



SIKKERHEDSGUIDE



NØDUDGANGE



HJERTESTARTER



SAMLINGSSTED

A decorative graphic on the left side of the slide, consisting of a complex network of thin, light teal lines forming a series of interconnected triangles and polygons, resembling a wireframe or a data network structure.

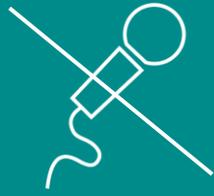
DATA MODEL FOR BALANCING MODEL 2022

Shipper Task Force Meeting, 6 November 2020



WELCOME

Julie Frost Szpilman, Energinet Gas TSO



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
- Norlys
- Axpø
- EnergiFyn
- DCC
- Danske Commodities
- Shell
- E.ON Sverige

ENERGINET AND NORDION

- Julie Frost Szpilman
- Christian Rutherford
- Signe Rasmussen
- Esra Gencay
- Søren Balle Rasmussen
- Ylva Nordlund

EXTERNAL

- Evida

Agenda



- Background
- What is our task?
- Presentation of the overall data model
- Discussion
- Wrap-up and next steps

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

System Commercial Balance Chart

Choose Gas Day

Gas Day

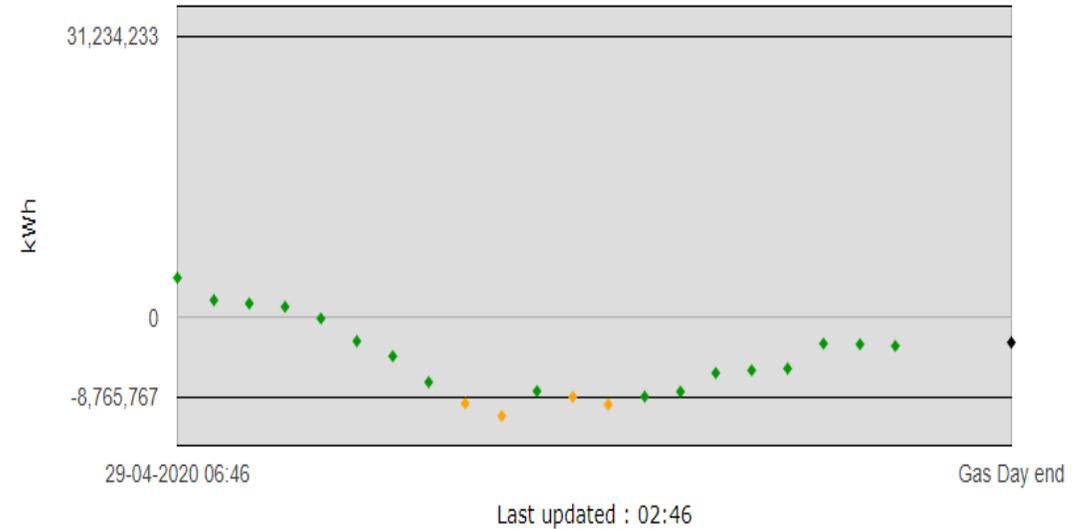
Prev

29-04-2020

Next

OK

Gas Day : 29-04-2020



◆ : 30-04-2020 11:16, SCB, Non valid ordinary, Balance kWh : -2,746,290

Energinet.dk Yellow Zone trade list



Energinet yellow zone marginal prices

Created (time for last calculation) : 30-04-2020 00:00

Marginal selling price Eur/MWh :

Marginal purchase price Eur/MWh : 7.000

WHY DO WE NEED TO ADJUST OUR BALANCING MODEL?

- In the current system, shippers are only required to be in balance at the end of the day
- With Baltic Pipe, Energinet and Nordion see the need for shippers to help to balance the system during the day

- In the current system, volumes are small and there are only few connections to larger markets
- With Baltic Pipe, Denmark can be an energy hub with possibilities to attract large volumes of gas and the existing market can profit from that

- Today, the green transition of the Danish gas system is still in the early stage
- Energinet has to support the further development of this transition

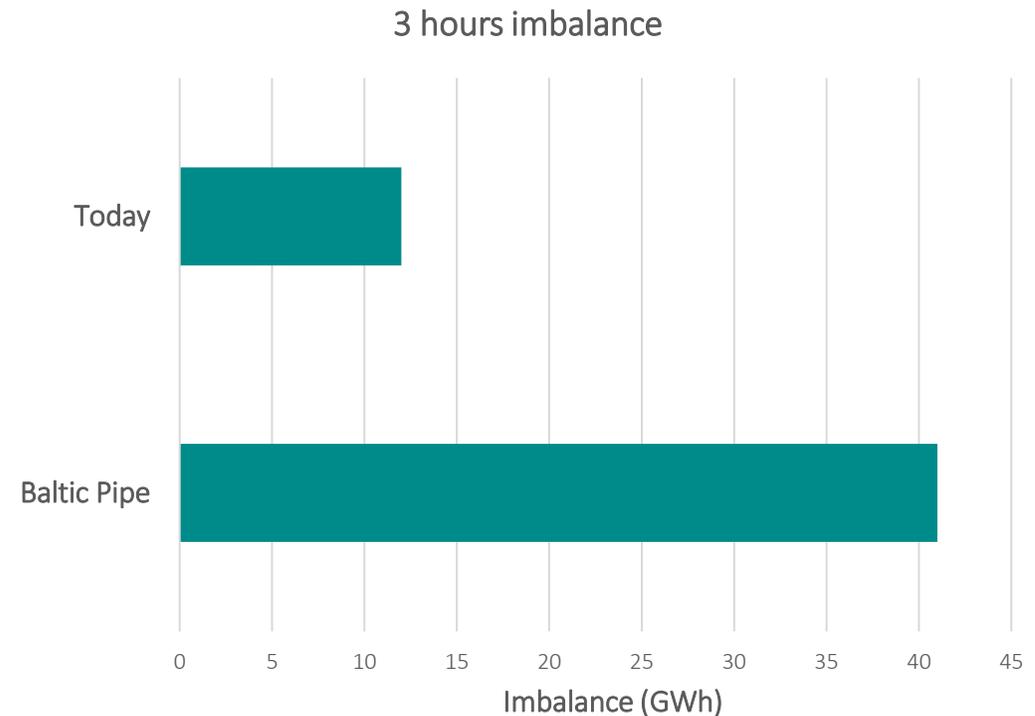
THE CHALLENGE!

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

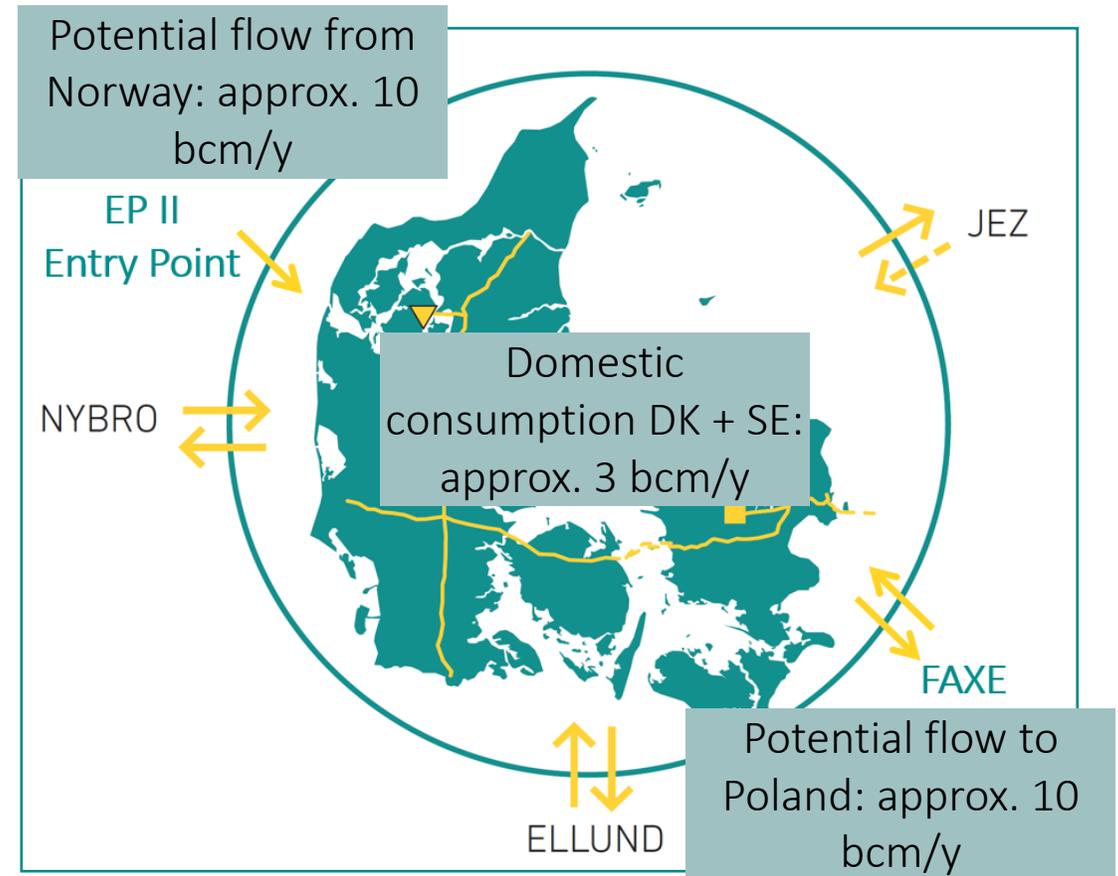
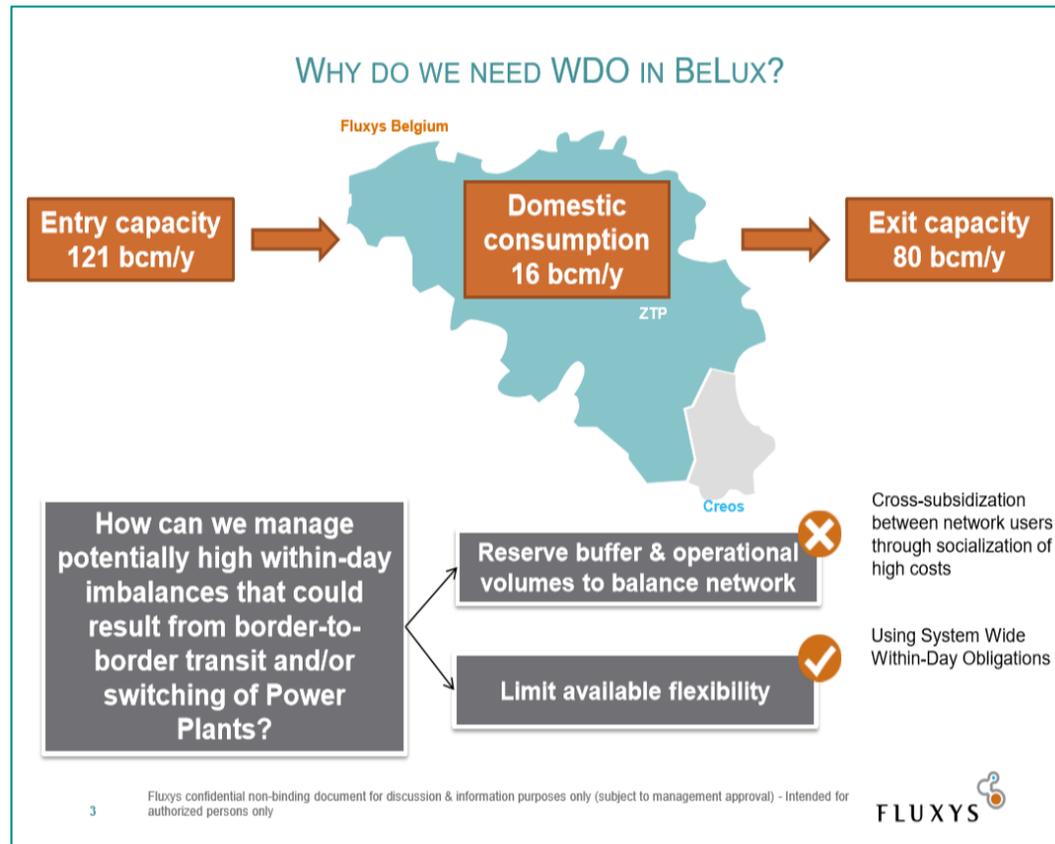
The impact is a potentially drastic change in flexibility.

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



WHY WITHIN-DAY OBLIGATION (WDO)?

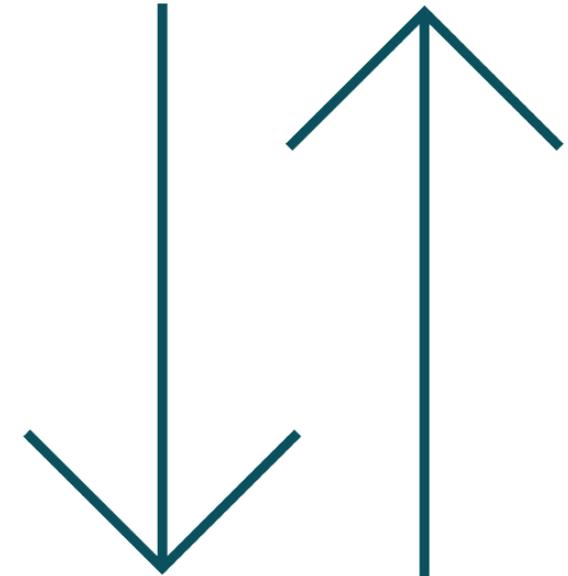
In the past: operational tools at TSO level Today: WDO as market based instrument



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

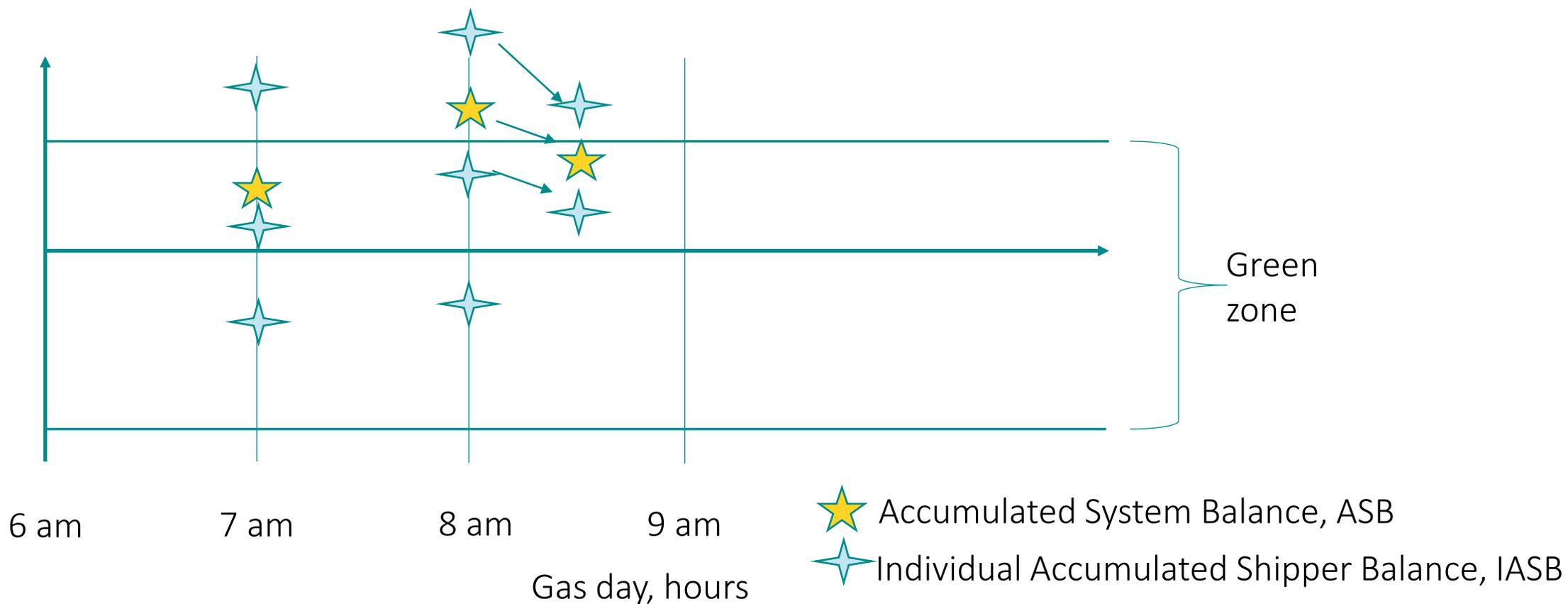
- Can be characterized as having a "individual" green zone per shipper
- Energinet sees a clear downside with this, in terms of creating a sub-optimal balancing model (limiting individual shippers, when there is still flexibility available)

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>

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:

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

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:

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

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

THE TASK FOR THIS SHIPPER TASK FORCE IS.....

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

- We are never 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

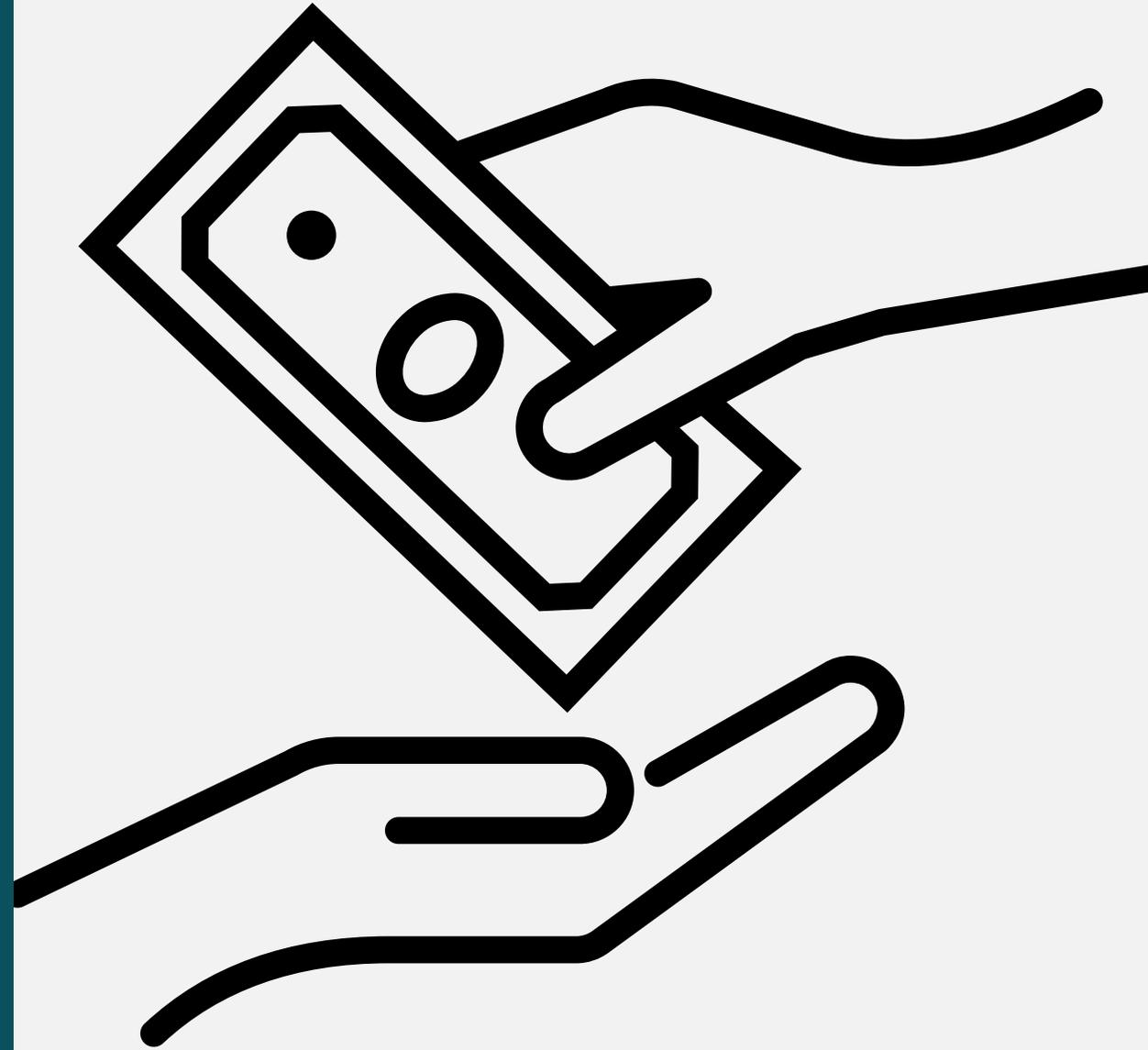


...AND THE REASONING FOR THIS TASK...

Defining the helpers and causers every hour will help us secure:

- incentivizing the correct shippers in each hour; and
- "justice", in terms of defining the right helpers and causer

But how accurate should we be able to determine helpers and causers, given that accuracy is not free of charge?



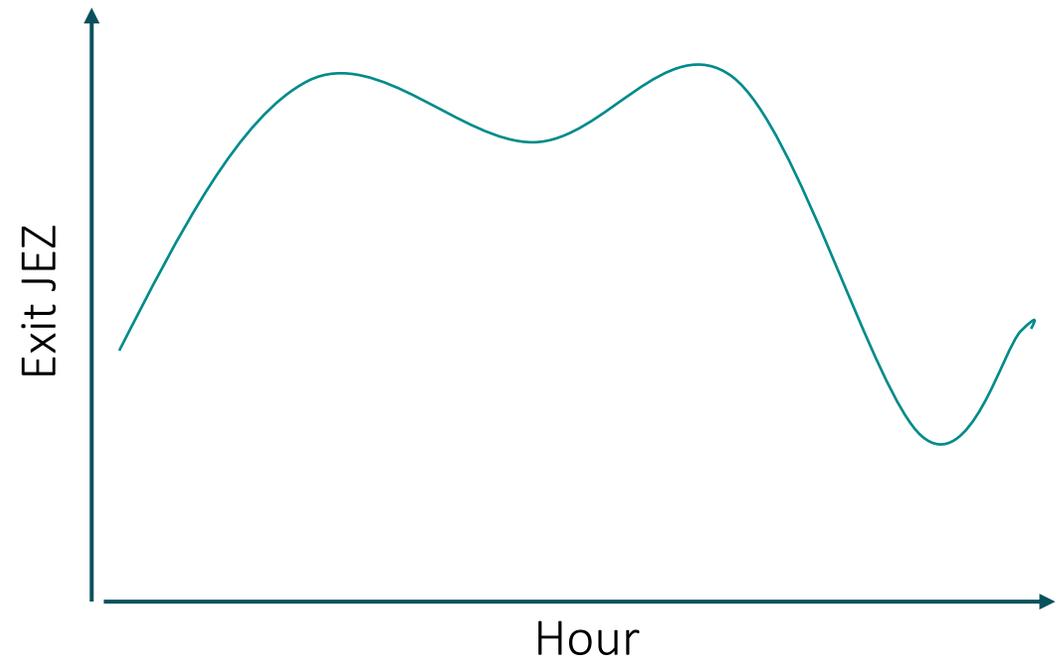
OUR SUGGESTION OF A MODEL TO DEFINE THE INDIVIDUAL JEZ PER SHIPPER

The aggregated JEZ per hour is defined as:

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

To calculate the individual JEZ value per shipper per hour, Energinet suggests:

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



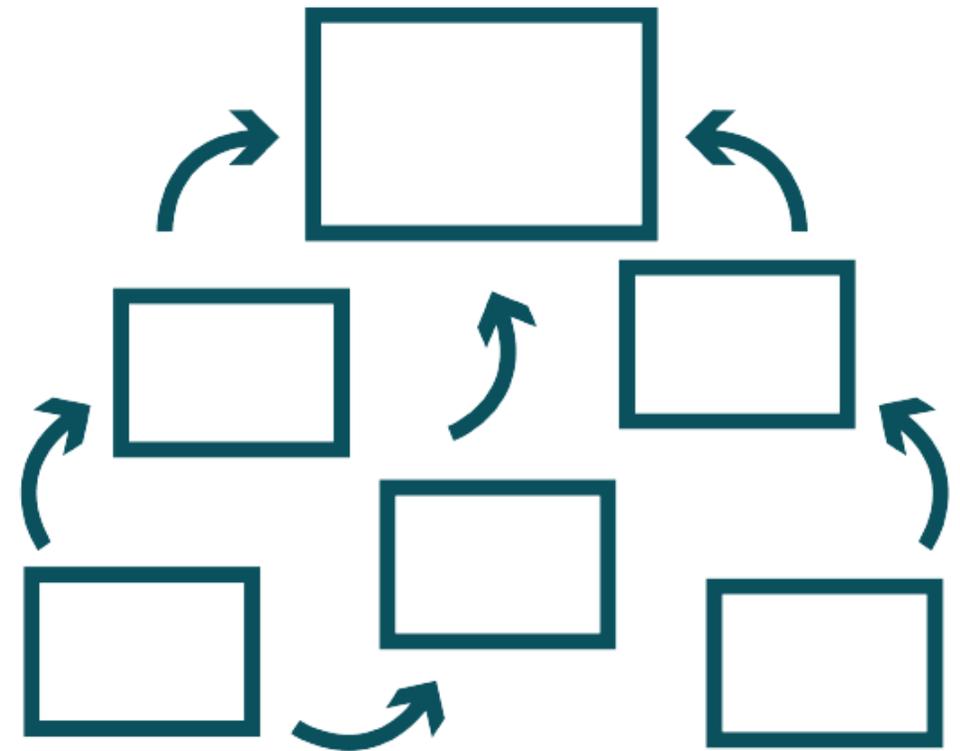
THE TWO FOCUS POINTS

Data for DMS:

- How accurate should the data be for you taking into account the trade off between data quality and the cost of quality?
- What is your experience?

Data for nDMS:

- How should we allocate the Residual per hour (smoothing or not smoothing)?



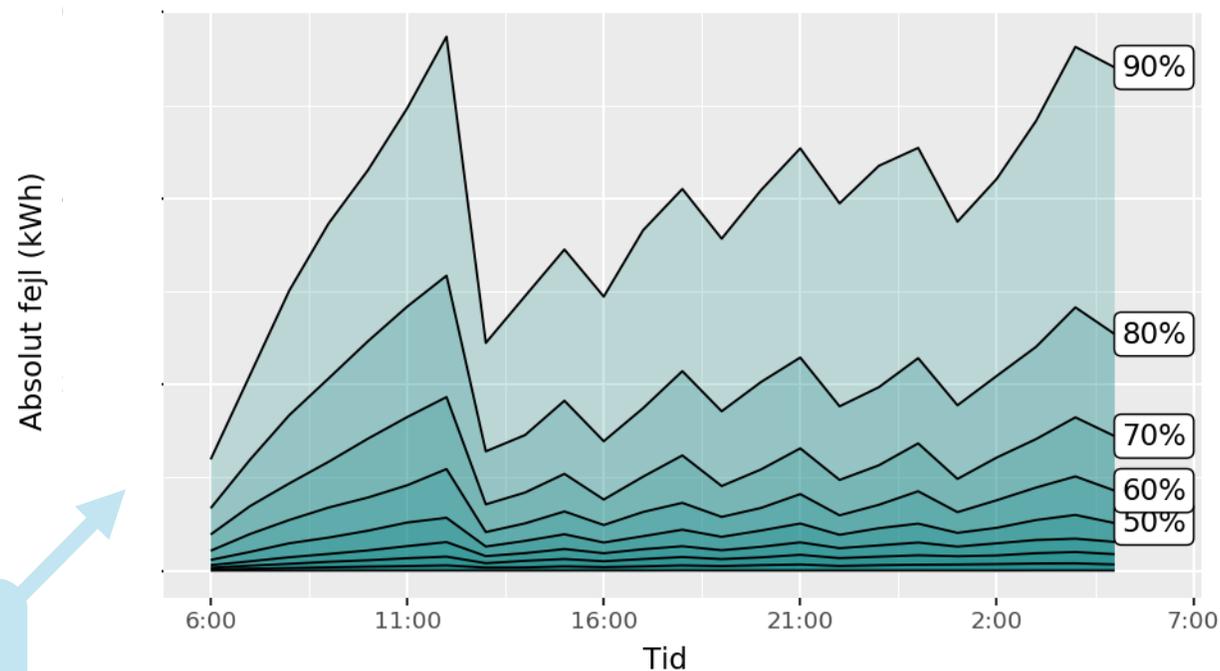
HOW WELL CAN WE ESTIMATE DMS WITH THE CURRENT LEVEL OF DATA?

Today we get DMS data five times per day from 12 pm

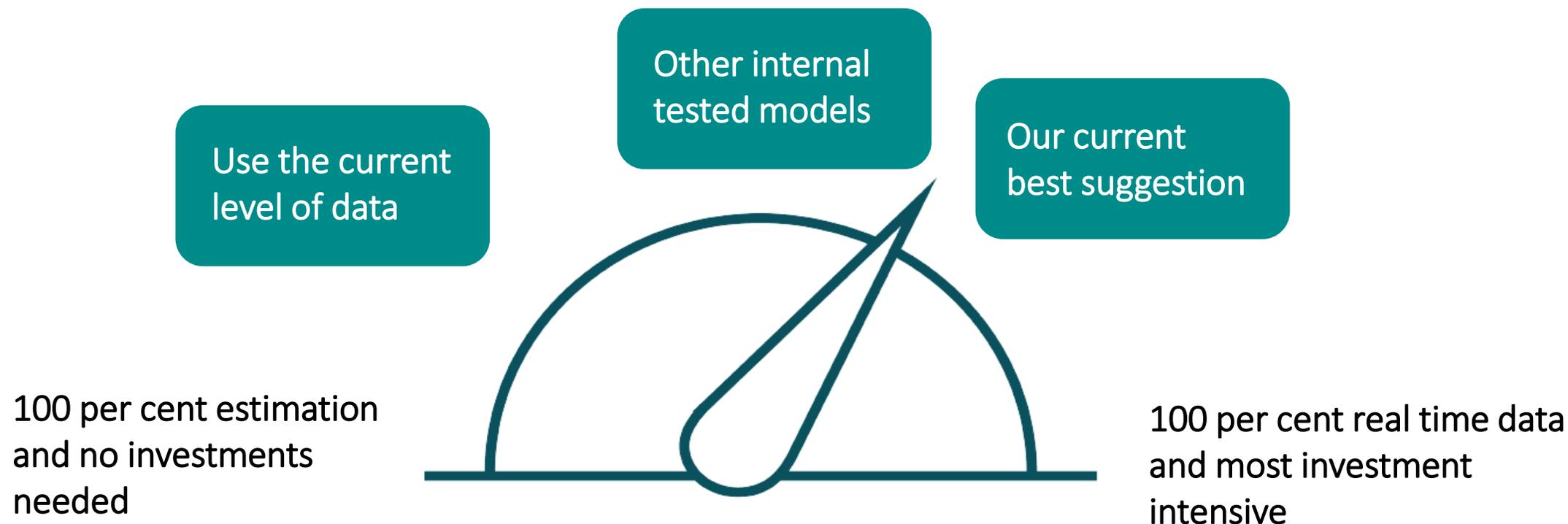
The figure shows that in 10 per cent of the cases, we have 12 pm an error on nearly 600,000 kWh per shipper or even higher

Energinet and Nordion think this is a too high rate of error

Every line is a decil: 90 per cent decil shows that in 10 per cent of the cases, it went worse than the indicated value.

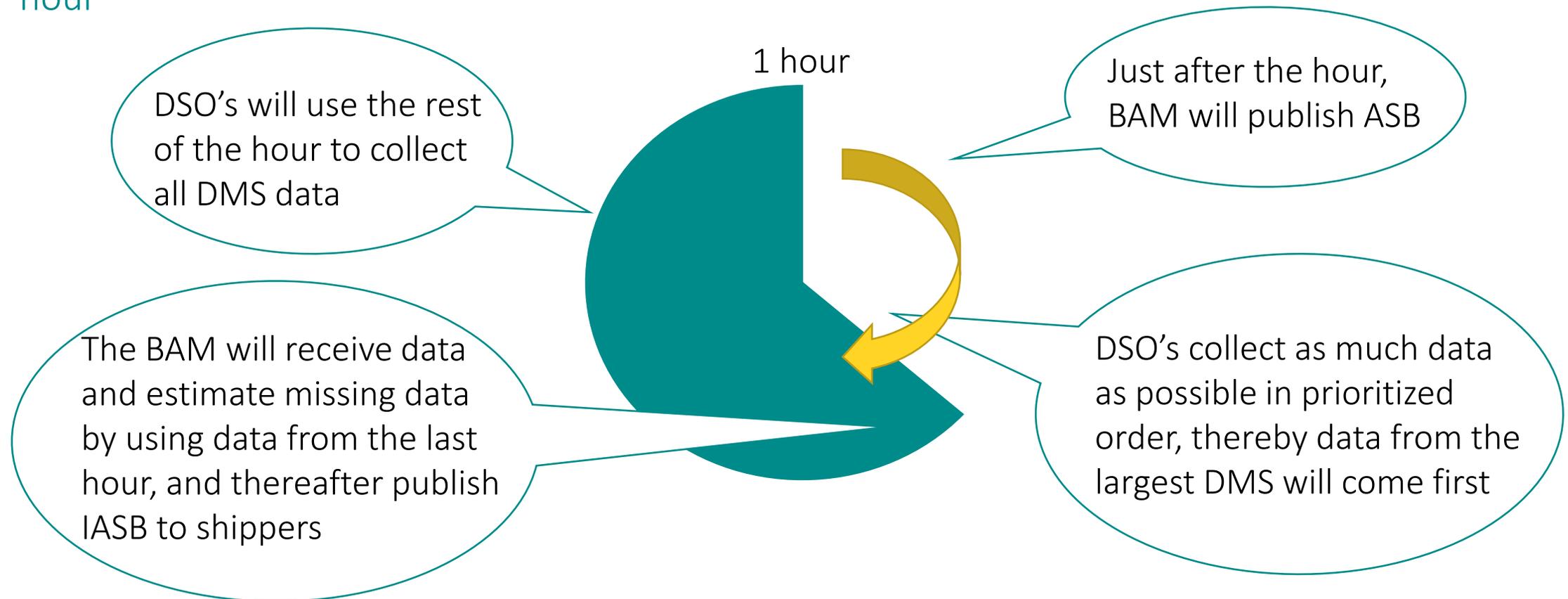


HOW MUCH SHALL WE INVEST TO GET MORE PRECISE ESTIMATION OF DMS?



OUR CURRENT BEST SUGGESTION TO A MODEL

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



OUR CURRENT BEST 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 modernize

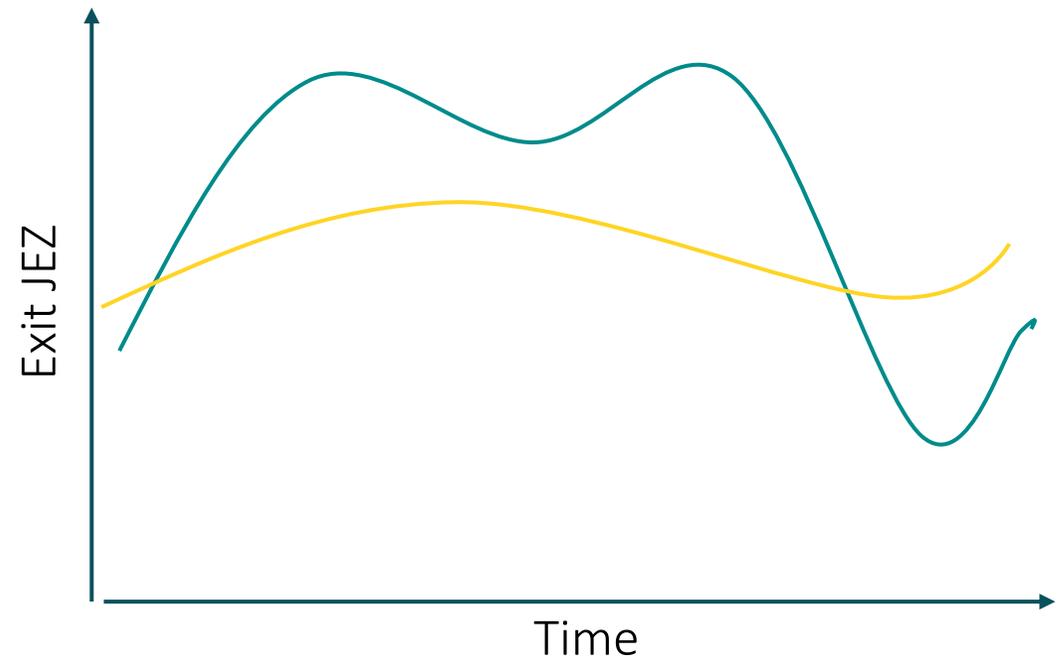


WHAT IS SMOOTHING OF NDMS DATA?

To smooth nDMS data gives a flatter profile, which makes it easier for shippers with Exit Zone consumption to keep the balance and less ENTRY capacity is needed

.....however, if we implement smoothing, we will take some responsibility away from the market, and this will cost flexibility and the BAM will have to reduce the Green Band/flexibility to some degree

....but the nDMS market is expected to decrease over the coming years, and all shippers will have to balance their DMS portfolio



QUESTIONS FOR YOU

1. What are pro and cons for you regarding:

- The level of investment, we will have to take to ensure an appropriate level of precise data of DMS
- To smooth or not to smooth data for nDMS

2. What experiences do you have with monitor your own DMS-costumers?

3. Can you see that you can use more data for some other kind of business?





BRAIN STORM





THANK YOU FOR YOUR PARTICIPATION

We will use the input to:

- The continuous regulatory work
- Further dialogue with dso's
- To prepare a business case for the preferred data model
- To strengthen our suggestion for a data model



NEXT MEETING: 10 DEC 2020 10 AM

Please contact Julie Frost Szpilman,
jfs@energinet.dk if you have further comments

