronau	TenneT B.V. TSO	Hengelo	380	AC	Gronau – Hengelo weiß
NL	DE-NL	Amprion	Oberzier	TenneT B.V. TSO	Maasbracht	380	AC	Maasbracht - Oberzier 380 Wit
NL	DE-NL	Amprion	Siersdorf	TenneT B.V. TSO	Maasbracht	380	AC	Maasbracht – Siersdorf 380 Zwart
NL	DE-NL	Amprion	Gronau	TenneT B.V. TSO	Hengelo	380	AC	Gronau – Hengelo schwarz
NL	DE-NL	Amprion	Niederrhein	TenneT B.V. TSO	Doetinchem	380	AC	Niederrhein - Doetinchem schwarz
NL	DE-NL	Amprion	Niederrhein	TenneT B.V. TSO	Doetinchem	380	AC	Niederrhein - Doetinchem weiß
NL	NL-DK1	TenneT B.V. TSO	Eemshaven	Energinet	Endrup	320	DC	COBRACable
NL	NL-NO	TenneT B.V. TSO	Eemshaven	Statnett	Feda	450	DC	Eemshaven – Feda (NorNed)
NL	NL-UK	TenneT B.V. TSO	Maasvlakte	NGET	Isle of Grain	450	DC	Maasvlakte – Isle of Grain (BritNed)
PL	PL-BY	PSE Op. SA	Wólka Dobrzyńska	Bel Energo	Brześć	110	AC	Wólka Dobrzyńska – Brześć
PL	PL-CZ	PSE Op. SA	Bujaków	CEPS	Lískovec	220	AC	Bujaków – Lískovec 245
PL	PL-CZ	PSE Op. SA	Kopanina	CEPS	Lískovec	220	AC	Kopanina – Lískovec 246
PL	PL-CZ	PSE Op. SA	Dobrzeń	CEPS	Albrechtice	400	AC	Dobrzeń – Albrechtice 443
PL	PL-CZ	PSE Op. SA	Wielopole	CEPS	Nošovice	400	AC	Wielopole – Nošovice 444

PL	PL-DE	PSE Op. SA	Krajnik	50-Hertz	Vierraden	400	AC	Krajnik – Vierraden 507
PL	PL-DE	PSE Op. SA	Krajnik	50 Hertz	Vierraden	400	AC	Krajnik – Vierraden 508
PL	PL-DE	PSE Op. SA	Mikułowa	50 Hertz	Hagenwerder	400	AC	Mikułowa – Hagenwerder 567
PL	PL-DE	PSE Op. SA	Mikułowa	50 Hertz	Hagenwerder	400	AC	Mikułowa– Hagenwerder 568
PL	PL-SE	PSE Op. SA	Słupsk	Svenska Kraftnät	Karlshamn	450	DC	SwePol Link
PL	PL-SK	PSE Op. SA	Krosno Iskrzynia	SEPS	Lemesany	400	AC	Krosno-Lemesany 478
PL	PL-SK	PSE Op. SA	Krosno Iskrzynia	SEPS	Lemesany	400	AC	Krosno-Lemesany 477
PL	PL-UA	PSE Op. SA	Zamość	WPS	Dobrotwór	220	AC	Zamość – Dobrotwór
PL	PL-LT	PSE SA	Elk Bis	LITGRID AB	Alytus	400	AC	Elk Bis – Alytus
SI	SI-AT	ELES	Podlog	APG	Obersielach	220	AC	Podlog-Obersielach
SI	SI-AT	ELES	Maribor	APG	Kainachtal	400	AC	Maribor-Kainachtal
SI	SI-AT	ELES	Maribor	APG	Kainachtal	400	AC	Maribor-Kainachtal
SI	SI-HR	ELES	Divaca	HEP	Pehlin	220	AC	Divaca-Pehlin
SI	SI-HR	ELES	Cirkovce	HEP	Zerjavinec	220	AC	Cirkovce-Zerjavinec
SI	SI-HR	ELES	Krško	HEP	Tumbri	400	AC	Krško-Tumbri
SI	SI-HR	ELES	Divaca	HEP	Melina	400	AC	Divaca-Melina
SI	SI-HR	ELES	Koper	HEP	Buje	110	AC	Koper-Buje
SI	SI-HR	ELES	Il.Bistrica	HEP	Matulji	110	AC	Il.Bistrica-Matulji
SI	SI-HR	ELES	Formin	HEP	Nedeljanec	110	AC	Formin-Nedeljanec
SI	SI-HR	ELES	Krško	HEP	Tumbri	400	AC	Krško-Tumbri
SI	SI-IT	ELES	Divaca	TERNA	Redipuglia	400	AC	Divaca-Redipuglia
SI	SI-IT	ELES	Divaca	TERNA	Padriciano	220	AC	Divaca- Padriciano
SK	SK-CZ	SEPS	Varín	ČEPS	Nošovice	400	AC	Varín – Nošovice
SK	SK-CZ	SEPS	Stupava	ČEPS	Sokolnice	400	AC	Stupava – Sokolnice
SK	SK-CZ	SEPS	Senica	ČEPS	Sokolnice	220	AC	Senica – Sokolnice
SK	SK-CZ	SEPS	P. Bystrica	ČEPS	Lískovec	220	AC	P. Bystrica – Lískovec
SK	SK-CZ	SEPS	Křižovany	ČEPS	Sokolnice	400	AC	Křižovany – Sokolnice
SK	SK-HU	SEPS	Levice	MAVIR	Göd	400	AC	Levice – Göd
SK	SK-HU	SEPS	Gabčíkovo	MAVIR	Győr	400	AC	Gabčíkovo – Győr
SK	SK-PL	SEPS	Lemešany	PSE Op. SA	Krosno	400	AC	Lemešany – Krosno 477
SK	SK-PL	SEPS	Lemešany	PSE Op. SA	Krosno	400	AC	Lemešany – Krosno 478
SK	SK-UA	SEPS	V. Kapušany	WPS	Mukačevo	400	AC	V. Kapušany – Mukačevo

Table 7: Bidding Zone Borders of the Status Quo configuration