

Report – Nordic System Price 10th - 27th November 2021

Overview

After publication of the Single Day Ahead Coupling and Nordic System Price Calculation results on 26th November 2021, a significant deviation between the System Price and the Nordic Area prices was seen. This triggered an internal analysis and investigation to determine the cause of the price difference.

Nord Pool informed the market that same afternoon that an investigation was underway, as Nord Pool had also received customer queries on this.

This investigation showed that the significant difference between Area Prices and the System Price had been caused by a configuration of the topology change (creating the virtual area NO2A) for the System Price calculation, put in place on Tuesday 9th November 2021.

The System Price had been calculated with this configuration in place from delivery day 10th November to delivery day 27th November.

Nord Pool made the relevant corrections and tested a solution on the morning of Saturday 27th November. All system prices have since been correctly calculated.

Nord Pool re-ran all the System Prices in question and published these to the market to become Nord Pool's official Nordic System Prices for the period.

Prompt communication with the market was maintained at all times to ensure transparency.

The issue

The issue was caused by a configuration of the topology change (creating the virtual area NO2A) for the Nordic System Price calculation.

The change of internal topology (requested by Statnett SF) should not have had any impact on the System Price Calculation. It was implemented to treat the flow of two external cables (NorNed and NorLink) together, instead of separately to allow a more optimal way of allocating capacity and flow to the two cables.

As the flow in both cables was already taken into account in the calculation of the System Price, this change would not have any effect on the System Price and was therefore not considered to impact the methodology.

Nord Pool's investigation revealed that the NO2A virtual area was included twice in the list of bidding zones involved in the System Price calculation. This was caused by a bug in the system, as it is not possible to enter an area twice. As a result, the System Price calculation took the flows from external areas (DE/LU and NL) linked to the virtual NO2A area into account twice.

Once identified and confirmed as the source of the issue, the duplicated NO2A virtual area was removed from the System Price calculation.

Nord Pool raised this issue as a matter of extreme urgency with its software supplier to investigate and give further answers as to the root cause.

Nord Pool's Area Prices are completely separate from the System Price calculation and remained entirely unaffected.

Only System Price affected

The Nordic System Price is an unconstrained market clearing reference price for the Nordic region. Its calculation is based on the same aggregated and anonymised orderbooks (OBK) for each of the Nordic bidding zones as those used in the calculation of Area Prices in the Single Day Ahead Coupling. In addition to the OBKs, hourly values of import and export flows of electricity to and from the areas neighbouring the Nordic bidding zones are included in the calculation of the Nordic System Price.

The System Price is calculated for the Nordic region as if it were one zone, by setting internal transmission capacities between the Nordic bidding zones to infinity. The calculation simulates a situation with endless transmission capacity throughout the Nordic grid system.

The System Price calculation is separate from the Single Day Ahead Coupling, which undertakes the calculation for all Area Prices across Europe.

Since 4th February 2014 the calculation has been using the same algorithm as is used in the Single Day Ahead Coupling – EUPHEMIA – but in addition there is a unique/separate System Price Plugin in place.

The incorrect configuration Nord Pool discovered on Friday 26th November was solely in the System Price Plugin and thus only affected the System Price calculation. All Single Day Ahead Coupling Area Prices, volumes and flows were correctly calculated.

Timeline (in CET)

Friday 26th November

12:45: Single Day Ahead Coupling market results (Area Prices) and System Price are published as usual. A significant deviation between the Nordic System Price and the Nordic Area prices was seen.

12:50: Internal investigation started. External questions also raised over System Price for delivery 27th November.

15:27: **External message** distributed - Nord Pool informs the market that the System Price is being examined to better understand the cause of the price difference.

21:42: Algorithm analysis and simulations confirm it as being most likely that the difference experienced between Area Prices and the System Price was caused by a configuration of the topology change (creating the virtual area NO2A) for the System Price calculation.

Nord Pool continued work to verify. Calculation was rerun with corrected flows from NordLink and NorNed.

24:00 Validation and conclusion that System Prices 10th - 27th November were incorrect. The Nord Pool team corrected and tested to ensure the System Price calculation was run correctly from 27th November.

Decision made to re-calculate prices to provide correct prices for the market, as soon as possible.

Saturday 27th November

00:54 **External message** distributed stating that price difference was triggered by a configuration of the topology change for NO2A – and that this affected the System Price from 10th - 27th November.

20:00 Confirmation that re-calculations will be ready for Sunday 28th.

Sunday 28th November

Ca 12.00 Recalculation completed, prices analysed and prepared for publication.

15:42 **External message** distributed including all recalculated hourly System Prices in EUR, in Excel format.

Monday 29th November

16:00 **External message** distributed - Nord Pool will change all System Prices from delivery day 10th November to delivery day 27th November 2021, across web, ftp, feed and Market Data API, to the Recalculated System Prices for the affected timeframe - these becoming Nord Pool's official Nordic System Prices for that period.

Follow up

In light of what we have experienced, Nord Pool has started a thorough evaluation of our processes, procedures and systems to ensure this will not happen again.

In-depth investigation of the System Price Plugin

The software used for the System Price Plugin, which triggered this incident, is under investigation. The topology configuration was implemented and tested in all test systems before it was put into production on 9th November. A bug, inserting the area twice in production, has been discovered and Nord Pool's software supplier is working on a permanent fix. Nord Pool and our software provider will ensure processes and procedures are put in place so that future configuration changes do not cause such an issue to occur again.

Evaluation 10th - 27th November

Nord Pool has started to analyse all our procedures and processes to see what improvements can be made in monitoring the System and Nordic Area Prices.