BALANCING MODEL 2022

User Group, 3 March 2021

Energinet Gas TSO and Nordion Energi

MUTE YOUR MICROPHONE, WHEN YOU DON'T SPEAK

SWITCH ON YOUR CAMERA, ONLY WHEN YOU ARE GIVEN THE WORD TO SPEAK

USE THE 'RAISE HAND' FUNCTION IF YOU WISH TO COMMENT OR ASK A QUESTION…

…YOU CAN ALSO WRITE YOUR QUESTION USING THE CHAT - THE HOST WILL ASK THE QUESTION FOR YOU

PARTICIPANTS

SHIPPERS

- Ørsted
- SEAS-NVE
- PGNiG ST
- Norlys
- Norlys Energy Trading
- Energi Fyn
- Gøteborg Energi
- Danske Commodities
- Shell
- E.ON Sverige
- Modity

ENERGINET AND NORDION

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EXTERNAL

- Evida (DSO)
- Gøteborg Energi (DSO)
- Varberg Energi (DSO)
- Øresundskraft (DSO)
- Kraftringen Nät (DSO)
- Danish Utility Regulator
- Swedish Energy Markets Inspectorate
- EEX
- Gaz-System
- Dansk Energi
- DTU

Agenda

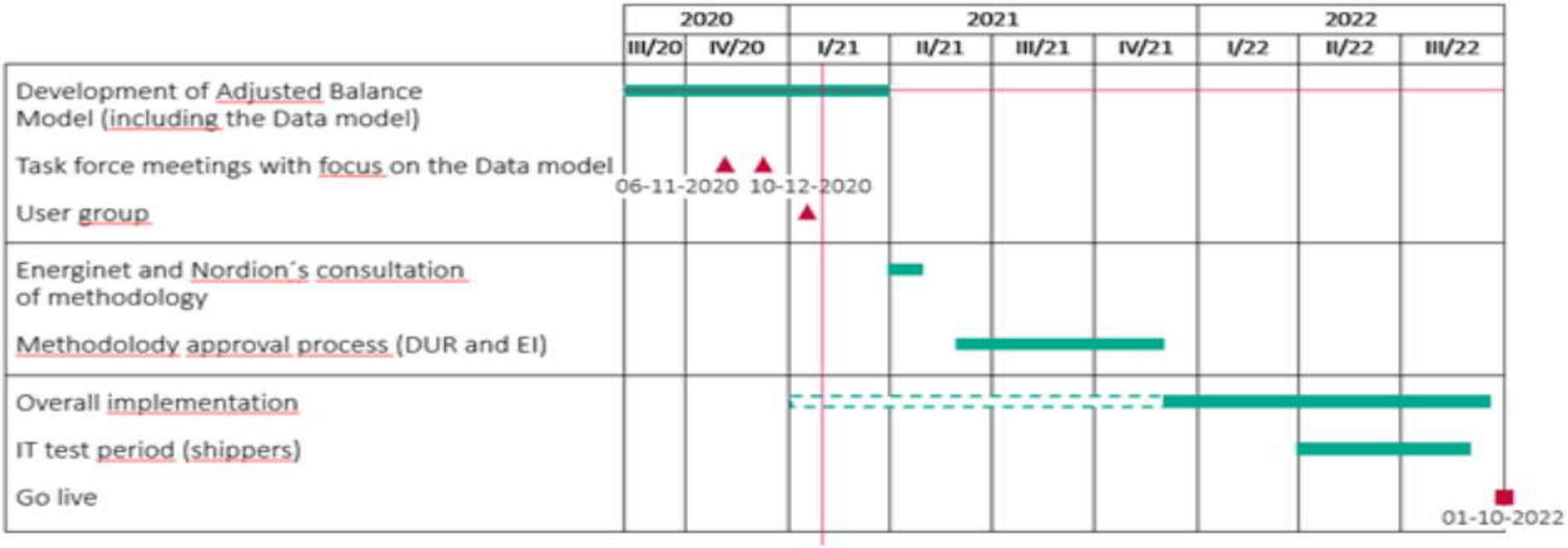
- Purpose of today's User Group
- Timelines and milestones
- The rationale for the update
- The function of the balancing model and the supporting data method
- Data quality
- Fallback and "no punishment principle"
- Smoothing
- Supporting data
- Wrap-up and next steps

PURPOSE OF TODAYS USER GROUP

- To present the ”full package” of the updated balancing model
- To present the outcomes of the Shipper Task Force meetings
- To hear your initial view of the ”full package”, before the official consultation
- To prepare you for the coming method application proces

OVERALL TIMELINE

Getting close to first official consultation



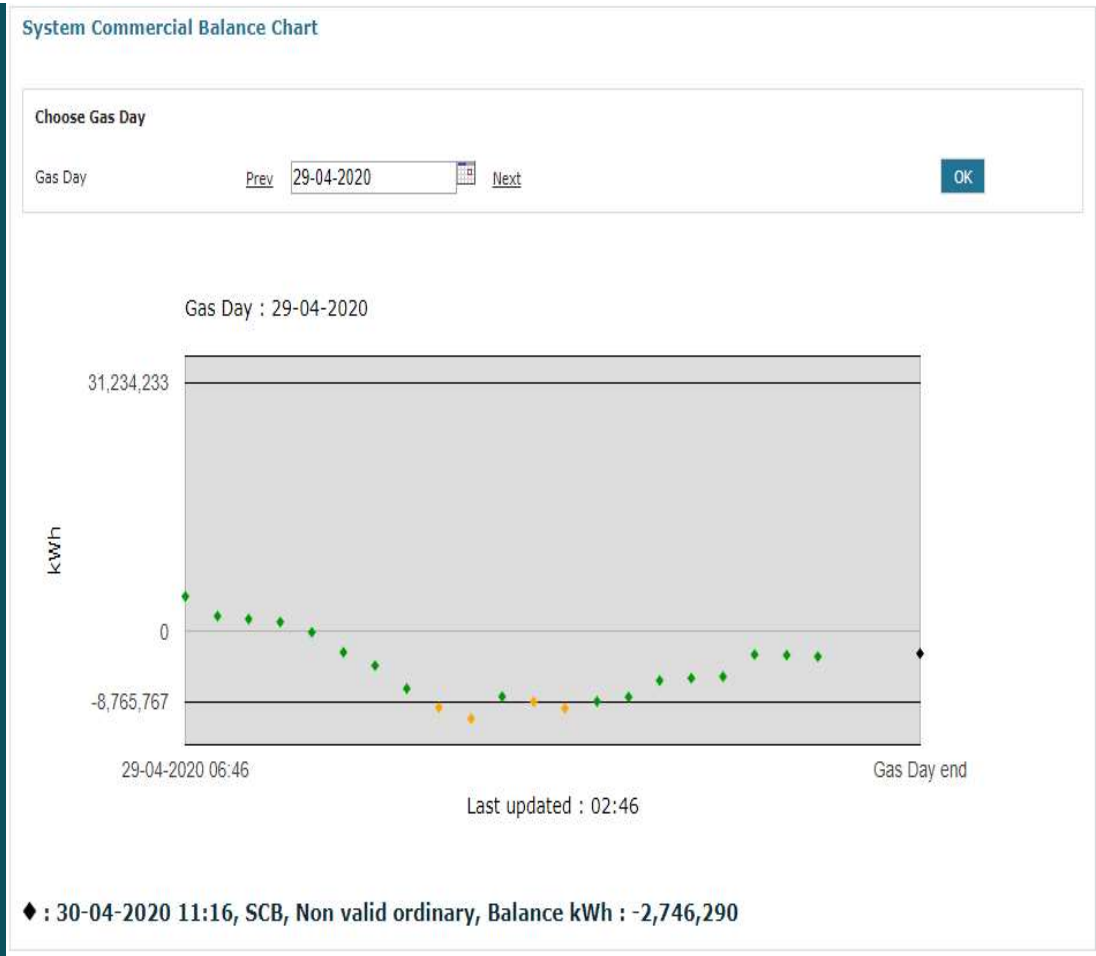
OVERALL RATIONALE

For update of balancing model

THE CURRENT MODEL

The main rationale behind the current daily balancing model with no added obligations is the characteristics and parameters of the current physical system

In short, there are no normal flow scenarios or situations, that cannot be handled in the physical system within-day, and thus there is no need for restricting shippers in their daily input-offtake during the gas day



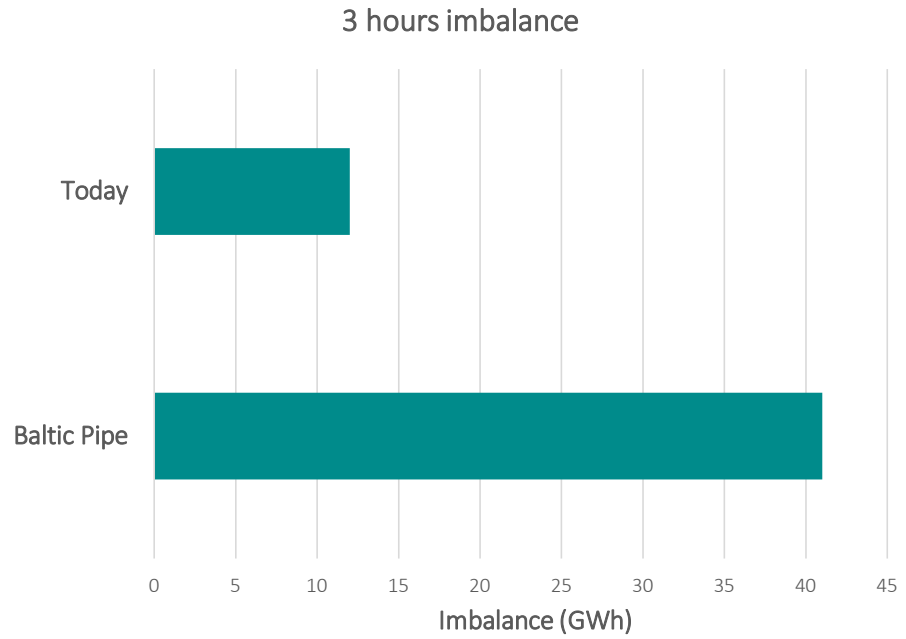
THE CHALLENGE!

The challenges with the Baltic Pipe in operation are:

- the flow uncertainty, and
- the risk of large changes in the nominations during a gas day

The impact is a potentially drastic change in flexibility.

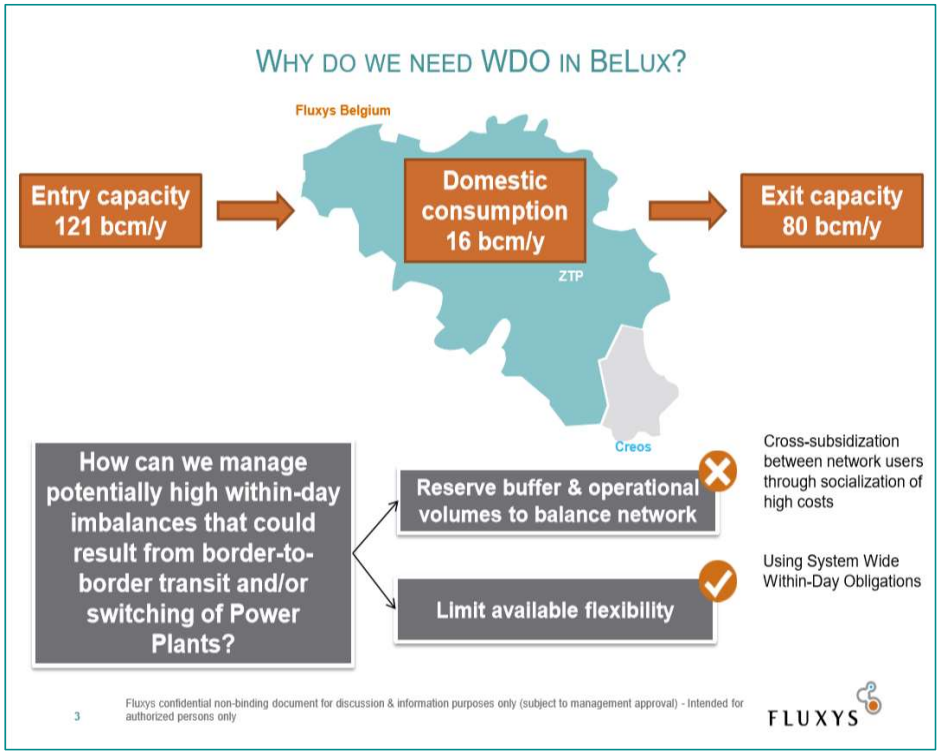
Therefore, we may need a faster reaction from the market **within day** in case of too large imbalances in the system.

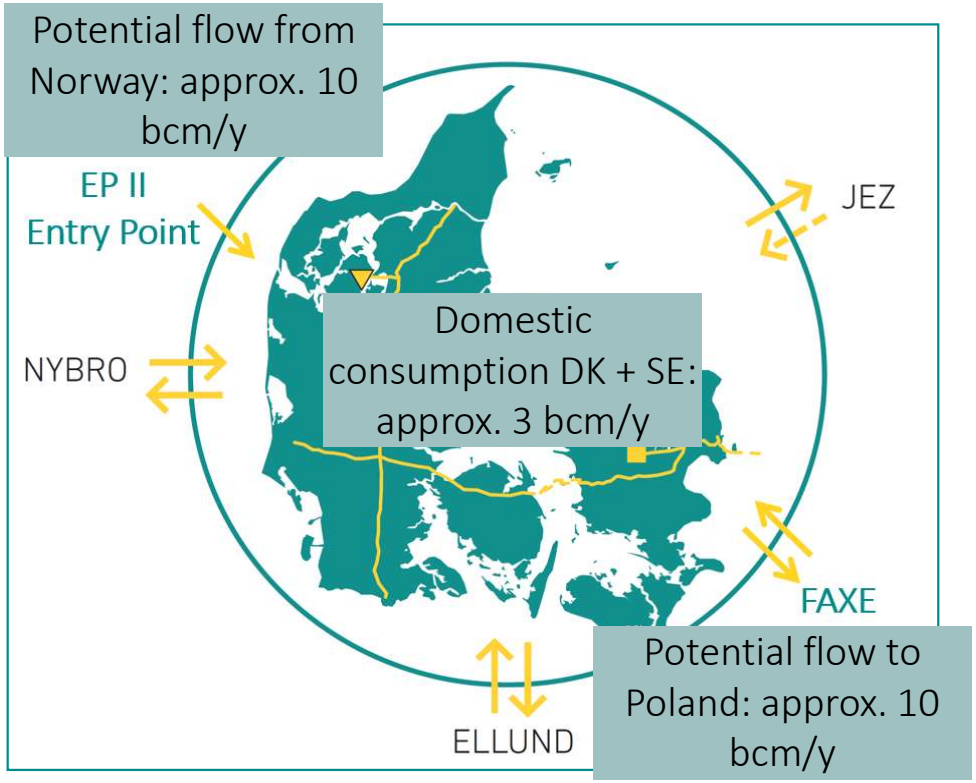


ENERGINET

WHY WITHIN-DAY OBLIGATION (WDO)?

In the past: operational tools at TSO level Today: WDO as market based instrument

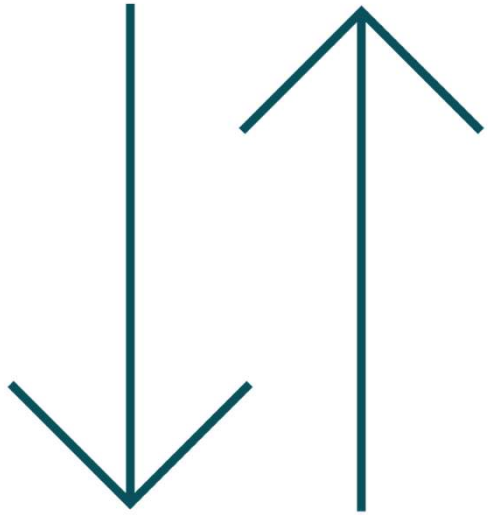




WHY SYSTEM-WIDE WDO?

The rationale behind

- The current green zone balancing system is already system wide, collecting and informing on the aggregated commercial balance position of all shippers
- When Energinet Gas TSO first implemented the current green zone model, it was very much inspired by the balancing systems in the Netherlands (GTS) and Belgium (Fluxys) due to similarities in the systems
- Energinet Gas TSO implemented a similar model, but without including the system-wide within-day obligation, as this was not required given the parameters of the Danish physical system at the time
- As the demand on the Danish/Swedish system are changing, it is a natural step to now fully implement the system-wide WDO



WHY IS THE SYSTEM-WIDE WDO PREFERABLE?

Network Code for Balancing describes 3 possible WDO solutions - Energinet Gas TSO and Nordion see a clear preference for system-wide WDO

System-Wide WDO

- Current balancing system already system-wide
- Current model very similar to Belgian system, who has system-wide WDO
- System-wide WDO secures full optimization of aggregated balancing position

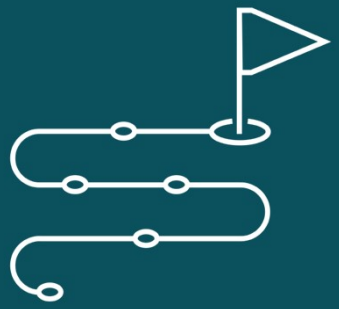
Portfolio WDO

- Can be characterized as having a ”individual” green zone per shipper
- Energinet sees a clear downside with this, in terms of creating a sub-optimal balacing model (limiting individual shippers, when there is still flexibility available)

Entry-Exit WDO

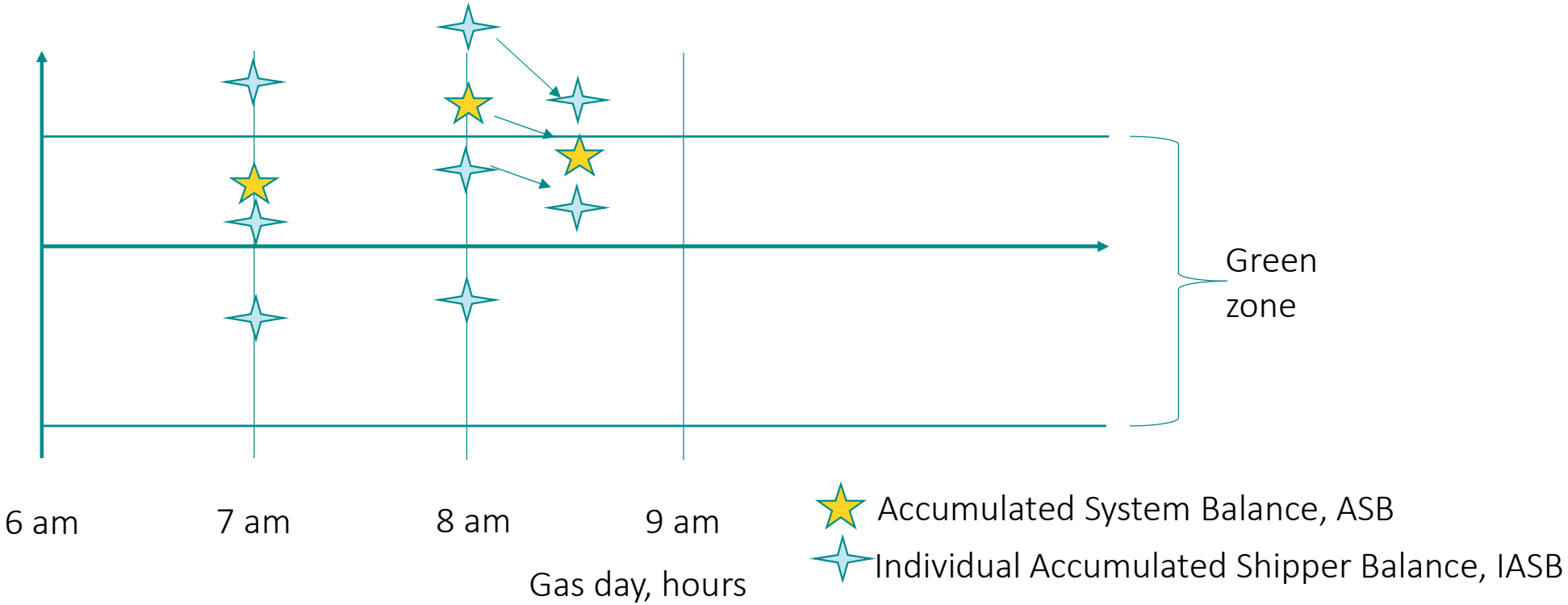
- Characterized as ”balancing between specific entry-exit points”
- Energinet’s analysis shows several issues with this WDO
- Seems to be mainly designed for systems where transit flow is relatively isolated from rest of system

For more detail, please check out the balancing Q&A at: https://en.energinet.dk/Gas/Shippers/Gas-balancing-model



FUNCTION OF THE BALANCING MODEL AND DATA METHOD

THE MECHANISM BEHIND WDO AND HELPER-CAUSER



WHAT IS THE DATA MODEL?

The data model is every parameter used to calculate ASB and IASB

The Accumulated System Balance is defined as:

$$\text{ASB} = \sum_{h=1}^{x} Entry - \sum_{h=1}^{x} Exit - \sum_{h=1}^{x} JEZ,$$

Where data for *Entry* and *Exit* is known every hour via nominations, while *JEZ* is calculated every hour via MR data (city-gate flow)

The Individual Accumalated Shipper Balance is defined as:

$$\text{IASB} = \sum_{h=1}^{x} Entry\,(i) - \sum_{h=1}^{x} Exit(i) - \sum_{h=1}^{x} JEZ(i),$$

Where *i* is an individual shipper, and where *Entry* and *Exit* is known every hour via the shipper's nominations, while *JEZ* is not known for the individual shipper

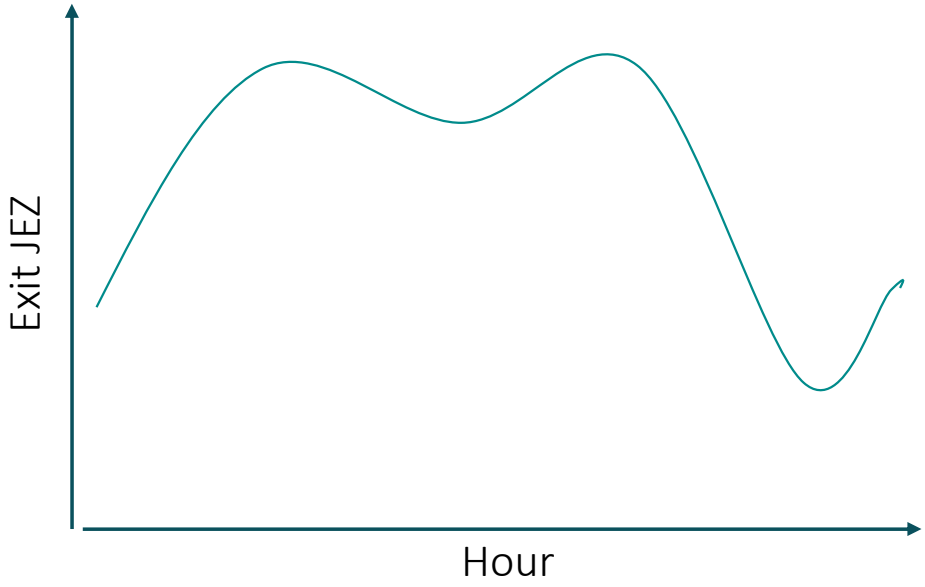
OUR SUGGESTION OF A MODEL TO DEFINE THE INDIVIDUAL JEZ PER SHIPPER

The aggregated JEZ per hour is defined as:

$$\sum_{h=1}^{x} Residual = \sum_{h=1}^{x} MR - \sum_{h=1}^{x} DMS,$$

To calculated the individual JEZ value per shipper per hour, the BAM will use:

- For DMS: To use DMS data for both Denmark and Sweden
- For nDMS: To allocate the residual based on most recent market shares



ENERGINET

SWEDEN WITH BM2022

Classification

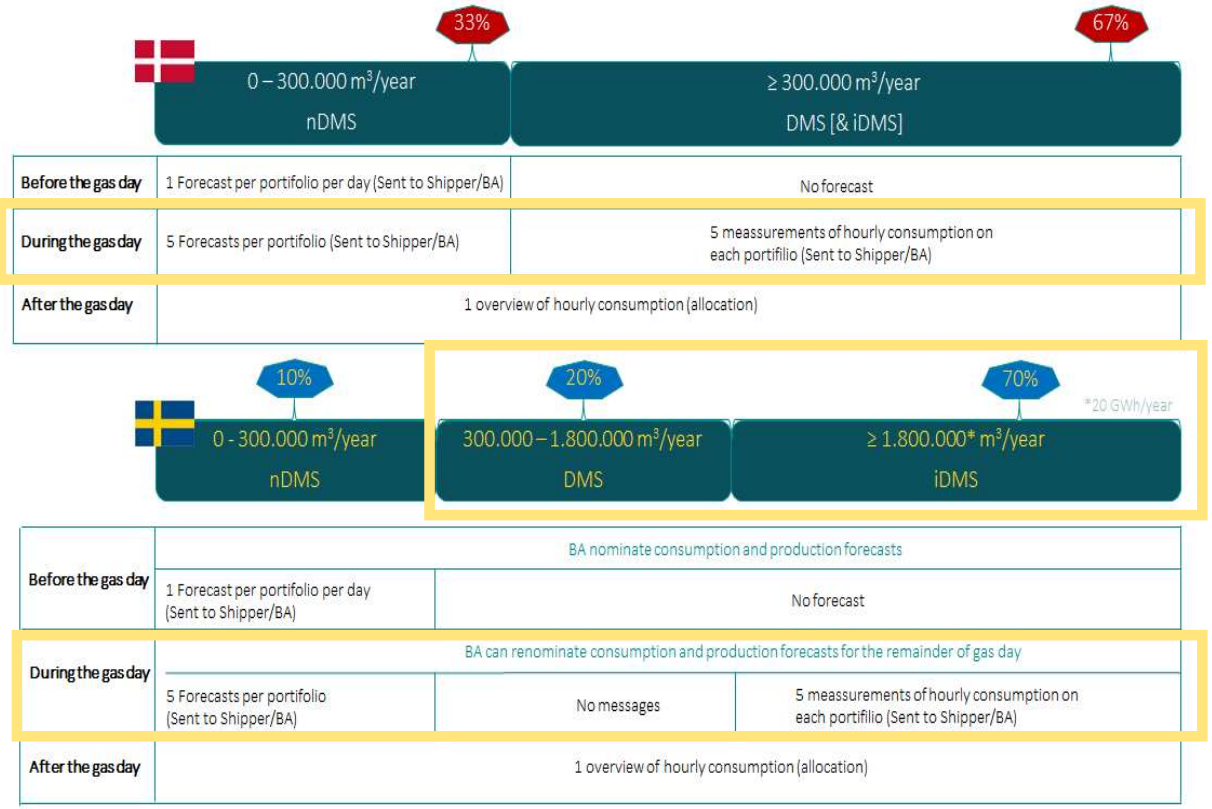
- DMS (Daily Metered Sites) = DMS (20%) + iDMS (70%)

During the gas day

- Hourly consumption every hour for all DMS
- nDMS calculated by NE/BAM

Final values

- Final allocations (DMS and nDMS) align with intra-day-reporting



THE TASK FOR THE SHIPPER TASK FORCE WAS…

…..to comment and inspire us to how Energinet and Nordion can best model JEZ individually per shipper every hour, given that:

- We are not able to calculate the exact individual balance per shipper per hour, as a large part of the market are not hourly read
- There is a trade-off between data/ data quality and costs
- We want to develop a fair model with the right incentives

WE HAVE TESTED DIFFERENT TYPES OF MODELS

Overall, the different types of models can be grouped as: ”HMC-model” and ”Continuous collection of DMS-data method”

Use the current level of data

Other internal tested models

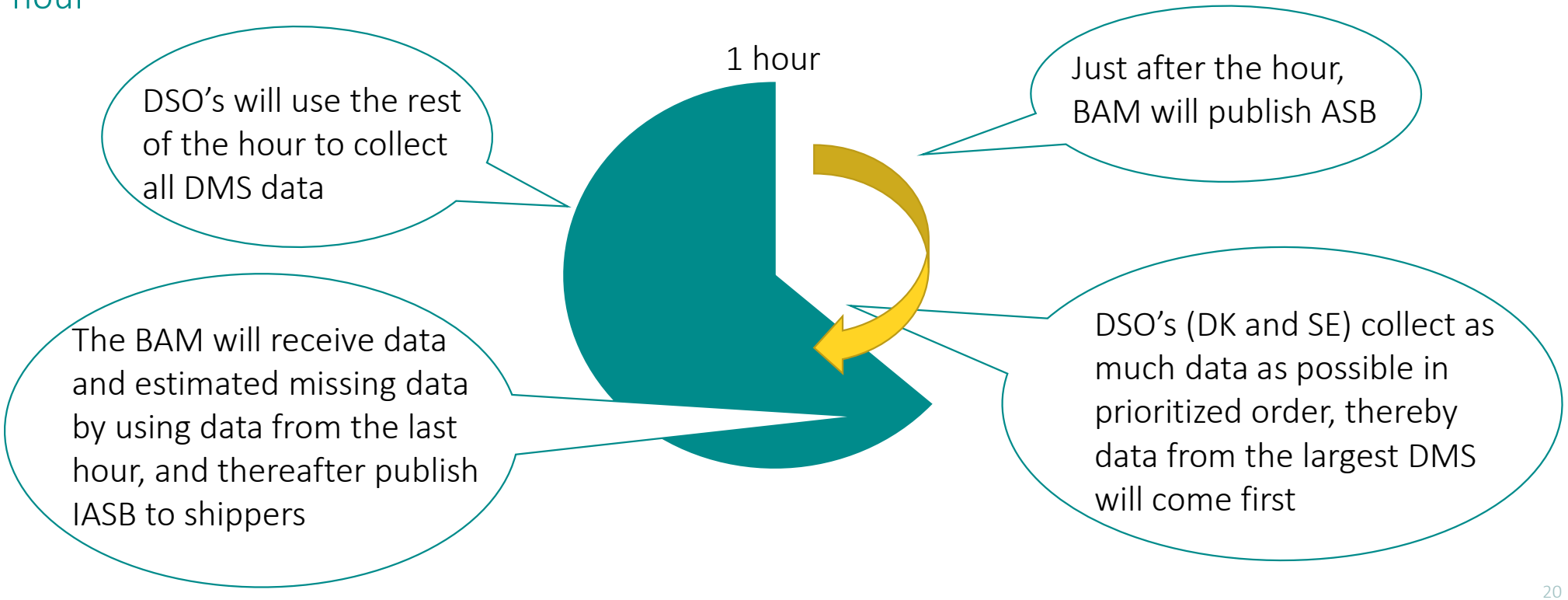
Our current best suggestion

100 per cent estimation and no investments needed

100 per cent real time data and most investment intensive

OUR SUGGESTION OF A MODEL

Non-stop collecting of DMS data and estimation of missing data by using data from last hour



OUR MODEL SUGGESTION

During the day, the data will be more accurate as the part of estimation will be smaller compared to all the accumulated data

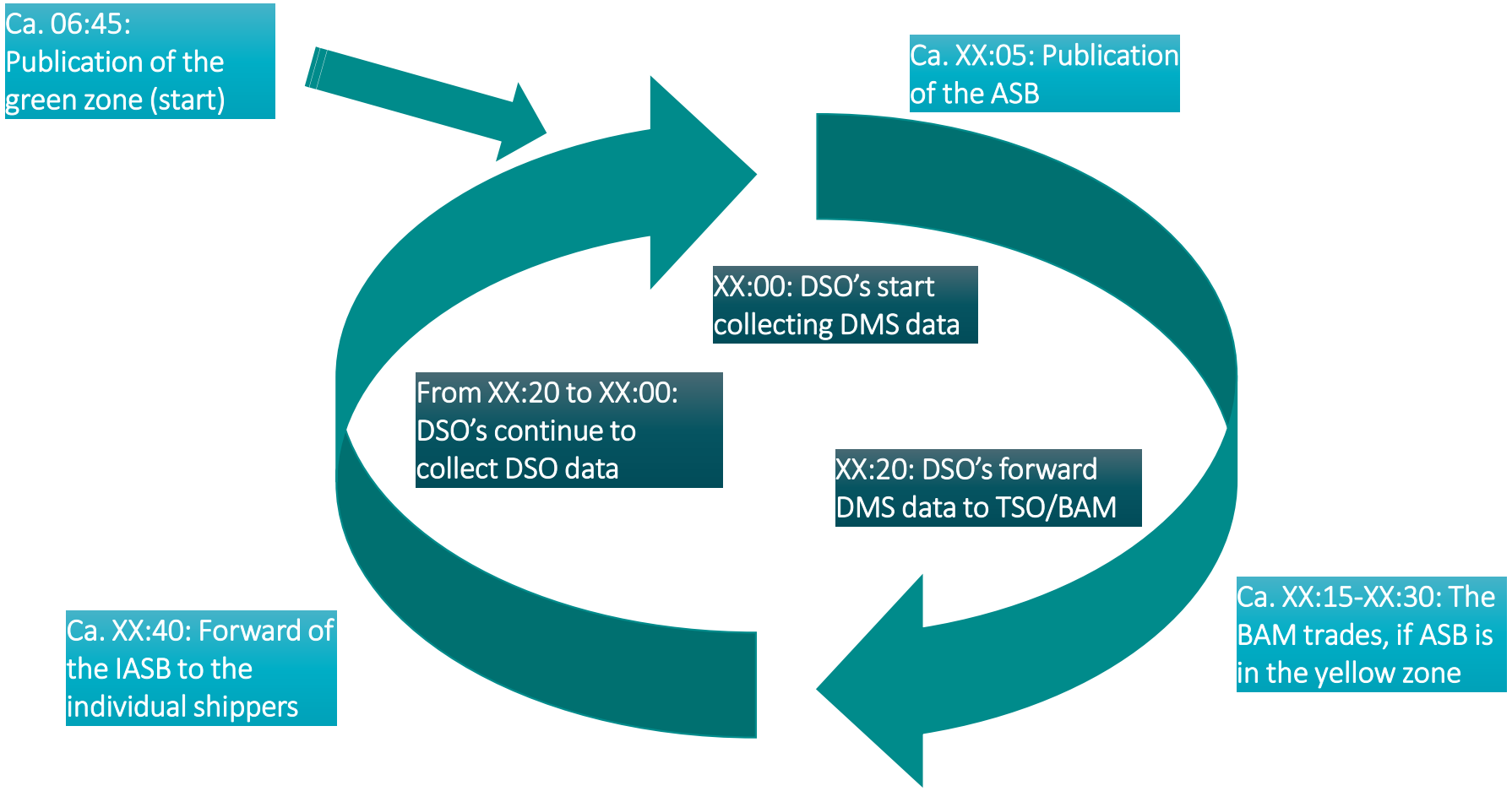
The assumption is:

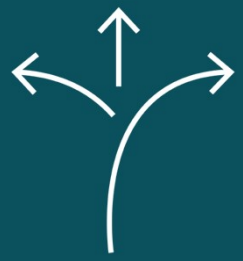
- The process of collecting data shall run every hour 24/7

Benefits are:

- Well known parameters
- Use nearly real-time data
- The model is suited for a future where hardware to collect data will be modernized

HOURLY PROCESS DURING THE GAS DAY





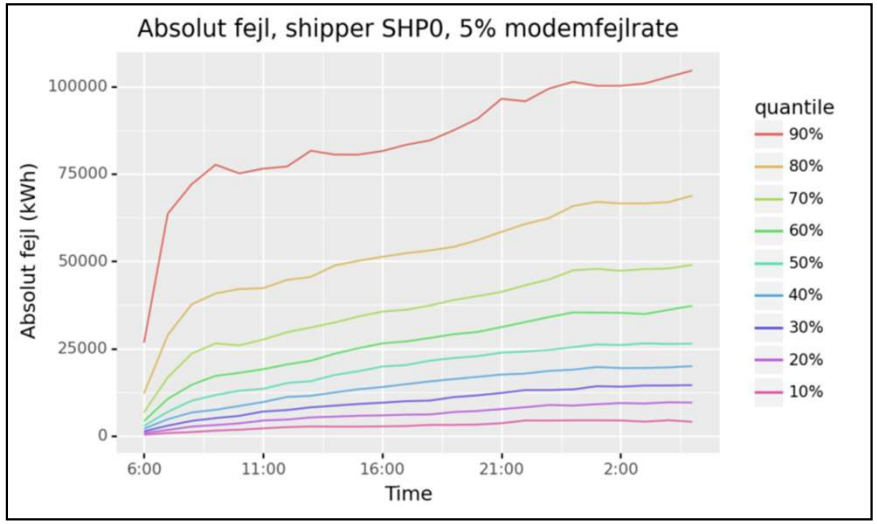
- DATA QUALITY
- FALLBACK AND ”NPP”
- SMOOTHING

DATA QUALITY

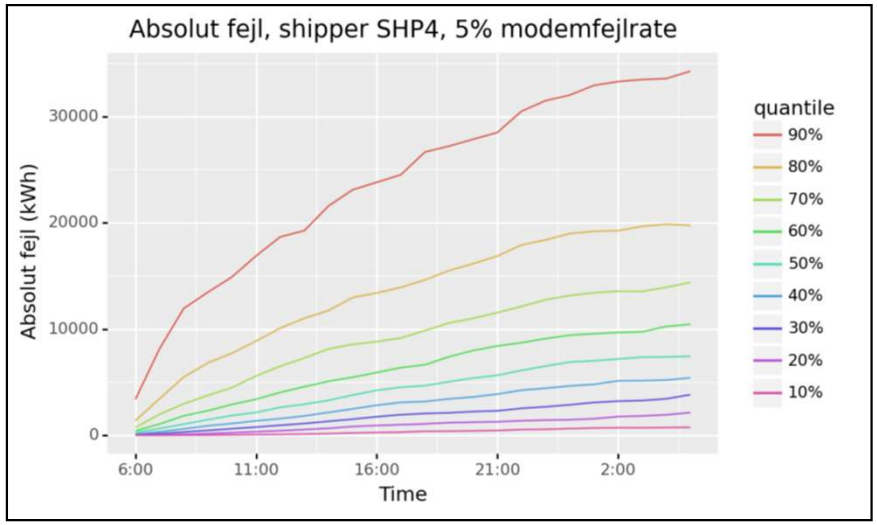
Overall principle

- General percentage per hour
- Based on DMS and MR data
- Indirectly affecting nDMS (as DMS is component)
- Preliminary DMS and MR values compared to actual DMS and MR values after the month
- Not recalculated in correction rounds
- Expected data quality level for DK and SE: 90-95 per cent, and possibly higher
- We expect the data quality to be lowest in the beginning of the gas day, increasing during the gas day due to more hours and thereby more data
- Will be used as threshold for NPP (see coming slide)

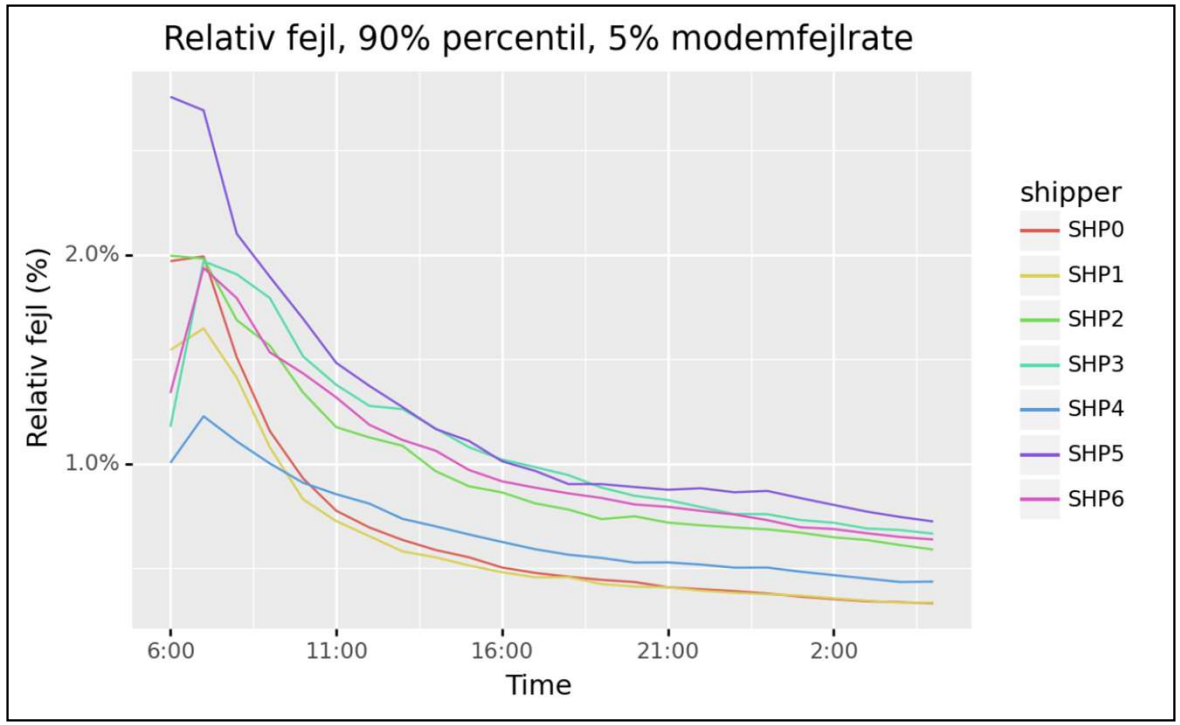
ABSOLUTE ERROR – LARGE SHIPPER (36% MARKET SHARE)



ABSOLUTE ERROR – SMALL SHIPPER (6% MARKET SHARE)



RELATIVE ERROR - ALL SHIPPERS



FALLBACK AND ”NO PUNISHMENT PRINCIPLE”

Fallback principles

- Fallback data on BAM level, to secure that some data will always be available
- Main principle: fallback based on latest received hourly data

“No punishment principle”

- In case that data is lower than data quality threshold for a given hour, and the BAM has traded in the yellow zone in that specific hour, the causers in JEZ are settled at the **neutral gas price**, in stead of the marginal price

DATA QUALITY IN DENMARK

Investments in new meter equipment at Evida can improve data quality – but at a cost

Current strategy:

- Change equipment when needed
- Improved data quality over time
- Overall data quality for DK is considered as high
- Downside: Potential regional differences in quality
- Upside: cost: 0 DKK

Segmented strategy:

- Change certain equipment, based on volume and predictability
- Improvement of data quality
- Upside: reduce regional differences to a minimum
- Downside: extra cost: 3-6 mio. DKK (depending on exact strategy)

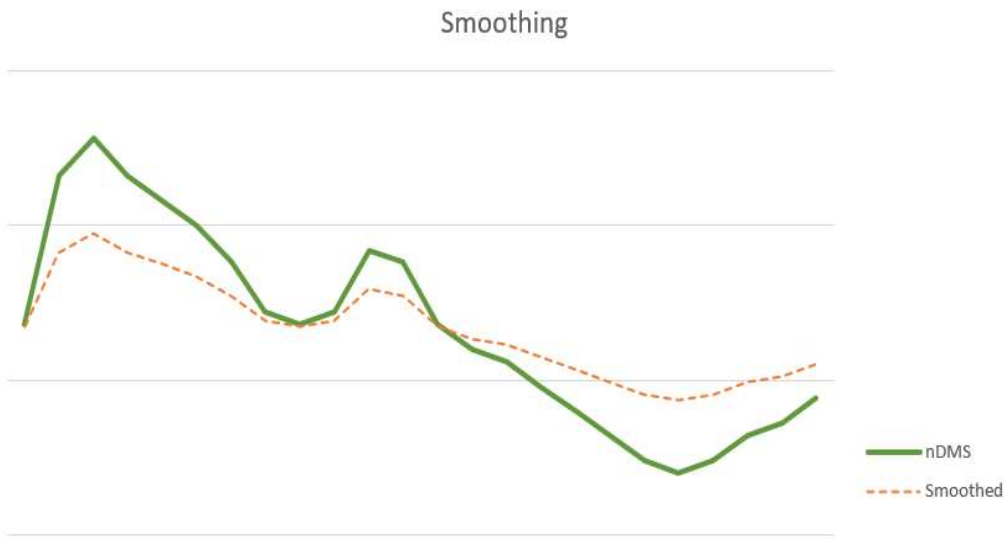
Full replacement:

- Full replacement of old equipment
- Improvement of data quality
- Upside: regional difference diminished
- Downside: extra cost of approx. 15 mio. DKK – and investment in costumers, who will possibly leave the market in a few years

SMOOTHING THE NDMS PROFILE

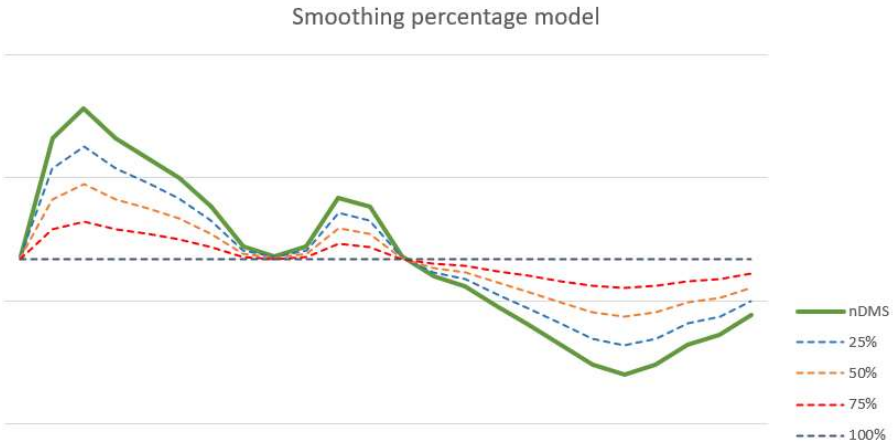
By smoothing, the TSO smooths the nDMS allocated throughout the gas day

The smoothed dataset for nDMS is used for balancing only. Thereby the smoothed data will not be used for final allocation after the gas day

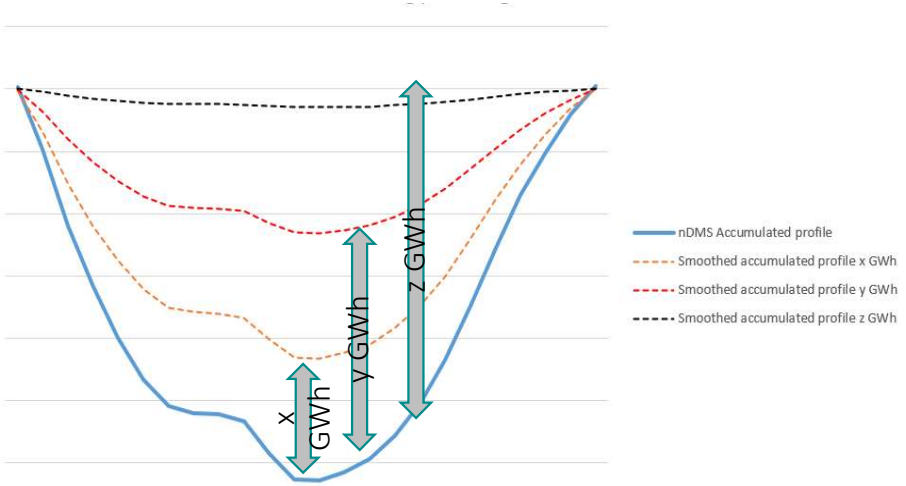


TWO SMOOTHING MODELS CONSIDERED:

Smoothing percentage model



Absolute smoothing model



The absolute smoothing model seems to be easier to explain

WHICH IMPACT DOES SMOOTHING HAVE ON THE GREEN BAND?

Random checks on individual gas days on 2019 data has shown that reduction in green band by introducing 100 per cent smoothing is approximately 10-15 per cent

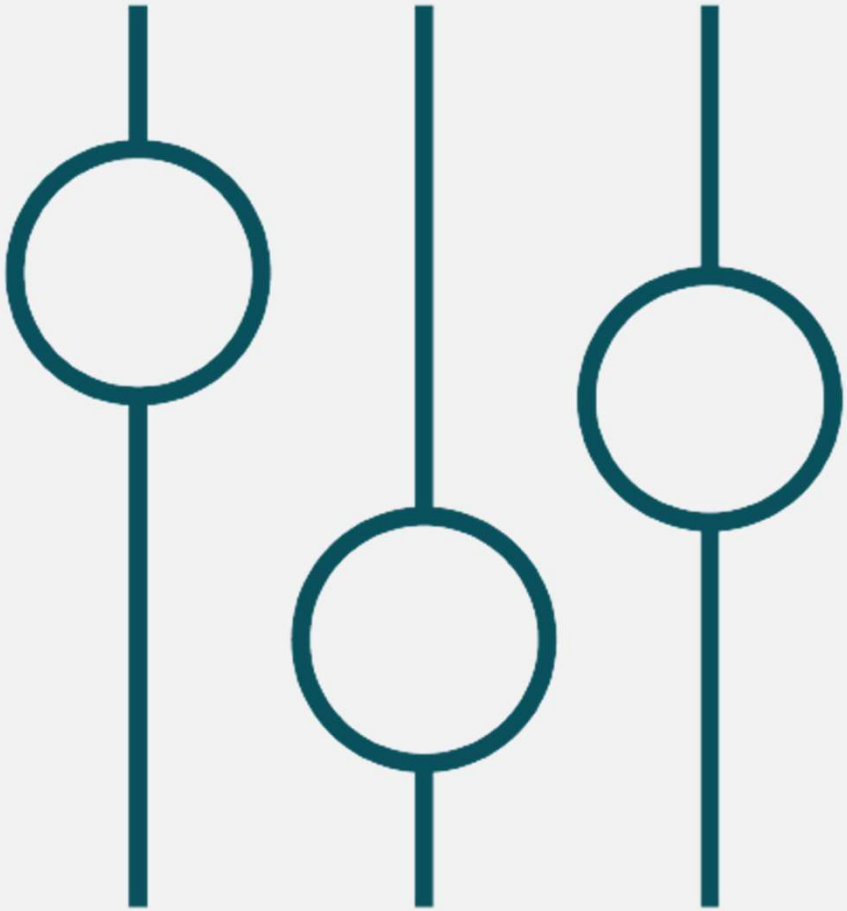
This number can change with:

- The size of the green band with Baltic Pipe
- Actual flow situation
- Weather conditions
- Consumption rates

CONSIDERATIONS ON SMOOTHING

- Shippers towards JEZ will experience a downside compared to the current model, in terms of delivering a profiled entry (higher tariff costs) – no change for other shippers
- By introducing smoothing, this downside is reduced
- Shippers that are active towards JEZ have a clear preference for smoothing (Shipper Task Force)
- Smoothing is used in Belgium and The Netherlands

Energinet and Nordion suggests to introduce smoothing via absolute smoothing model at a high level – up to “full smoothing”

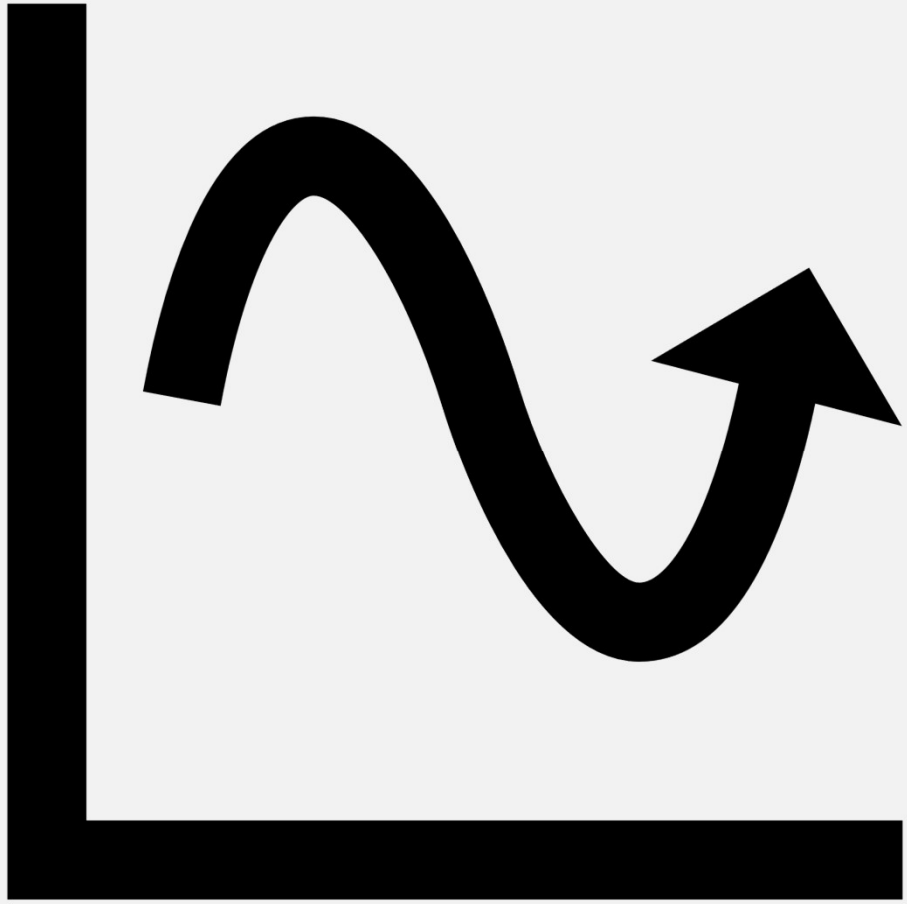


SUPPORTING DATA

Shipper request

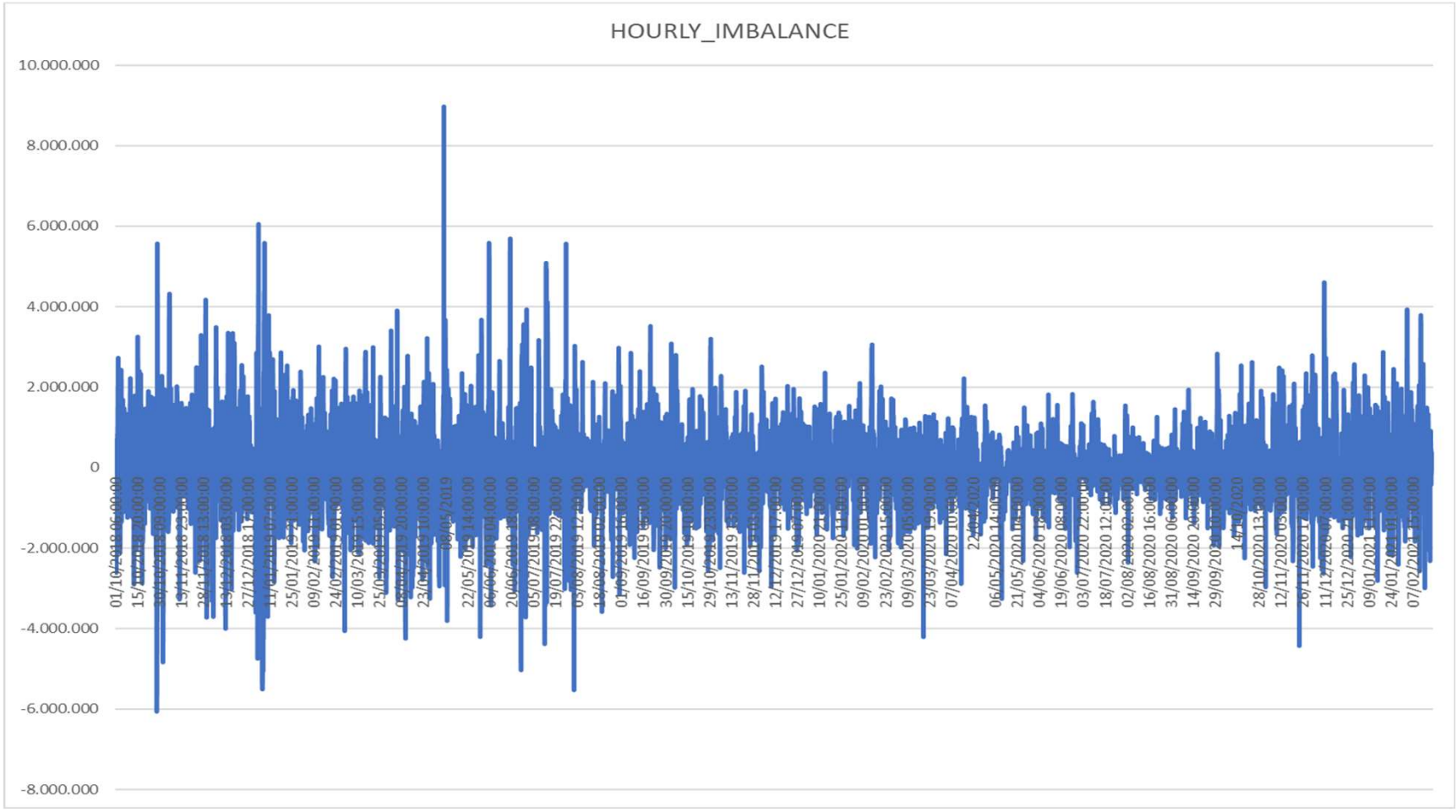
“DISCLAIMER” ON DATA

- The following slides shows imbalance values (almost) from the past 2 ½ years
- The data is based on the current model, without WDO
- The data does not take into account the asymmetry of the green zone and yellow zone trades, but just shows the registered unvalidated imbalance per hour

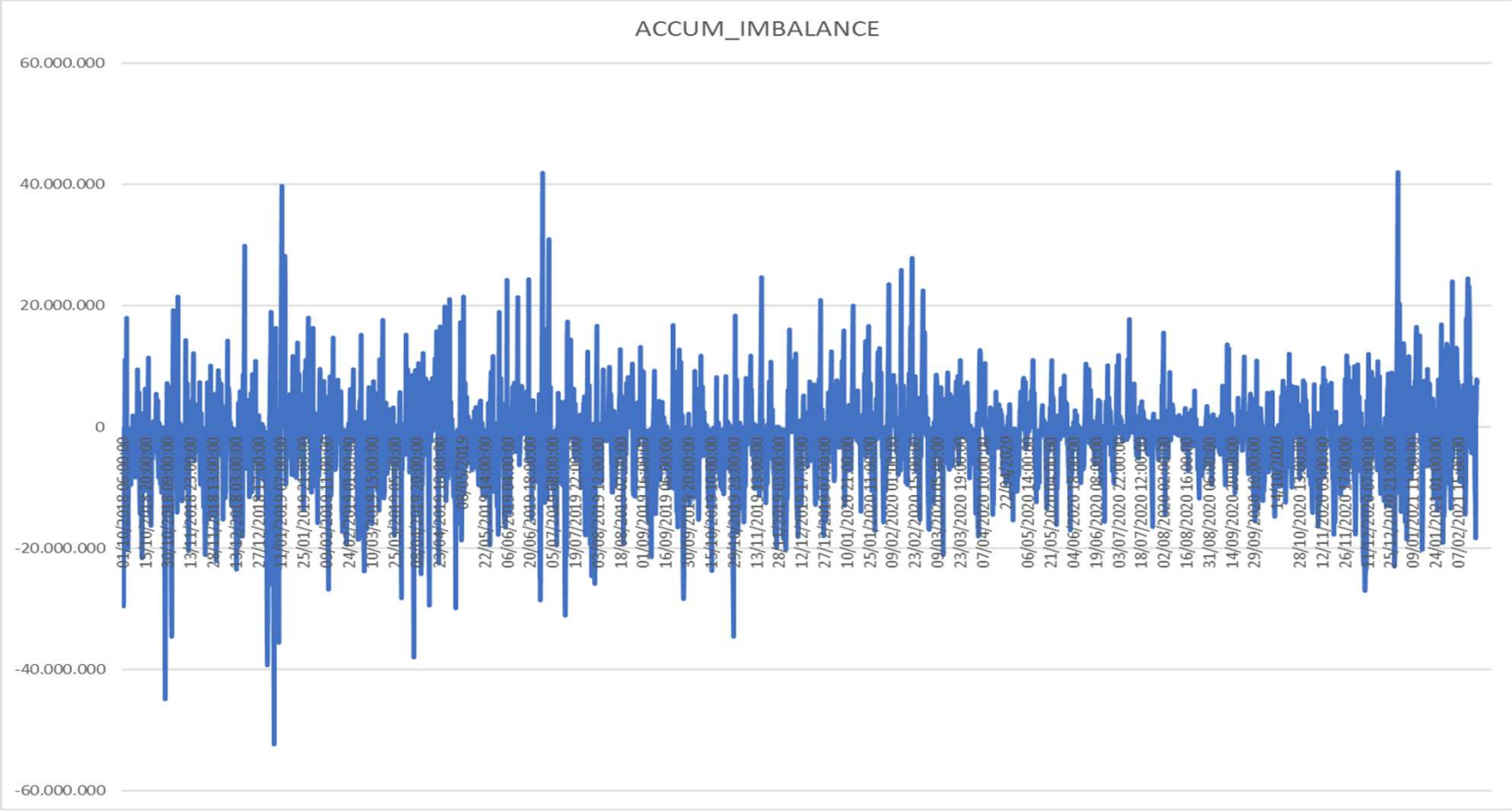


SHIPPER REQUEST – HISTORIC HOURLY DATA

ENERGINET



ACCULUMATED HOURLY IMBALANCE



QUESTIONS FOR SHIPPERS

- What is your overall impression of the “full package” for Balancing model 2022?
- Are there areas or parameters that in your view needs further consideration?

THANK YOU FOR YOUR PARTICIPATION

Next major milestones:

- Energinet and Nordion will prepare for consultation of draft method application
- Consultation period: from Easter Holiday and 4 weeks ahead (end start of May 2021)
- Method application towards DUR and EI: 1 June 2021

NEXT STEP: CONSULTATION IN APRIL 2021

Please contact Christian Rutherford, cru@energinet.dk if you have questions or comments