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Submitted to **Capacity Calculation Methodology Proposal for the Nordic CCR**
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Introduction

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4 Please state any remarks or concerns with regard to the input data for the Capacity Calculation Methodologies (CCMs), either being CNTC or Flow Based (FB), as described in chapter 7.

Please state any remarks or concerns with regard to the input data for the Capacity Calculation Methodologies (CCMs), either being CNTC or Flow Based (FB), as described in chapter 7.:
Transparency in forecast of available cross bidding zone border capacity is an essential input in production planning and thus price formation. As flow based will imply a significant change in the transparency of what is expected variations in available capacity, Swedenergy emphasizes that TSOs must properly address this concern during the implementation phase. We note that this issue is linked to the potential use of a minimum cross border capacity rule as has been implemented in the CWE flow based methodology.

Swedenergy would like to see a list of the critical network elements, how many hours they are constraining the system and what is the shadow value of increasing the capacity 1 MW. In addition we think not only the average numbers of grid constraints should be shown but also the minimum and maximum values. The impact of the individual grid constraint on the social welfare calculation must be shown.

Swedenergy would also appreciate a better description on how social welfare has been calculated, what assumptions has been made on the short run elasticity of demand, etc.

Swedenergy expects that market parties gets proper tools, the capacity calculation matrix for every hour for day ahead price forecasts, and other pertinent information. The necessity to have anonymous critical network elements strongly restricts the transparency in the flow based capacity calculation method as compared with the NTC and the CNTC method. Thus the very small welfare gains shown in the calculation may very well be lost when compared with increased opaqueness of how capacity is allocated cross border. If there is an UMM concerning the grid or for example problems with a plant, in the CNTC and NTC context it is relatively straightforward to translate the impact of the published phenomena upon the market. In that sense price formation is more robust in the current capacity calculation setting. Transparency, in the market sense, makes it necessary to indicate publicly which critical branches restrict the market the most and thereby indicates and create acceptance for where grid investment is needed. Thus, transparency in the procedural sense, that we in an abstract manner better know that TSOs calculate capacity using a black box including strict mathematical procedures, may in the best of cases be helpful to the regulators.

Regarding network transparency, CWE regulators have required the TSOs to offer a minimum of cross border capacity in flow based, thereby creating a minimum size of the flow based matrix, independent of the treatment of the critical branches. This minimum capacity matrix has actually been used in a majority of cases. Therefore, in order to avoid reducing capacity made available to the markets and for easier predictability, a minimum capacity should also be considered in the Nordics. This minimum capacity should be set in the spirit of regulation 714 and be related to the thermal capacities of the cross-zonal capacities. If a proposed minimum capacity is below the current average capacity, Swedenergy expects an exhaustive analysis explaining why the intention in the regulation 714 is to be disregarded.

Swedenergy lack a commitment to more transparency of what the actual values used for reliability margins are and ex-post reports on use of the reliability margins.

Since GSK shift keys are in essence predictions of behavior and since they play a significant part in price formation, we expect transparency on the use of GSKs. It should be published, which GSK methodology is the default for each area, and there should be regular public analysis if that default methodology is still fitting or if another methodology would be more suitable. It should also be published when a TSO differs from the default methodology and chooses another and the reasons for that choice.

Swedenergy recognize that this is rather a comment on the Common Grid Model, nevertheless we insist on transparency of which remedial actions are included in which reliability margins in advance of the capacity calculation, which aren't included, and which RAs are used at the end. Given the ongoing debate of how grid constraints can be alleviated to give more capacity for the market this is highly relevant information for market parties. To accommodate an informed debate, transparency and reliable information is essential. This information is also essential to have an informed analysis about the costs and benefits of remedial actions.

5 Please state any remarks or concerns with regard to the Flow-Based (FB) CCM as described in chapter 5 and 6

Please state any remarks or concerns with regard to the Flow-Based (FB) CCM as described in chapter 5 and 6:
Swedenergy requests a better description on if and how the value of intraday capacity is taken into account at the day-ahead stage. Swedenergy's major concern is that starting the flow based implementation at the day-ahead stage, with D-2 input data, is counterintuitive and contradictory to the transition towards more weather dependent supply system. From Swedenergy's view the implementation of flow based capacity calculation should start with the intraday if it is not possible to introduce it at all timeframes at the same time. It is not clear to Swedenergy why the TSOs proposal does not discuss the possibility to start with intraday despite repeated proposals from to stakeholders to do so.

It is impossible from the presented material to conclude that the Nordic version of flow based should be non-intuitive as proposed in the consultation documents. The CWE region has chosen the intuitive version and any deviation from their method will affect Nordic price formation differently than the continental price formation. This may be an obstacle for market integration as actors in both regions will have a completely different set of tools to understand what is happening in the infrastructure. In the CWE region both intuitive and non-intuitive flow based runs were presented before any decision was taken. Swedenergy suggests that the Nordic TSOs learn from the discussion in CWE and use the same visualization of the results.

1) The impact assessment more or less assumes that the non-intuitive version of flow-based is what has to be shown. This is remarkable considered that CWE has opted for the intuitive version reasoning like this:
a) the FB "intuitive" only decreases the day-ahead market welfare while it does not bring any good property to the models; Choose the non-intuitive version
b) The stakeholders have a preference for ATC-like properties which exist more often in "intuitive". Areas involved in non-intuitive exchanges should not have to import (resp. export) with the lowest (resp. highest) price to "help" others. In addition, if the zonal size affects whether you more often are involved in non-intuitive situations; choose the intuitive version
c) With a "commodity market" point of view: A product should not be sold in another country at a lower price than the price charged in its home market. Changing price dynamics may make forecasting price more difficult; Choose "intuitive"
Apparently the second and third reasons were enough to warrant the development of an intuitive version in CWE. Swedenergy thus suggests that the default version of flow based capacity calculation should be the intuitive version.

In the case that the TSOs disregard the strong recommendation from the stakeholders to first implement flow based capacity calculation intraday, Swedenergy have the following comments. The consultation documents fail to describe how exactly flow based in day ahead and CNTC in intraday will interact, also describing how capacity will be given in different cases. It should answer how flow based corner solutions in the day ahead market will be handled in intraday market, how counterintuitive flows across a bidding zone border will be handled, when capacity calculation happens and with which input data etc. Initial intraday capacity on different bidding zone borders should also become part of the data published under the parallel run alongside with prices and resulting flows.

Swedenergy lack a general description on how remedial actions are used. From some of the comments in the stakeholders' forum, as well as the answer to ACER that this concerns internal bottlenecks it is difficult to avoid the conclusion that some of the TSOs want to use flow based to avoid countertrading internal bottlenecks and instead move them to the border. Swedenergy strongly urge the regulators to prevent flow based capacity calculation becoming a tool to move internal bottlenecks to the border by including structural congestions into the mathematical algorithm as critical network elements! As countertrade is part of the allowed methods in regulation 714, it should be part of the methodology.

Concerning bidding zone delimitation, flow based will provide some useful data, but it won't help market participants understand neither bidding zone delimitations nor proposed capacity increases in the transmission grid, if the limiting critical branches are anonymous and their location is not known.

6 Please state any remarks or concerns with regard to the CNTC CCM as described in chapter 6

Please state any remarks or concerns with regard to the CNTC CCM as described in chapter 5 and 6:
During the stakeholder interaction process, Stakeholder representatives have asked for a proper evaluation of the difference between a CNTC and FB methodology, with real historical outcomes/flows as a reference. Such a calculation has however not been performed and thus it is impossible to assess the CNTC method as a relevant and objective reference point has not been available. In order to make a proper comparison between two alternatives (CNTC and flow based) both need to be modeled to the same degree and go through parallel runs. Swedenergy considers the fact that the TSOs did not include a proper evaluation of CNTC a large and important failure.

In addition, any comparison between flow based and CNTC needs to include other factors besides the pure day ahead optimization, such as compatibility with a functioning intraday market. When the evaluation of the CNTC is made it is not enough to consider a comparison with flow based within the flow based context. As flow based capacity calculation is a mathematical optimization given certain parameters and inputs, any other method put into this context must per definition be worse. However, it is Swedenergy's belief that CNTC gives more flexibility to later time frames (intraday, balancing market), supports the commercial actions and gives transparent long run signals where investments in transmission and capacity is needed. These are positive values which should be included in the evaluation.

7 Do you agree with the proposal for a Flow-Based (FB) capacity calculation for the day-ahead timeframe? Please state reasons why.

Do you agree with the proposal for a Flow-Based (FB) capacity calculation for the day-ahead timeframe? Please state reasons why.:
No, it is a premature to take a decision to adopt the flow based calculation method based upon the minute material given. A final decision should in Swedenergy's view be postponed until after the 18 month parallel run, of which at least 6 month should be on the final Common Grid Model. The final material should also include an assessment of a continuation of the CNTC as a method, as well as comparisons between the intuitive and non-intuitive version. In addition, Swedenergy urge the regulators to foremost and primarily consider the flow based calculation method in the intraday timeframe.

1) The material does not include a sensitivity analysis, providing a case that the relatively small welfare gains are robust. This sensitivity analysis is especially important considering that the final common grid model is not used in the simulations.
2) Swedenergy thinks the given material lacks a chapter discussing the lessons learned from the implementation of flow based in CWE. CWE for example experiences challenges in XB intraday trade and market parties report problems to understand price formation when the Critical Network Elements are kept secret. In addition, CWE has decided, to employ an intuitive patch in their flow based version. In their communication, ACER (2016), a main concern seems to be that flow based capacity calculation is used to push internal bottlenecks to the border.

3) Swedenergy wants a more detailed discussion on the impact on the electricity markets. If the system price and the relationship between area prices (and the system price) changes, and if market participants have a reduced understanding of price formation, the efficiency of the markets could be reduced. Forward markets are an integral part of the Nordic electricity markets and contributes to its efficient functioning. It is therefore of the utmost importance that the introduction of flow based capacity calculation also includes some analysis of the alignment with the network code for forward markets. In the case of the non-intuitive implementation Swedenergy fail to comprehend how flows in the wrong direction can be aligned with the implementation of the forward code and liquid forward markets.
4) The stakeholders have at several occasions promoted the idea that flow based capacity calculation makes most sense in the intraday timeframe. CACM does not prioritize the day-ahead market before the intraday market. It clearly states that flow based should be introduced in all timeframes. Given that we expect a power system with large intermittency and forecasts that are only becoming valid close to real time, any change of the capacity calculation method in the Nordics should prioritize the intraday timeframe. Thus the implementation of flow based should first be done in the intraday timeframe.
5) The welfare changes seem small and build upon the non-intuitive version of flow-based. As such the risk of a complete change of capacity calculation methods to the commercial transactions seems higher than the small benefits. At the outset we are then comparing a small potential upside for the system operators (avoiding counter trade and pushing bottlenecks to the borders) and a large potential downside for the stakeholders (less cross border capacity and deteriorated and opaque price formation).
6) One issue often discussed regarding the flow-based capacity calculation is whether it is transparent or not. Van den Bergh et al (2016) points out that as flow-based as a methodology compared to the current NTC, is more strictly defined, thus in the procedural sense it is more “transparent”. We can all know the mathematics behind the optimization. It should be clear that part of that seeming transparency still leaves ample room for the transmission system operators to steer the results (Marien et al (2013) and thus move internal bottlenecks to the border. The latter is addressed by ACER’s recommendation per November 2016, which is only superficially addressed in the consultation documents. However, it is not conclusive that the coordinated NTC, based on a common grid model could not be almost as well-defined. Van den Bergh et al continues: “once the capacity allocation parameters are determined, an ATC-value indicates more clearly which transmission capacity is available to the market, compared to the FBMC parameters […]. Hence, from a market player’s perspective, the transparency of F(low)B(ased)M(arket)C(oupling) can be questioned”. (our bold). Thus a more formal version of the CNTC with more openness towards the regulators and the stakeholders of what is performed, how and why, likely would increase both the procedural transparency, and the transparency of the market outcomes.
7) The underlying idea in the proposed version (and as stated in the stakeholder forums) seems to be a) avoiding counter trading b) push congestion to the borders by including them in the mathematical procedures. None of these reasons follows the intentions in neither 714 nor the ACER (2016) principles.

From a general perspective, making decisions early comes at a cost of lost flexibility. It is Swedenergy’s view that the operation of a transmission system requires sufficient room to maneuver, and flexible options. Starting from that perspective, optimizing the use of the transmission grid based on input data from D-2 raises concerns on how flexibility will be ensured.

Transparency in the considerations behind any proposed reliability margins is requested. In addition, the proposal does not seem to make a difference between structural or temporary congestions. It is crucial that the capacity calculation methodology should not be used to avoid any structural congestion. Thus, given the magnitude of the proposed change, the relatively limited estimated social welfare change (if any when the check of robustness is done), lack of properly designed solution for intraday, and the diverging opinion between significant share of stakeholders and the TSOs on the relevance of a flow based method for the Nordic System, Swedenergy calls for a careful assessment of the proposal and to await the outcome of the full 18 months of parallel runs before committing to a transition to flow based capacity allocation.

8 Do you agree with the proposal for a CNTC capacity calculation for the intraday timeframe as a first step of the ID CCM implementation? Please state reasons why

Do you agree with the proposal for a CNTC capacity calculation for the intraday timeframe as a first step of the ID CCM implementation? Please state reasons why:
No, the intraday market should be the primary objective for flow-based capacity calculation. The needs of the power system are better known closer to real time. Thus flow based could provide real values in the intraday timeframe. For example, close to real time there is much less uncertainty regarding production and consumption, leading to less need for approximation in the GSKs.

Article 3 of the CACM regulation explicitly calls for;
(b) ensuring optimal use of the transmission infrastructure; and
(d) optimising the calculation and allocation of cross-zonal capacity; and
(g) contributing to the efficient long-term operation and development of the electricity transmission system and electricity sector in the Union.
Swedenergy share the concern raised by the industry that the process for developing the long term solution for flow based methodology for intraday is not described properly. Judging from the continental experience the solution for intraday is still not within reach which suggest that the Nordic region may learn from the CWE experience before making a final commitment.

Swedenergy does not, for the above reasons, approve of any solution that does not implement flow based at day-ahead and intraday at the same time, or that starts with implementing flow based in the intraday timeframe.

9 Do you agree with the proposal for a Flow-Based (FB) capacity calculation for the intraday timeframe as the final step of the ID CCM implementation? Please state reasons why

Do you agree with the proposal for a Flow-Based (FB) capacity calculation for the intraday timeframe as the final step of the ID CCM implementation? Please state reasons why:
No, flow-based capacity calculation for the intraday timeframe makes sense as the first step. At that point relevant information can be used to optimize the network use in relation to real market needs.

10 Please state any remarks or concerns with regard to the implementation timeline in chapter 11

Please state any remarks or concerns with regard to the implementation timeline in chapter 11:
1) The implementation of flow-based should not happen before a 18-month period of satisfactory parallel runs has taken place, which were visible to stakeholders

in real time, so it is possible to question prices in direct comparison to today's results. That way stakeholders can build experience of forecasting flow based prices in almost "real" conditions. There must be at least 6 months using the final version of the common grid model, since changing the grid model can have significant effects on both NTC and flow based prices. This should preferably be in the winter, when the system is usually more stressed.
2) The parallel run needs to happen with flow based and with flow based with the intuitive patch, should there be any real comparison between the two.
3) The implementation of flow-based in any timeframe should not be allowed until the solutions for other timeframes (intraday especially) has been demonstrated to be fully working in practice. Thus we expect the Nordic project to incorporate lessons from the CWE.

11 Please state any remarks or concerns with regard to the impact assessment as described in chapter 10

Please state any remarks or concerns with regard to the impact assessment as described in chapter 10:
Swedenergy is very concerned that the proposal for such a significant regulatory change, that will impact everything from the need to change/revise trading system, analytical tools, transparency and behavior of market participants are made based on estimated welfare gains that are relatively close to zero (and possible are zero when proper sensitivity analysis is performed) and very small in relation to the total value of the electricity traded on the market that it will impact. As for all simulations and socioeconomic calculations, these estimates come with some degree of uncertainty. In this case, it seems reasonable to tentatively conclude that the gains are not significant, and there could be severe risks to the price formation and the markets.

In our view it is premature to make a decision based on the material of 16 weeks using not the final tools, the final decision to implement (or not) should be made after a successful uninterrupted parallel run of 18 month on the final grid model, as described above. In addition, the alternative CNTC has not really been properly assessed. So the comments below are non-exhaustive:
• There must be several uncertainties in the reported calculations. However, the reported material do not consider any real sensitivity analysis, providing a convincing case that the rather small (relative the market size) welfare gains are indeed robust. Given that the reported welfare gains compared to the market size are very small it must be shown that the gains are positive within the error margins. It is probable that considering the errors we may have zero or even negative welfare changes.
• No proper assessment of the CNTC-alternative has been performed.
• As the CWE are running with flow based, the intuitive version, Swedenergy finds no reason to deviate from that. Such deviation would hamper market integration and create unnecessary transaction costs for market players that would want to act cross border CWE and the Nordic market. The impact assessment should then include a welfare assessment with an intuitive version of the flow based capacity calculation. The impact assessment more or less assumes that the non-intuitive version of flow-based is what has to be shown. This is remarkable considered that CWE has opted for the intuitive version reasoning like this:
a. the FB "intuitive" only decreases the day-ahead market welfare while it does not bring any good property to the models; Choose the non-intuitive version
b. The stakeholders have a preference for ATC like properties which exist more often in "intuitive". Areas involved in non-intuitive exchanges should not have to import (resp. export) with the lowest (resp. highest) price to "help" others. In addition, if the zonal size affects whether you more often are involved in non-intuitive situations; choose the intuitive version
c. With a "commodity market" point of view: A product should not be sold in another country at a lower price than the price charged in its home market. Changing price dynamics may make forecasting price more difficult; Choose "intuitive"
Apparently the second and third reasons were enough to warrant the development of an intuitive version in CWE. Given that the examples of why flow based intuitive is preferable is essentially a copy and paste of 2014 presentations in the CWE we could have expected that the project group also delivered comparisons similar to those used in the CWE region.
• The concern regarding the functioning of intraday markets, if there is a move to flow based in the day ahead, has not been properly assessed. In addition, the option to move to flow based in intraday first, should be assessed.
• Given the small welfare gain, a sensitivity analysis is crucial. The model assumes unchanged behavior of flexible hydropower-producers. This is an unrealistic assumption.
• The social welfare should be divulged per bidding zone.
• The welfare gain of flow based capacity calculation as compared to the NTC-method originates from a few weeks. An in-depth analysis should be made to investigate whether not similar results could be made by CNTC, and what was driving the results these weeks.
• Swedenergy considers that such a large step as moving to flow based capacity calculation also should include assessments of alternative solutions to grid problems (the underlying problems to be solved) such as non-commercial flows. Could these flows be addressed by modern phase shifters? What are the cost of remedial actions to alleviate problems? Moving from NTC to flow based capacity calculation is a radical step; are there incremental steps to solve problems, which would avoid a considerable change from today's system?
• Seemingly stochastic variations between area prices, created by the flow based capacity calculation, will put especially smaller market participants at a disadvantage, as their lower volume cannot support sophisticated forecasting tools.
• The Nordic market is unique as it combines 15 bidding zones with one system price which has supported the development of a financial market. Thus an impact assessment of the capacity calculation method's impact on the system price, and the forward market, needs to be performed. Just stating that the financial market is not "in the scope" (p.101 the consultation document) is clearly not enough. The minimum account would be to study the impact on these markets in CWE, and ensure that the proposed version of flow based capacity calculation accommodates the intentions of the forward allocation network code.
• Flow based capacity calculation only makes the procedures of the TSOs transparent whereas a market needs transparent outcomes. See other questions for further comments on transparency.
• The results in the Nordics show a decrease in producer surplus and an increase in consumer surplus. However, looking at the results for welfare in CWE 2014 most of the welfare gains emanates from an increase in producer surplus. This should give rise to serious doubts about the Nordic calculations, and also emphasize the importance of openness of the calculations and the necessity of real sensitivity analysis. The TSOs should be able to explain why and how this difference in the results occurs. Looking at the procedures explained in the consultation material, one hypothesis on how these results occurs is that hydro is considered, by the TSOs, to be infinite. Thus Norwegian hydro production can be increased infinitely and replace other Nordic production. That would indeed lower prices in any modeling exercise. However, this is not even remotely realistic.
• The way price formation is described in the consultation document; there would never be any risk as long as "the marginal generator" could be identified. In the TSO's world demand has no room, as little as have any changes in other conditions (fuel prices, weather, outages, political and regulatory decisions affecting cross border trade, etc). It becomes an "economics 101" reasoning, where guessing the marginal generator is all there is needed. Given the fact that new plants are not built that quickly, meaning that the "cost curve" will remain fairly stable, an observer of the industry should be astonished that companies have need of modeling and analytical employees at all. Once, the TSOs seem to reason, we have established a marginal cost curve in a bidding zone it is just a matter of using UMMs and add/deduct from the stack accordingly. Fuel costs can effortlessly be added to this calculation. This could of course easily be done by a simple excel calculation. However, price formation in a real market is far more advanced and complex (cf Hayek 1945). That is why we still have better or worse traders and

modelers. It is hardly a sufficient analysis of the impact of flow based (which we know increases divergence of area prices) to say that it is enough for the market actors to know the marginal cost of the marginal generator. In addition, it is important to understand that where the “marginal generator” is crucial. In the current setting it is straightforward to understand how competition occurs between generators in different bidding zones. In the flow based context this becomes opaque. Economics as an analytical tool does have its advantages but to use the static situation of the supply and demand intersection to explain the dynamics of price formation is clearly not sufficient. The confusion of the textbook economics description of what prices should converge to in the long run have been made a short run prescription in the analysis made by the TSO. This is even more worrisome considering that the modeling and results are taken from a period where most observers agree that we are far out of a long run equilibrium, thus prices hardly cover the full cost of generation, as the market is plagued with over capacity for different policy and regulatory reasons.
• The long run impact on investments in generation and transmission capacity has not been analyzed. With “secret” bottlenecks affecting prices in a completely different way than in the current system, the evaluation of future investments in generation capacity becomes more difficult and risky. Concerning the investments in transmission capacity, it is hard to perceive how a case for a transmission capacity increase is argued when we cannot talk about the bottleneck in clear terms.

12 Please state any remarks or concerns to what extent the CCM proposal meets the objectives in Article 3 of the CACM

12. Please state any remarks or concerns to what extent the CCM proposal meets the objectives in Article 3 of the CACM:
CACM states:
(a) promoting effective competition in the generation, trading and supply of electricity;
The negative impact on transparency for the price formation that flow based capacity calculation has, and a much more complicated methodology for the procedures of determining cross-zonal capacity may impact the relative strengths between large and small market participants.

(b) ensuring optimal use of the transmission infrastructure; and (c) ensuring operational security, and (d) optimising the calculation and allocation of cross-zonal capacity:
An optimization of capacity allocation using D-2 input data should imply that the options of flexibility in later time frames are lost. This also strengthens the case to begin the flow based calculation with the intraday timeframe.

e) ensuring fair and non-discriminatory treatment of TSOs, NEMOs, the Agency, regulatory authorities and market participants; and (j) providing non-discriminatory access to cross-zonal capacity.
The negative impact on transparency for the price formation that flow based capacity calculation has, and a much more complicated methodology for the procedures of determining cross-zonal capacity may impact the relative strengths between large and small market participants. It will also make it more difficult for customers with a hedging need to understand how and when they should hedge.

(f) ensuring and enhancing the transparency and reliability of information;
The model is to some extent a move towards a “black” box where participants are less likely to be able to forecast the use of the transmission grid using their own resources and information.

One issue often discussed regarding the flow-based capacity calculation is whether it is transparent or not. Van den Bergh et al (2016) points out that as flow-based as a methodology compared to the current NTC, is more strictly defined, thus in that sense is more “transparent”. It should be clear that part of that seeming transparency still leaves ample room for the transmission system operators to steer the results (Marien et al (2013) and thus move internal bottlenecks to the border. The latter is addressed by ACER’s recommendation per November 2016, which is only superficially addressed in the consultation documents. However, it is not conclusive that the coordinated NTC, based on a common grid model could not be almost as well-defined. On the other hand, writes Van den Bergh et al, “once the capacity allocation parameters are determined, an ATC-value indicates more clearly which transmission capacity is available to the market, compared to the FBMC parameters […]. Hence, from a market player’s perspective, the transparency of F(low)B(ased)M(arket)C(oupling) can be questioned”.

Thus a more formal version of the CNTC with more openness towards the regulators and the stakeholders of what is performed, how and why, likely would increase both “procedural” and “outcome” transparency. In the current proposal pro flow based it becomes important to weigh the positive benefits of procedural transparency with the negative costs to “outcome” transparency.

With respect to the promotion of fair and effective competition, Swedenergy is uncertain if the CCM proposal improves the competition. Transparency of procedures alone is not enough, if market parties lack understanding of the logics of the outcome. Smaller market parties will be at a disadvantage when analyzing flow based price formation, if area price differences become seemingly stochastic.

Swedenergy lack the information on how internal congestions are treated. Additionally, a description of alternative solutions such as countertrade and phase shifters, that could also contribute to align commercial and non-commercial flows, is missing. What are the cost and benefits of these alternative solutions? Swedenergy is uncertain whether flow based capacity calculation will contribute to better and more efficient investments, if market parties do not know, where the congestion is located and if critical network elements are kept anonymous.

With respect to the promotion of fair and effective competition it seems that flow-based changes the dynamics with respect to the price formation and for example increase the amount of hours with price area differences. The reasons for having zonal rather than nodal pricing are foremost to make it easier to act and participate in trade over a larger geographical area. In that sense it seems flow-based and its rather stochastic impact on prices (especially with its non-intuitive version) will increase the obstacles for smaller actors, and at least given the current information it will increase the hedging costs for stakeholders active in more than one bidding zone. This can mean that the transaction costs to act cross-zonal, which is one of the fundaments of the Nordic market with its 15 bidding zones, increases to a level where participants ceases that activity. We would have expected an analysis of these issues in the submitted consultation documents.

Indeed and in addition to the above, having the critical networks elements (the bottlenecks) secret from the market parties is a common problem cited in the CWE-region. It should therefore be a prerequisite that whatever causes bottlenecks and changes to the transmission capacity must be reported. Otherwise the underlying idea about informing market parties about changes through the UMM:s partly loses it meaning. A market party must be able to understand what it means to the market when a unit in one geographical area is having problem. In today´s NTC-world this is very straightforward. In the future flow-based world it is not. It becomes even more opaque if the generation shift keys and the PDTFs are developed behind closed doors. It is clearly a step backward if we will in the future neither know what caused a bottleneck nor where it is located.

13 If you wish to give other relevant remarks please state these here

If you wish to give other relevant remarks please state these here:
In Swedenergy's view the process leading up to this methodology, which will form the basis of the regulatory decision, has had several deficiencies:
• CNTC as an alternative solution has not been properly evaluated
• The use of the non-intuitive model and basing the proposal on that seems premature
o It diverges from the choice of CWE making market integration more difficult
o It makes the use of flow based even more opaque as the capacity calculation is now not only affecting price formation in an opaque way but also forcing flows from high price areas to low price areas
o A casual view on the data provided gives some rather large and strange price differences hours with non-intuitive flows. One example is 21 January, at 1700-1800 hours, where the result of the simulations leads to a very low rate of transmission capacity but still congestion occurs, this besides leading to adverse flows in Sweden and between Sweden and Finland. The fact that the simulations also indicate a ten folded raise in adverse flows, almost 9% of the period, is worrisome.
• 16 weeks of data produced while not using the final grid model are interesting, but not enough to base a decision on
• No real learning from what happens in the CWE w.r.t. flow based seems to be part of this process. Thus we seem to repeat all the mistakes done there.
• Swedenergy thinks a more detailed discussion of ACER's proposal, fully taking into account possible remedial actions is necessary. Swedenergy especially appreciates ACER's seeming worry of using flow based capacity calculation to move internal bottlenecks to the border.
• The stakeholders have several times commented that they would prioritize flow based in the intraday, when better information is available. This has not been taken into account despite that CACM makes no such prioritization as the Nordic TSOs have done.
• Anonymous data is not enough. It should be at least possible to publish data ex post, if operational security is the concern. Besides the project seems to have shared data with Norwegian master students (Jegleim, B. (2015). Flow Based Market Coupling (Master's thesis, NTNU. for example). While it is of course nice, that academic researchers have data access, it is alarming that market parties, where this data has considerable financial impact, have not.
• Challenges for intraday trading, if flow based optimizes the market into a corner solution based on uncertain day-2 data.
• The hearing period of a month including several public holidays is too short to make a proper statement. We therefore reserve the right to make more comments, should more issues appear.

Given the current status of the material given in the consultation it is impossible to make any informed decision on neither flow based capacity calculation nor an improved coordinated NTC. Thus to avoid damaging a well-functioning market to meet a far too optimistic timeline, any decision should be postponed until a proper decision material is available. That material should also include an assessment of a continuation of the CNTC as a method.

In the current capacity calculation method (NTC), the "coarseness" of the method in itself gives room for changes and actions intraday and in the balancing market. In itself that equalizes the weight of the day-ahead and intraday timeframe to some extent. By mathematically optimize the transmission capacity use day-ahead, based on d-2 data we will put the system on a constrained border in the flow based domain. There is no leeway for corrections. The stakeholders have repeatedly stated that this may pose a problem for system security, and that the flow based algorithm should include some margin for intraday use. However, this has been completely disregarded by the TSOs in the consultation document.

As stated, the TSOs approach the issue on price formation with a naïve view on dynamics. In particular, the view that price formation can be deduced from the static description of supply and demand begs several questions. Is there no uncertainty in the TSOs views? Is information and data the same as knowledge about fundamental relations in a market? Does a connection between short run prices and long term prices not exist?

The ACER principles have been dealt far too summarily. Just stating that the "Nordic system is so different that we don't need to concern ourselves" does not suffice as an argument. That argument could then be used against the flow based capacity calculation method or in principal anything. Rather the principles should be considered in-depth, and especially the use of remedial action must be an integral part in the capacity calculation method. To state that "In the Nordic power system, a high share of the grid constraints is located inside bidding zones, not on the border" (p 37), and then argue for the use of flow based to decrease cross border flows, completely misses the intent in regulation 714 and the ACER (2016), which is to increase cross border trade. Internal congestion should be counter traded, in the long run transmission capacity should be physically increased or bidding zones should be re-defined.

On a larger scale, all calculations should be Nordic and first we should strive for a true Nordic evaluation of all socioeconomic changes. Thus all TSOs should carry the same instructions that their actions should be beneficial for the Nordic market rather than a domestic welfare optimization. One way of solving this is to let a supranational body, for example the Regional Operating Centers, as described in the currently proposed European legislation, make the decisions on CNEs, counter trade etc. In so far that we need to avoid that the TSOs push internal problems to the border by abusing the CNEs and security of system reasons rather than counter trading this can provide increased transparency and trust in the system.

The overall idea with the flow based capacity calculation method is to align commercial and physical flows. There are alternatives to mathematical modelling. We suggest that phase shifters should be introduced as a possible solution, and that this option is considered as part of the overall solution package.

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