

Nordic CCM SH Meeting – meeting minutes

June 10, 2024, 9.30-16.00 (Hybrid event -
Clarion Hotel Arlanda Airport Stockholm and MS Teams)

Participants	
Total physical participation: 30	Total online participation: 51

Text in non-italics are comments, statements, questions or claims from the stakeholder(s), interpreted by the CCM project.
Text in italics are answers or comments provided by the Nordic CCM project.

1. Welcome and opening words (9.30-9.50)

2. ATCE methodology (09.50-11.30)

SH question: Is the second point that states that ATCE takes into account all flow-scenarios and provides more conservative capacities to manage all outcomes, a choice or inherent with the methodology?

CCM project: *It is inherent with the chosen methodology.*

SH question: Is the increased capacity in DA as large as the decrease in ID capacities?

CCM project: *In general, you have more 'trade' and capacities in DA than ID which is why we should maximize the capacities for DA and then distribute the "left over" capacities for ID. The CCM project has not analyzed the impact for ID since the continuous ID trade is not part of the current EPR.*

SH question: How do you define trade? Trade for me is when we trade from cost efficient capacities to where prices are higher? We get more flow but that doesn't mean we get more trade. Counter intuitive flow does not increase the trade. So do we get more flows or more trades?

CCM project: *We will get more volumes of production, higher net-positions. What we know is that flow-based will increase SEW whether that is due to increased flow or trade doesn't matter.*

SH question: Can the potential cost (loss) of smaller capacity (conservativeness) vs. gain of more operational "security" be measured?

CCM project: *We are looking at what the physical capacities are and how much we can provide in ID and how much we need to keep to ensure operational security. It's a tradeoff between these two. We need to look at the broader scope, it is not just the methodology that is changing but the physical flow as well that we need new tools and methods to handle.*

SH comment: When using the NTC methodology there is no conservative measure for cut 2 in Sweden. With flow-based we now have long periods of no capacity at all. If one believes that Finland will solve this you are wrong, there will be flows going south and thus setting 0 capacity in both directions is not okay.

CCM project: *The EPR provides a common ground on these sorts of scenarios. How they can occur and how can we handle it. We will look further into this together with the balancing perspective.*

SH question: Imagine a scenario where you have an increased load in the south of Sweden or a loss of production, for instance Ringhals 4 in the later hours of the day in DA and you are nearing trading hours. Where would support for such a change come from if you cut the stability to go from north to south? Is everything going to come from Norway to support in that case?

CCM project: *If there is a disturbance on a big production unit in the south of Sweden we need to replace that with some reserves which we have in the south of Sweden and other Nordic countries. It is also possible to import from Norway, Denmark and south of SE4 to be able to replace the production that has been lost in that case. If we have a disturbance, capacities and the load-flow will change and therefore we need to both look at n-0, and n-1, in order to understand what happens after a disturbance. It is important to analyze and discuss how the intraday and balancing market will operate with the new ATCE capacities which is ongoing during the EPR.*

SH question: In the hybrid flow-based method that the Core region implemented last week, they now update the capacities in ID again and they use a more updated Congestion Forecast model. Instead of taking the D-2 congestion forecast which is used for the flow-based day-ahead calculation they do another calculation using an updated model in the intra-day at 10 AM. They plan to develop this even further. For instance, when entering the day of operation, a same day congestion forecast of the grid will be used. This will be implemented in stages. Is this something Nordic CCM plans to do?

CCM project: *Our intention is the exact same. We also want to implement this in the Nordics. Creating a common grid model for D-2 is quite an effort and not an easy task. Creating a CGM for D-1 is yet another hard task. We are in the process of doing that and as soon as a D-1 CGM is ready, and the quality has been validated it can be used for re-computation of ID capacities. Likewise, during the ID time frame, a CGM will be created which will also be used to re-compute and reassess ID capacities.* **TSO comment:** According to CCM Nordic we are obliged to reassess the grid model, D-1 and ID CGM, before IDA2 and IDA3. So, it is a given and what we are working towards, however it will require also to handle negative ATC and negative RAM in the IDAs.

CCM project: *A further explanation to why there are so often constraints to the North is to understand the loop flows. Always when there is a flow in the direction towards NO1, and there are changes made in net positions. e.g. a bit more wind tomorrow in Denmark and in the southern part of Sweden, then one would want to adapt this forecast to hydropower in the north. This is something that is currently not possible with NTC. However, it is possible when you go to flow-based, because one can take into account the grid and the loop flows. That is a change going into flow-based but we also need to understand that is actually how the physical grid works. It is to be overloaded if you are in NTC and actually change these flows to the north. Stepwise we need to take more details into account in the capacity calculation to make the power system more efficient.*

SH question: Today's model is made with a judgement call by looking at the totality of the DA flow versus the NTC and the difference essentially becoming the ID capacity. If the flows were on the totality on all those, of course the system would break down, but the likelihood of that happening is extremely low. My question is if this high utilization is sufficiently explaining these instances where we essentially see the Nordic grid being cut into two or three regions in ID that are not able to trade between themselves. Is that system secure and is there not some judgment to be made about probability even in this model? The market needs to know whether it can use the market tradeable tools from DA to adjust their own portfolios and the system needs or if they can't. In the moment some of these results would suggest that you cannot trade in ID to help yourself or to help the system. You might be able to do it elsewhere but not in the regular competitive market.

CCM project: *Both the model and the market are changing. We have more kinds of flow in different directions, and we need to have tools to be able to handle these sorts of outcomes. It is important to understand what sort of scenarios we might face and how often and understand how much capacity we might need to reserve and how much we don't need to reserve. This is a change that is being addressed throughout the EPR.*

SH question: What happens in the balancing market? Have you looked into the implications of this on the balancing market such as volumes, prices and costs?

CCM project: *Related analysis is ongoing but not done. It's important to understand the whole picture and whole process. Other projects besides the implementation of flow-based also have an effect on the balancing market such as 15 MTU and automatic reserve (mFRR EAM) and thus we will look at the results from all these projects to understand the entire process and effects on the balancing market.*

SH question: In what way do you think ATCE calculation will affect mFRR volumes compared to NTC?

CCM project: *We will talk later today about this related to different case studies.*

SH question: How does this take into account the likelihood of flows? (regarding the section of remaining capacity available for ID)

CCM project: *It depends on what kind of NTCs we include in this problem. Today in ATCE methodology we allow the NTC capacities to be completely free regarding direction. In regular NTC methodology we make some assumptions that the flows are going in certain directions therefore it is possible to some extent prioritize the direction. In ATCE we allow all directions to consider all possible scenarios. Thus, a way to make it more in line with today's method would be to add constraints on what kind of NTC's we are looking for. But we haven't done this due to us wanting to ensure that all the operation security limits are fulfilled.*

SH question: The choice of a non-linear multiplicative objective function is questionable. We raised this question two years ago and received a response stating that Nordic RCC tried their assumptions about optimizations and ended up with the current multiplication. Now that you have the simulation results are you more confident that it is a good choice considering that it could potentially affect borders differently? Weighing the borders was two years ago considered to be too complex, is there now a desire to introduce weights to avoid discrimination?

CCM project: *We are confident in the non-linear optimization function and believe it works well. Regarding the second question, all the borders are treated equally in the optimization function, they are not weighed. Thus, we see in the results that different borders get different capacities which is a result of the CNEC constraints which impact the CNECs differently. There is different available RAM left for ID on different CNECs and therefore the borders themselves get different capacities. We have discussed if we should introduce weights, but we want to avoid that and continue to treat all borders equally in the optimization function. It is difficult for TSOs to start introducing weights to prioritize some borders over others.*

SH question: In the DA, based on how you have set the parameters it is detected that a CNEC is at its limit and thus this consequently leads to a reduction of capacity or non-availability in ID. What is then considered for remedial action? Isn't there any remedial action that can be considered that would make a relaxation in real-time and shouldn't that relaxation be considered before the ID ATC capacity is considered? Because it seems to me that DA results become dictating with any possibilities going forward.

CCM project: *Remedial actions are already considered as a part of the flow-based parameters. They can allow more market flow on the CNECs. We use the same parameters for the gate opening in DA and ID. If there are any remedial actions available for DA they will also be considered for ID. But if the DA allocation already used up the RA or the margin is 0 then there is no RA left for ID.*

SH question: How did you arrive at the 2% relaxation on PTDFs?

CCM project: *The previous setting was 5% so we set all the zone-to-zone PTDFs below 5% to 0% but then the TSOs analyzed what kind of overloads would occur. The overloads were deemed to be too high, so we started looking into levels under 5% that were acceptable in terms of risk for operational security and that is how we ended up with the current value of 2%.*

SH question: Is the PTDF relaxation explained in the methodology?

CCM project: *Yes, please refer to the published document: https://nordic-rcc.net/wp-content/uploads/2024/04/ATC_Extraction_Description_20240425.pdf*

SH question: Then it is internal to the solver/tool? So, no update to the market will be published in terms of "results" (Actual relaxations?)

CCM project: *The relaxation parameters are the inputs to the ATCE tool. The published ID EPR data are already considering the relaxation parameters.*

SH question: I would want to further understand what you are implying with relaxation. You are allowing this relaxation which is creating arbitrage, now is this a good thing or a bad thing?

CCM project: *It's more important to increase ID capacities and we do not yet know how the bidding and usage of arbitrage will look.*

SH question: Going forward the power system will evolve, for instance more renewables will be introduced. What do you see are the possible consequences of implementing flow-based in a constantly changing power system?

CCM project: *Together with a changing power system the flow-based methodology will also change and be developed. This is a first step in the development path that we have for capacity calculation. We are working on continuously improving the methodology for ID as well as for all other time frames.*

SH question: Arbitrage is permitted in the market as long as you do not do it systematically. The real concern is if there will be a restriction to capacities to try to resolve the potential risk of someone trying to systematically use arbitrage? The concern would be if there was a limitation of capacities in either direction on this basis. The primary need for the market is not arbitrage but changes in the portfolio. The reason why we have increased arbitrage is because of the optimized flow-based intuitive model that drives forward a lot more non intuitive prices. We have a ratio of 80% between SE1 and SE2 in some weeks. So please consider not limiting the ID capacities because of this possible misuse of arbitrage.

CCM project: *The arbitrage possibilities will not be prevented and thus the capacities will not be set to 0.*

3. CCM Weekly process on ID during EPR (11.30-12.00)

SH question: Where do I find the ATCE results?

CCM project: You will find the ATCE results for the different weeks here: [Simulation Results - Nordic Regional Coordination Centre \(nordic-rcc.net\)](http://Simulation Results - Nordic Regional Coordination Centre (nordic-rcc.net)).

4. General trends of historical data (13.00-13.30)

SH question: Did you take into account the borders when calculating ATCE imports and did you perform a hop-to-hop analysis?

CCM project: We have also looked at the borders, but we chose to present the trading possibilities from bidding zone perspective to other borders instead. Regarding hop-to-hop analysis we will get back to you later.

SH comment: You are comparing the whole possible trading space with what actually occurred which is not a reasonable comparison. There can be a need to move from SE2 to SE3 and instead the possibility to move from SE2 to SE1 can exist, but that is not the need. Let's say something happened in SE3 and I want to balance my position and I am interested in ID between SE2 and SE3. It doesn't change the market or improve the market if I have capacity between SE2 and SE1 because that is not needed. In this situation what is needed is capacity from SE2 to SE3. You compare the whole possible trading space where's I am looking at what is needed at this hour.

CCM project: What you are interested in is the opportunity to actually trade something. If you have either import or export capacity in/out from an area, usually you have both, you are able to do the trade that is needed. We cannot state the need for capacity from a certain border. What we are trying to provide is as much capacity as possible and we are trying to provide either export or import capacity to all the areas.

SH comment: I understand that but then you need to compare the ID capacity with what is possible today with the NTC methodology. You can't compare the actual trades done with the total capacity.

CCM project: What we did was compare it with the actual capacities today but to further illustrate that, there is no point having 10 000 MW of capacity if you only use 1000 MW. We have tried to illustrate that in most cases with ATC capacities you would still have enough capacity to trade with based on the needs of today. The realized ID trades are the physical reflection of the market participants' trading needs. This is the closest we can get to illustrate how ATCE would facilitate today's trading needs.

SH comment: This does not make sense because you are not comparing today's trading needs with the capacities you are given. You are just saying that the total trade then is compared with the total capacity given now. But that may be capacity in a direction I am not interested in.

CCM project: We need to clarify what we mean by needs. In our understanding what you need is a balancing service. Whether it comes from SE2, SE3 or SE1 doesn't matter. The ID time frame does not work in a way that allows people to state with whom or where you want to trade.

SH comment: I am not saying that is how it works. I am saying that you are comparing trade that happened because of a need with the total capacity given. If you are talking total capacity given, then you need to use the NTC numbers in that case.

SH comment: It does matter where the trade can be made. We are dealing with maximum welfare optimization. Therefore, it will matter if you are short of capacity in a position and if you can trade with the bidding zones that have something to offer which is price efficient or not. Your volume might be covered but it won't be the most efficient for the market participant or the welfare and probably not for the system either.

It would be interesting to see the distribution effects because one distribution effect you can't so far see in the statistics is that for example SE1 has an open channel to Finland. If there is going to be trade from the north to physically facilitate needs in the south, then that route needs to cover this. Couldn't this route then be overloaded?

CCM project: Regarding overloads on certain flow routes, that has already been covered in the ATCE methodology. We have taken into account all of the different ways that the flow can go and ensure that it doesn't cause overloads more than the relaxation allows. If a trade is to happen between SE2 and SE3 and it goes through Finland that the ATCE has already calculated that that is possible because otherwise that capacity would not be there at all. If we allow capacity, we have ensured it is within operational security limits.

5. Case studies on ID ATCE results (13.30-14.00)

SH question: Was the ID ATCE enough in the scenarios presented?

CCM project: Yes, as shown in the presentation.

SH question: In this case, are you adding capacities for all the different borders? It would be more insightful to show which borders the capacities come from.

CCM project: Yes, we are showing the sum of all export borders of Finland, meaning this is the total export capacity for ID in Finland. If we were to look at border level it could look like there is a border without any capacity even though you are able to trade around it in order to trade from one area to another.

SH comment: But then that would be shown somewhere else. It's of course a bit difficult to visualize. It might actually affect some other borders.

CCM project: In this presentation we are only focusing on Finland. When looking at the borders out of Finland you are not necessarily showing how much electricity can be moved to a neighboring area. It is hard to state on border level if you can do the trading in the opposite way.

SH question: What is the relevance of export capacity when the power system in Finland is close to being too short on capacity?

CCM project: In the example situation we didn't need the import capacity because it had already been used in DA.

6. Swedenergy presentation (14.00-14.30)

CCM project: Are you showing ATC or NTC?

Swedenergy: ATC capacities.

CCM project: Are the imported values from ID, DA or both?

Swedenergy: ID.

NRA reflections: What we have said earlier is that we will assess the effects on the ID market and that is something we are looking into right now. We are doing a similar analysis to the one shown. The example of SE3 is a very interesting one and it would be good to hear more from the TSOs and their reflections on this as well as a detailed description of how SE3 can be handled.

Swedenergy: Does any of the TSOs want to give a reflection on SE3 now?

CCM project: Yes, firstly we believe you have used one specific hour for this example while in our presentation "Case studies on ID ATCE results" we used day average capacities that were quite stable.

Swedenergy: What do the NRAs think about a lot of volume being moved from ID to the balancing market?

NRA comment: So far, we haven't seen evidence that this risk will actually occur, we will look into it further and it is something we take seriously.

Swedenergy: The results the CCM project has shown add up, but we have arrived at quite different conclusions and therefore we need to look into this further and compare results and we would really want to show our hop-to-hop analysis to the CCM project.

CCM project: We see scenarios where we end up in more challenging situations. We also see situations where it is easier to balance the system in flow-based. The whole picture is important to capture. We welcome Swedenergy to elaborate more about their internal analysis and discuss further with the TSOs.

SH comment: The internal Swedish borders are extremely important for the functioning of the whole Nordic ID-market since they are placed in the middle of the system, and thus when forcing significant reductions on ID-trading capacity on those borders will have a dramatic impact on liquidity and trading-possibilities in the Nordic ID-market. When analyzing the impact of this you always have to look at hub-to-hub capacities and especially between those areas that are providing flex in the specific situation. In the FIN-incident 24/11 FIN imported huge ID-volumes from SE2, SE1 and Norway, whereof plenty of volumes wouldn't have been possible in an FBMC-world due to limitations on e.g. SE2-SE3 and SE2-SE1 (and in such situation just looking at FIN import capacity isn't really that relevant).

TSO question: We have to take into account that for DA trade we use the grid model D-2 and we need to acknowledge that in the ID market the prognosis of for instance fluctuations in wind and temperature changes the required liquidity that the market parties have to trade and we are working on implementing D-1 grid model for the ID auction 2 and the ID grid model for ID auction 3. Many of these worries that we see here could be targeted or solved when D-1 IGM is implemented. This could leave more capacity to the market since a D-1 model is based on actual trade instead of prognosed trade. Is it possible for TSOs to present any comparisons between these current ATCE results and capacities that are calculated with a D-1 CGM?

CCM project: Very valid remark. The target is to perform a reassessment of ID capacity when D-1 and ID are good enough. Those IGMs are a work-in-progress and the quality is not there yet and before implementing them we need to make sure that the quality is sufficient.

SH comment: Vattenfall's hub-to-hub analysis is very interesting, and it would be good to see and understand more of it.

CCM project: We will look into the hub-to-hub analysis done by Vattenfall and share further information in a future meeting.

SH comment: A solution that we need to consider is changing Sweden into one bidding area. If we did that a lot of the issues that are being discussed today would disappear. Svenska Kraftnät should look into this.

TSO answer: Bidding zone configuration is beyond the scope of the CCM project. Please follow the Bidding zone review project for the latest information.

SH comment: Very significant supply-demand flexibility in parts of the Nordic system is at risk. This will have an effect on the TSOs ability to have help in the planning stage to balance the system. It could tell much of the market to not trade in ID. This begs the question of whether this is a fair balance assessment that some are singled out? We are moving towards a system where lots of supply demand will be out of the market. We have an open free competitive market, and the ID market should not be closed. We can't compare Sweden's small bidding zones with Germany. In Sweden we have a subdivision structural congestion and let's not hinder the market to operate in the best way in those conditions. Revisit and please look at the consequences of this.

7. TSO reflection on SH presentation (14.50-15.30)

SH question: When we speak about what will be given in the opposite direction, in my understanding if we have capacity from A-B today which is utilized in the spot exchange by 70%, in XBID we will have the remaining 30% at the very beginning toward B and everything that is towards A + the already commercially allocated from A to B. Will this be given anyhow in XBID with the new flow-based market coupling? This would mean that if I have a counterintuitive flow from A to B then in the intraday, I expect to have at least the opposite flow in the intuitive direction. I want to make sure that this is true because when I think about arbitrage for me this would be the first thing I would think of.

CCM project: In today's market you provide capacities in both directions in day-ahead and let's say that 70% is utilized from SE2 to SE3. The TSOs then provide the remaining 30% in the same direction and then at least 70% in the opposite direction. This doesn't necessarily happen in ATCE because it takes into account how much capacity we can give while allowing for a maximum of this overload to occur from relaxation. In some situations, you might get no capacity given in the opposite direction if that would entail an overload in other parts of the grid.

SH question: By stating that you are only looking at the DA results because that is what is in the scope of the analysis and because that is what has been decided by the regulators it seems that you are only looking at the upside and not the downsides of implementing flow-based. The downsides of higher balancing costs are not shown in the results. How can we then compare if flow-based will generate more SEW if we don't look at the downsides?

CCM project: We have shown that we have both reduced and increased capacities in the ID market. Please note that we do not have the data for assessing the SEW in the balancing market. Once we have aligned with the NBM project that is responsible for such an analysis, we will inform the stakeholders.

SH question: If we want to minimize costs, why is the objective function of flow-based to maximize flows?

CCM project: The SDAC algorithm maximizes the SEW, which is the sum of producer surplus, consumer surplus, and congestion rent, for the entire SDAC region, subject to FB constraints. It does not aim to maximize flows. This approach is designed to enhance market efficiency while ensuring operational security.

SH question: You are stating that we don't know if the system is more robust after implementing flow-based and therefore we need less balancing?

CCM project: No. We stated that once we know more about the grids and how the flows are distributed throughout the grids, we would probably have a better view of potential overloads compared to today's system. That would in turn result in less need for balancing.

SH question: Can't we ask the Core region, who already have flow-based, if they as a result of flow-based have less balancing needs?

CCM project: The NBM project is analyzing the Nordic balancing needs. Please note that Core TSOs and the Nordic TSOs have different challenges and balancing needs. Core TSOs' experience on the balancing needs may not reflect the Nordic situations.

SH question: There are crossborder capacities reserved before the DA market. The value that is allocated to these capacities is based on the forecast of the price difference between market areas. How good we are able to forecast prices will depend on flow-based, it can for instance become trickier if there is counter-intuitive flow. Do you have any impressions on this or is this something that you will investigate?

CCM project: *The NBM project is looking into this, and we will soon have more comments.*

SH comment: I want to give some continental perspective from Core. It is very difficult to compare flow-based with NTC. We should have a holistic view from long term all the way to the balancing time frame. The bidding strategy of people bidding on spot prices and ID will change. With that said there are two things we saw with flow-based on the continent. In EPR we were testing passage from central Europe FB AHC and there was a case where France reached the 3000-euro cap in a couple of hours. The net position in France increased with just a few extra MW the results of the EPR run would have shown a couple of thousand euro less in Core which just says that if we look at the spot exchange which is normally used as the main index for all APIs this would have been a big change and it would not have triggered the cap to the spot. If you looked at the flows on all the different borders they have increased a lot with flow-based. The difference between flow-based and NTC can be seen in areas where there is a really big spike up or down then you see the max of the net position which you would not have seen with NTC. The NTC would have to stay conservatively available and allow less flexibility.

SH question: It was mentioned that as long as you can maximize the capacities for DA, ID and balancing we can assume that the welfare is also the best possible. What I find important to consider is if the combined total DA+ID capacities are being maximized for the benefit of the overall market. If you have very restrictive ID ATCE then the best welfare optimizing supply-demand shifts won't happen in the markets. Whether they will be priced equally in the balancing market is not known. It could also be more costly to start up in real time instead of planning ahead. I wonder if we have really fulfilled that totality with ATCE?

CCM project: *In DA we have maximized the capacity given to the market and it is more than what has been given using NTC. We have been more conservative in ID ATCE which is due to wanting to avoid overloads. According to the regulations, the TSOs should provide capacity to the extent possible for each timeframe. For the ATCE computation, we are fulfilling the regulations by maximizing the DA remaining capacity for the ID gateopening.*

SH question: Why is intraday SEW not calculated as defined in CACM GL?

CCM project: *When you calculate SEW you need access to demand and supply curve because the social welfare is the area between these two. When we are looking at the ID market we don't have access to bids and we therefore cannot construct demand and supply curves.*

SH comment: This data will be available as of Thursday 13/6 when the IDA auctions go live.

CCM project: *We can with this new data availability reassess the SEW for intraday if stakeholders believe this would hold some value.*

SH question: Has the regulator approved this approach as well?

NRA: Yes, it is defined in the methodology that the SEW can't be calculated for ID and that we have to assess that in a different matter. Of course, flow-based was meant to be introduced earlier so we didn't know that IDA would be introduced.

8. Unavailability information publication (15.30-15.45)

SH question: Does this mean that NTC will be used for NUCS forever or will it eventually become flow-based?

CCM project: *This is an interim solution. In the long run the intention is to move from NTC to flow-based. The publication goes hand in hand with the LTCC meaning the publication will move to flow-based one year after go-live.*

9. AOB and closing words (15.45-16.00)

All participants are thanked for their constructive inputs!

The presentations have been uploaded on the Nordic RCC website: <https://nordic-rcc.net/flow-based/stakeholder-meeting-material/>