Forsyningstilsynet
Carl Jacobsens Vej 35
2500 Valby

ENERGINET

Energinet
Tonne Kjærsvej 65
DK-7000 Fredericia

+45 70 10 22 44
info@energinet.dk
CVR-nr. 28 98 06 71

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4. juli 2018
Forfatter:
CRU/TAL/

Submission of Methodology for Approval of changes to the balancing model

Pursuant to section 36 a (1) and 40 (1) of the Danish Act on Natural Gas Supply, Energinet must submit the methods that are used to calculate or establish terms and conditions for access to the transmission grid, for the approval by the Danish Energy Regulatory Authority.

This Submission of Methodology for Approval concerns submission of:

- Permanent removal of price cap of 10 per cent, capping the neutral gas price towards the day-ahead price, which was introduced on 1 October 2016, when Energinet changed the price formula for the neutral gas price[1]
- Permanent removal of price cap of 35 per cent on marginal prices when Energinet trades in the yellow zone trading windows, which was introduced as an ad-on to the new balancing model 1 October 2014[2]
- Change of method towards calculating the adjustment step 2 price for imbalances, from a fixed percentage, to a percentage that relies on the transportation costs between Denmark and Germany, or short-term withdrawal costs from gas storage facilities[3]
- Change of price formula for calculating the Force Majeure price, which sets the price for emergency gas[4]

It is the opinion of Energinet that the submitted methods can be set for approval because they comply with the requirements in the Danish Act on Natural Gas Supply and applicable EU Regulations.

The submitted methods will be applicable at the time of approval from the Danish Energy Regulatory Authority.

[1] Metodegodkendelse: Justering af Energinet.dk's kommercielle balancemodel (gas).
http://energitilsynet.dk/gas/afgoerelser/sekretariatsafgoerelser/2016/#c10366040

[2] Energinet.dk's nye kommercielle balancemodel – metodegodkendelse.
http://energitilsynet.dk/gas/afgoerelser/tilsynsafgoerelser/2014/#c10364733

[3] Energinet.dk's nye kommercielle balancemodel – metodegodkendelse.
http://energitilsynet.dk/gas/afgoerelser/tilsynsafgoerelser/2014/#c10364733

[4] https://en.energinet.dk/Gas/Tariffs-and-Fees

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Resume
Den væsentligste Danske platform for produktion af gas, Tyra feltet, skal være ude til reparation i ca. 2 ½ år. Tyra og dens satellitfelter står for over 90 % af den danske gas produktion i dag.

Konsekvenserne af dette er dels at Danmark næsten udelukkende vil skulle få sin gas fra Tyskland i denne periode, og dels vil fleksibiliteten og forsyningssikkerheden være mindre end i dag.

For at imødekommer dette planlægger Energinet en række fysiske og markedsmæssige tiltag. Derudover kræver perioden grundig forberedelse og opmærksomhed både hos Energinet, de tilstødende systemer og af markedsdeltagerne.

En ekstrem lang og hård vinter med afbrud af leverancer til markedet vil være udfordrende. Men grundig planlægning og optimering af kapaciteten i systemet kan minimere risikoen for afbrud af leverancer.

Derudover så vi ved den seneste Early Warning periode i februar/marts 2018, at den nuværende prissætning af ubalancer gav uhensigtsmæssige incitamenter i forhold til forsyningssikkerhed. På baggrund af Early Warning vil de ændringer, der er foreslået i denne metodeanmeldelse, være at betragte som permanente og vil derfor ikke kun være gældende mens Tyra er lukket ned.

De kommercielle tiltag i relation til Tyra er blevet drøftet med markedet over en række fælles- og bilaterale møder. Materiale og referater fra disse møder findes på Energinets web[5].

På baggrund af dette foreslår Energinet følgende ændringer:

- Permanent at fjerne prisgrænsen på plus/minus 10 %, som sætter en grænse for hvor meget den neutrale gaspris må svinge i forhold til day-ahead prisen, som blev indført frem mod 1. oktober 2016, da man ændrede beregningen af den neutrale gaspris
- Permanent at fjerne prisgrænsen på plus/minus 35 %, som sætter en grænse for, hvor meget de marginale handler i gul zone må være i forhold til den neutrale gaspris, som blev indført med den nye balancemodel i 1. oktober 2014
- Ændring af metode for at fastsætte Adjustment step 2 prisen fra at være en fast procent til at være en procent fastsat i forhold til alternativomkostningen på transport fra Tyskland til Danmark eller omkostningen af kortsigtet udtræk fra gaslager
- Ændring af prisformlen for Force Majeure prisen, som bruges til at prisfastsætte nødgas.

[5] https //en.energinet.dk/Gas/Tyra

1. The submission obligation

Energinet must as transmission system operator submit the methods that is used to calculate or establish terms or conditions for access to the transmission grid, including tariffs, for the approval by the Danish Energy Regulatory Authority, cf. section 36 a (1) and section 40 (1) of the Danish Act on Natural Gas Supply.

The method for permanent removal of the price caps introduced in 2014 and 2016, the method for calculation of step 2 price and the change of formula for imbalance prices in Emergency concerns establishment of a term for access to and usage of Energinet's transmission grid, and the choice of method are not specified in applicable law, including the Danish Act on Natural Gas Supply. Thus, the method requires Submission of Methodology for Approval (hereinafter the "Submission") to the Danish Energy Regulatory Authority (DERA).

2. The background for the Submission

The Tyra platform, which forms the most significant platform for the Danish gas market, is planned to be out for maintenance from November 2019 and until July 2022[6]. The possible close down of Tyra has been known for some time, and was first communicated to the market in April 2017[7].

In short, this means that less than 10 per cent of the normal gas production level will reach the Danish onshore system during this period. The impact will be that the Danish gas market will almost solely be depending on gas imports from Germany, and in general will experience a lower level of flexibility than today[8].

The main conclusion from Energinets latest supply/demand analysis[9] is that Danish and Swedish consumers will continue to experience a robust supply situation if Tyra shuts down. When, at the same time, the majority of the Danish production in the North Sea is closed down for a number of years, the system becomes less flexible and more vulnerable to incidents occurring compared to today's supply situation.

Energinet intends to take various measures both in relation to the market and to infrastructure in order to secure maximum infrastructure capacity. The situation requires preparation and awareness on the part of Energinet, the adjacent systems and not the least the market players if the gas supply is to be secured.

An extremely long and hard winter with disruption of the supply sources will be challenging. However, careful planning and focusing on the optimal use of the capacity in the system will mitigate the risk of supply failure.

[6] In accordance with the latest Gas Market Message on this subject no. 2000, forwarded on 24 November 2017

[7] In accordance with Gas Market Message no. 1298, forwarded on 4 April 2017

[8] Please see https://en.energinet.dk/Gas/Tyra and previous presentations at Shippers' Forum about the Tyra shutdown at https://en.energinet.dk/Gas/Forums

[9] https://en.energinet.dk/Gas/Tyra/Supply-situation

Also, during the resent Early Warning in February-March 2018 it became clear that the current rules for settling balancing prices in Denmark created unsuitable incentives in the market, in terms of security of supply. Based on Early Warning it became evident that the changes suggested in this Submission must be considered as permanent changes to the balancing model, and will not only apply during the Tyra shutdown period.

During the past year, the possible commercial measures have been discussed with the market participants on a number of occasions. The material and minutes from these User Groups and workshops are found at Energinet's website[10].

2.1 The need for the Submission

Balancing rules are a significant part of the T&C's for acting as shipper in a transmission system. Also the balancing rules are regulated in the European Balancing Network Code, in which the relevant regulator in the Member State in question (in this case DERA) has a central role towards approving the exact balancing rules for the Member State[11].

This Submission is adjustments of certain elements towards the existing balancing method, which was approved by DERA on 23 September 2014, and adjusted on 19 September 2016 and 29 November 2016.

The adjustments are needed for the reasons described in point 2 above. The detailed rationale for each adjustment is described in point 3 and 4 below.

The main balancing method will still apply.

2.2 Legal framework

National legal framework

According to Section 11(1) of the Danish Act on Natural Gas Supply, and as the gas transmission system operator (TSO) in Denmark, Energinet shall ensure a sufficient and an efficient transport of natural gas, including the task of preserving and maintaining of the physical balance in the gas network.

As TSO in Denmark, Energinet shall ensure that there are sufficient amounts of natural gas in the overall natural gas supply system so that the physical balance in the network can be maintained, cf. Section 12 (1)(6).

Energinet can include necessary costs in the prices for its activities under Act on Energinet Section 2(2) and (3), including gas transmission activities, cf. Section 37 d of the Danish Act on Natural Gas Supply and Section 2 of Executive Order No 816 of 27 June 2016.

[10] https://en.energinet.dk/Gas/Tyra

[11] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2014.091.01.0015.01.ENG

Pursuant to section 36 a (1) and 40 (1) of the Danish Act on Natural Gas Supply, Energinet must submit the methods that are used to calculate or establish terms and conditions for access to the transmission grid, for the approval by the Danish Energy Regulatory Authority.

European legal framework

According to Regulation No 715/2009 and in particular Article 6(11) and Article 8(6)(j) thereof, the European Commission may adopt network codes concerning balancing rules. On this basis, Regulation No 312/2014 is issued to establish the network code on gas balancing of transmission networks.

Balancing rules shall be designed in a fair, non-discriminatory and transparent manner and shall be based on objective criteria. Balancing rules shall reflect genuine system needs taking into account the resources available to the transmission system operator. Balancing rules shall be market-based, cf. Article 21 (1).

According to Article 4 (1) of the regulation No 312/2014 regarding network codes concerning balancing rules the network users shall be responsible to balance their balancing portfolios in order to minimise the need for transmission system operators to undertake balancing actions set out under this Regulation.

Balancing rules established in accordance with this Regulation shall reflect genuine system needs, taking into account the resources available to transmission system operators and shall provide incentives for network users to balance their balancing portfolios efficiently, cf. Article 4 (2).

According to Article 6 (4) (a) and (b) the balancing actions shall be undertaken on a non-discriminatory basis and have regard to any obligation upon transmission system operators to operate an economic and efficient transmission network.

Network users shall be bound to pay or be entitled to receive (as appropriate) daily imbalance charges in relation to their daily imbalance quantity for each gas day, cf. Article 19 (1). The daily imbalance charge shall be cost reflective and shall take account of the prices associated with transmission system operator's balancing actions, if any, and of the small adjustment referred to in Article 22(6), cf. Article 19 (3).

The small adjustment shall according to Article 22 (6) (a) incentivise network users to balance their inputs and off- takes; (b) be designed and applied in a non-discriminatory manner in order to: (i) not deter market entry; (ii) not impede the development of competitive markets; (c) not have a detrimental impact on cross-border trade; (d) not result in network users' excessive financial exposure to daily imbalance charges.

The value of the small adjustment may differ for determining the marginal buy price and the marginal sell price. The value of the small adjustment shall not exceed ten percent of the weighted average price unless the transmission system operator concerned can justify otherwise to the national regulatory authority and have it approved pursuant to Article 20, cf. Article 22 (7).

According to Article 3 (1) of regulation No 2017/1938 concerning measures to safeguard the security of gas supply the security of gas supply shall be the shared responsibility of natural gas undertakings, Member States, in particular through their competent authorities, and the Commission, within their respective areas of activity and competence.

3. Submission of methods

In the following, each method adjustment, and the rationale for the adjustment is described in detail. The suggested adjustment of the two price caps is described together.

3.1 Permanent removal of price caps of 10 and 35 per cent

3.1.1 Price cap of plus/minus 10 per cent

On 1 October 2016 Energinet changed the formula for the Neutral gas Price from being a 50/50 per cent split between the indexed day-ahead and within-day prices, to a clean within-day index price. The 10 per cent price cap towards the day-ahead index was implemented at the same time, because some market players saw a risk of the within-day market being too illiquid, which could possibly have a negative effect on the Neutral Gas price and thereby the settlement price for imbalances. Thus the rationale for the price cap was to still safeguard the Neutral Gas Price towards the more liquid day-ahead index.

Figure 1 below illustrates the development of the prices at Gaspoint Nordic for the Spot Index price[12], compared with the within-day reference price, since the 10 per cent price cap was introduced, and until 1 May 2018.

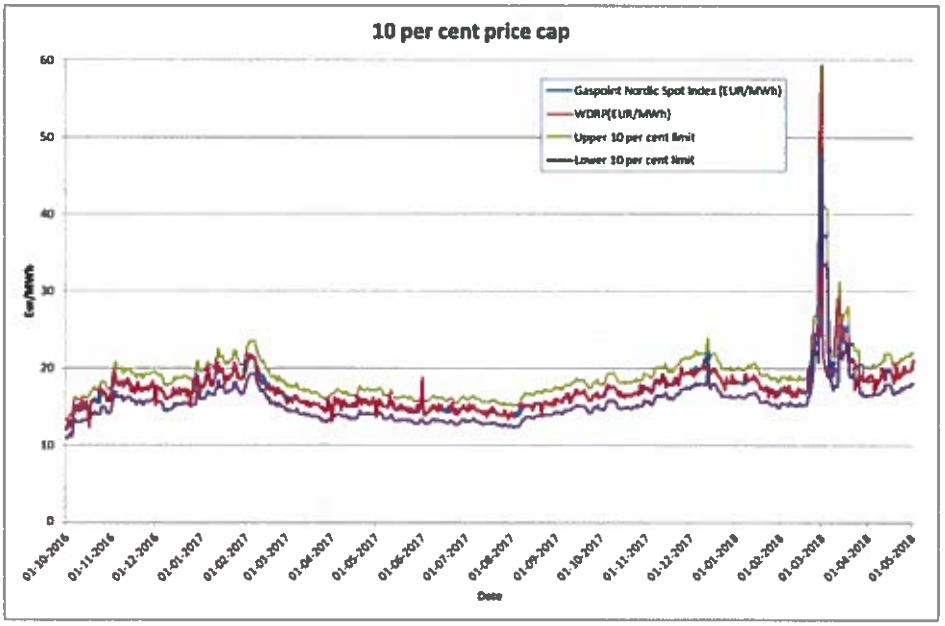

Figure 1: Comparing the within-day price at Gaspoint Nordic with the 10 per cent price cap

[12] Since 6 September 2017, the Spot Index price was changed to the EGSI price. See www.gaspointnordic.dk for more information

The figure shows that on most days the within-day reference price is very close to the average market price. Data also shows that the within-day reference price has only been outside the limit 11 times since the introduction on 1 October 2016. Also only 3 observations were outside 15 per cent. And only 1 observation was outside 20 per cent[13].

3.1.2 Price cap of plus/minus 35 per cent

The 35 per cent price cap was introduced as an ad-on to the new balancing model on 1 October 2014. It caps the marginal prices when Energinet trades in the yellow zone trading windows, and thereby puts a cap on maximum/minimum imbalance prices on a given gas day.

The price cap was introduced to reduce the risk for shippers being out of balance on days where the marginal price was far from the market price. There were market players that saw an issue of Energinet having to trade at any price in the yellow zone in an illiquid market. Also, there had not been introduced within-day capacity products on the German side of Ellund at the time, meaning that sourcing gas within-day was limited, in case of being out of balance.

For these reasons, the price cap of 35 per cent was introduced. The 35 per cent limit refers to Energinets previous imbalance charge before the new balancing model was introduced.

The development of the Neutral Gas Price compared with the marginal buy and sells prices since 1 October 2014 is illustrated in figure 2 below:

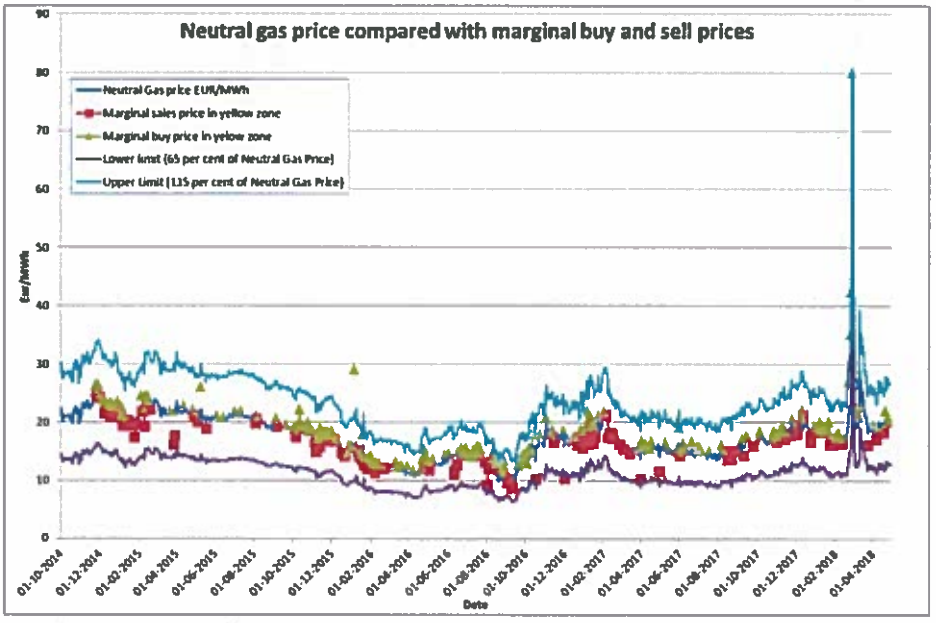

Figure 2: Traded volumes within-day at Gaspoint Nordic since 1 October 2016

Based on this figure, Energinet have the following observations:

- The marginal price is most often close to the Neutral Gas Price

[13] 1 June 2017

- This seems to be especially true after 1 October 2016, compared to the period before, where a number of improvements to the balancing model was introduced – including change in Energinet's yellow zone trade procedure and changes towards trading windows
- The marginal buy/sell price have only been outside the 35 per cent limit 3 times since the new balancing model was introduced 1 October 2014:
    - On 6 January 2016 a marginal price of 29 Eur/MWh was set, compared to a Neutral Gas Price of 16 Eur/MWh (83 per cent)
    - On 1 December 2016 a marginal price of approx. 10 Euro/MWh was set, which was slightly outside the 35 per cent limit, compared to a Neutral Gas Price of 16 Euro/MWh (35.05 per cent)
    - On 26 February 2018 a marginal price of 35 Euro/MWh per cent was set, compared to a Neutral Gas Price of 24 Eur/MWh (44 per cent). This was the gas day before Energinet declared Early Warning

Based on these observations, it is Energinets opinion that the price cap of 35 per cent has only been effectively used once to safeguard the market from marginal prices far from the general market price, being on 6 January 2016, where a marginal price very far from the general market price was set. The observation on 1 December 2016 was very close to the limit, and the observation on 26 February 2018 can be considered as a true market price, based on the supply/demand situation at the time.

3.1.3 General points valid for both price caps

In the following a number of general points valid for both price caps are discussed.

3.1.3.1 Development of the within-day trading liquidity

In figure 3 below the traded volumes at Gaspoint Nordic on the within-day market are illustrated.

The figure shows that the traded volumes have been stable (no negative nor positive trend) on the within-day market since October 2016.

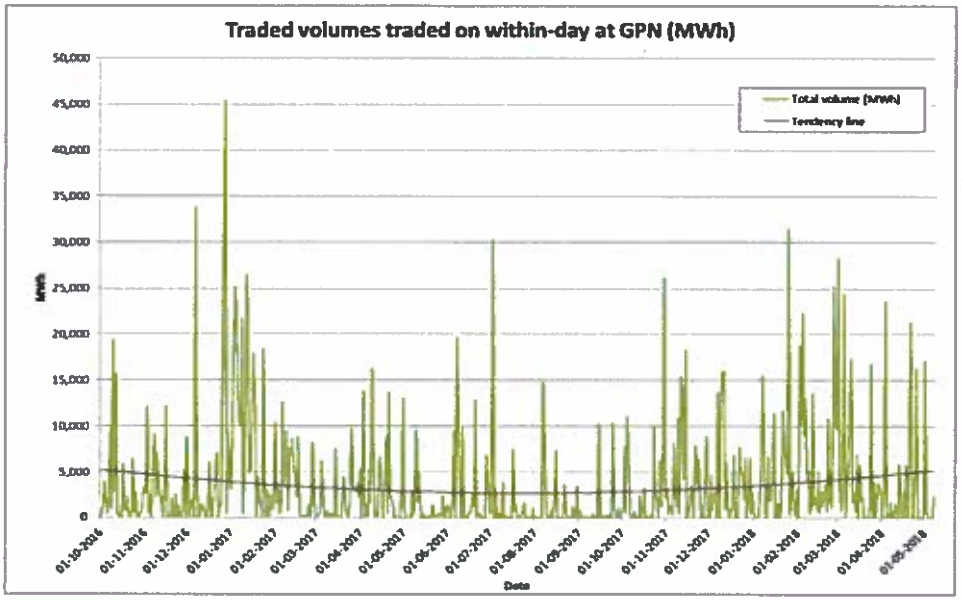

Figure 3 Traded volumes within-day at Gaspoint Nordic since 1 October 2016

3.1.3.2 Experience from Early Warning, spring 2018

On 27 February Energinet declared Early Warning for the first time since 2013. A combination of cold weather and low storage inventory levels in North-West Europe drove gas prices up to very high levels in both Germany and Denmark. However in Denmark, unlike Germany, price caps are part of the balancing rules, capping the possible Neutral Gas Price and marginal price. This resulted in a situation on the 27 February, where the market was incentivised to take a short position in Denmark, to bring gas to Germany, where gas prices were not capped.

The price caps were jeopardising the security of supply of the system and Energinet had to declare an Early Warning on 27 February in which the price caps were removed, in order to have a true price signal of the market situation in Denmark, and to avoid shippers deliberately being short in the Danish grid.

Most likely, Energinet had declared Early Warning later, due to the low storage inventory level, but it is Energinets clear opinion that the price caps pushed the system into an Early Warning sooner than otherwise necessary since they prevented the correct signal being sent to the market. In fast markets, where prices are driven up rapidly, it is essential that the gas price in Denmark can follow the gas prices in North-West Europe, as wrong price signals exposes the physical system. In such situations, Denmark is competing with gas systems in Germany and the Netherlands, where no price caps are installed.

3.1.3.3 Expectations for the Tyra period

It is Energinet's expectation that gas prices in Denmark in general will continue to follow the North-West European gas markets, but that Denmark will be a constant high priced area, as gas constantly must be attracted from Germany.

Due to the generally lower flexibility in the Danish market during the Tyra shut-down period, Energinet would expect that there may occur days or periods where the Danish gas market is

partly decoupled from the German market, due to a different supply/demand situation specifically for Denmark. In such cases it is important that the price in Denmark is "free" to increase, to give the right price signal for the relevant supply/demand situation.

Also, previous experience shows that most often such situations will occur with short notice, driving the spot prices within-day and day ahead up, compared to what was traded the gas day before. For this reason it is important that the within-day price is not capped towards the price set the day before, as this prices was set based on the different supply/demand situation the day before. The within-day price must be able to freely reflect the supply/demand situation the given day, to give the right balancing signal to the market in order to safeguard security of supply.

3.1.3.4 Other developments in regards to balancing rules

Since the new balancing model was introduced on 1 October 2014, Energinet have taken steps to improve the model, based on experience and comments from market players.

Some of the most important improvements were introduced on 1 October 2016, in regards to Energinets trading procedure in the yellow zone trading windows:

- The trading windows were changed from five small 10 minute trading windows, to one large window from 9:00-18:00 and two small trading windows in the evening
- Energinet can choose not to trade. Before 1 October 2014, Energinet had to trade, and at any price

These improvements have had a positive influence both on the risk of Energinet buying or selling balancing gas at very high or very low marginal prices not reflecting the actual balancing situation and on the general price formation of the within-day market, as Energinet can wait for prices to stabilise, or to not trade at all, if it is not physically required.

Generally it is also worth mentioning that the balancing prices and price signals have been transparent to the market during the gas day since October 2014, thereby giving shippers the opportunity to change balancing position during the gas day.

3.1.4 Conclusions on price caps

The following table lists arguments for and against removing both price caps:

Arguments for removing price caps	Arguments for keeping price caps
• It is important that there is no price cap in a fast moving market, which is not necessarily a crisis situation • Price caps are not used on the markets close to Denmark (or in any known gas balancing system in EU) • Energinet have improved the yellow zone trading procedure, which re-	• Within-day liquidity has not been improved (nor reduced) since 1 October 2016, where the price cap was introduced • Within-day liquidity has only slightly improved since 1 October 2014

	duces the risk of "wrong" pricing on the within-day market (Energinet can choose not to trade) • Transparent price and balancing signals during the gas day makes price caps irrelevant in most cases • During normal operation, the 10 per cent price cap is very rarely hit, and most often only slightly, as the within-day price follows the day-ahead price • During the Tyra shut-down period, there can occur situations where the within-day price must be different to the day-ahead price • The 35 per cent cap has only been relevant one time since 1 October 2014 (6 January 2016), in the function of safeguarding the market from marginal prices far from the market price • During the Tyra shut-down period, there can occur situations where there is a need for a high marginal price, to reflect the actual balancing situation in the market • Within-day capacity is now offered on the German side of Ellund (since November 2015)

Table 1 Arguments for and against removing both price caps

Based on this analysis, Energinet will forward a suggestion for change of method towards DERA, to permanently remove both price caps.

3.2 Change of method for calculation the adjustment step 2 price

The adjustment step 2 price is applied when the System Commercial Balance (SCB) ends in the yellow zone end-of-day, and only towards shippers who have an imbalance in the same direction (long or short). The adjustment step 2 price is higher than the step 1 price, and was included in the balancing model to give incentive for shippers not to go out of balance, after the last trading window had ended (after 23:15).

When the model was introduced, the step 2 price was set at plus/minus 2 per cent towards the Neutral Gas Price. The percentage was calculated based on the cost for a standard storage product compared to a relatively low gas price, so market players had an incentive to withdraw

from storage (or buying from players who could withdraw), instead of using Energinets balancing system.

The step 2 price was increased to plus/minus 3 per cent on 1 October 2016, as Energinet had experienced a number of times where the SCB ended in the yellow zone end-of-day. The increase was calculated based on the higher price for short-term interruptible withdrawal at the storage facilities, compared to a standard storage product.

During the Tyra shut-down period, the transmission system will be more vulnerable towards larger imbalances, as the flexibility is more limited than today. For the same reason it is also more important that the commercial balancing stays within the communicated boundaries for the gas day (the green zone).

For these reasons, Energinet suggests to change the adjustment step 2 price from a fixed percentage, to a percentage that is calculated before each gas year, based on the highest of:

- either the actual day-ahead transportation cost from Germany to Denmark for the gas year in question, at a relatively low gas price at the time of calculation (in today's market it would be in the range of 15-20 Eur/MWh)
- or the short-term withdrawal cost from storage.

Example:
Based on today's tariff at Energinet and Gasunie Deutschland, the day-ahead transportation cost for bringing gas from Gaspool to Denmark is approximately 1 Eur/MWh[14]. Assuming that the transportation cost between Denmark and Germany is higher than short-term withdrawal from storage, this would lead to an adjustment step 2 percentage of (at 2 different price level examples):

- 1 Eur/MWh divided by 15 Eur/MWh = plus/minus 6.67 per cent
- 1 Eur/MWh divided by 20 Eur/MWh = plus/minus 5 per cent

This means that an increase in transportation cost or withdrawal cost will increase the percentage, whereas an increase in the general gas price level will decrease the percentage. The maximum percentage possible is 10 per cent, based on the legislation in the Balancing Network Code.

3.3 Change of formula for imbalance prices in Emergency

3.3.1 Introduction and background

At the Emergency Workshop 25 January 2018, Energinet gave a presentation on imbalance charges in Emergency.

During the investigation in this respect, Energinet has identified that the current balancing regime during Emergency does not fulfill the main purpose of giving sufficient incentive for shippers to secure gas for the end consumer market in all cases. Also Energinet has identified issues in the current model which could result in wrong behaviors in certain situations.

[14] Based on current price lists at Energinet's and Gasunie Deutschland's websites

When designing market rules and measures, Energinet needs to balance between creating an attractive gas market in Denmark and not compromising the security of supply. The main reason for changing the incentives for shippers to secure their own end-consumer portfolio is that Energinet considers this balance as non-optimal, especially entering into a period without supply from the Tyra platform.

During the recent Early Warning in February-March 2018, it became evident that market players in general do take a higher risk and does not secure their end-consumer market to the same degree as previously. Both the storage inventory level in Denmark and the withdrawal rate before and during the Early Warning clearly indicated that the market is willing to explore the limits of the gas system, to commercially benefit from that (see figure 4 below).

It is the market players that have the responsibility for supplying gas and balancing their own portfolio. Also, all market players, including shippers, have a shared responsibility for the security of supply[15]. However the latest Early Warning makes Energinet question if the market are taking sufficient actions towards fulfilling their responsibilities.

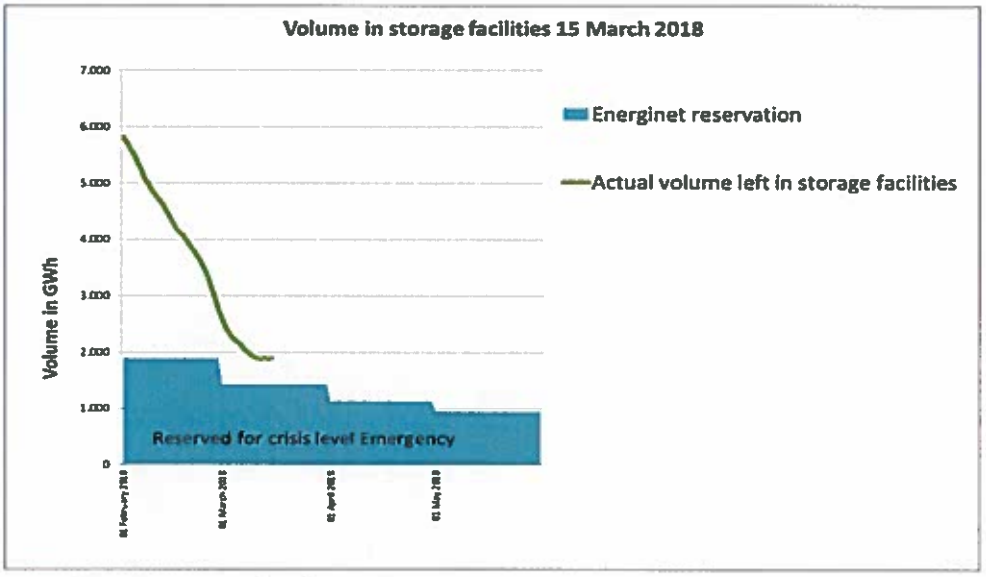

Figure 4 Storage inventory level during Early Warning – March 2018

Thus, this point 3.3 will first discuss the issues identified with the current concept, based on the general issue described above, and suggest an amendment of the concept, to secure the right market incentives in this respect.

3.3.2 Purpose – market incentives

The pricing regime for emergency gas must secure that the commercial players secures the supply of gas for the end-consumer market and the balance of the transmission system. In this respect emergency gas must not be considered as a "safety tool" for the market. On the con-

[15] Article 3 of the REGULATION (EU) 2017/1938 concerning measures to safeguard the security of gas supply (and repealing Regulation (EU) No 994/2010)

trary market players should be incentivised to take the necessary measures to avoid emergency.

Energinet sees two main purposes of the imbalance price regime in Emergency:

- Before Emergency
  - Give shippers incentive to secure gas for its own portfolio for a whole (non-average) season (e.g. buying and filling storage capacity, save gas in storage for end of storage season, buying and utilizing transmission capacity to manage a cold winter)
- During Emergency
  - Secure shippers have incentive to utilize all possible supply sources before receiving deliveries of emergency gas from Energinet.

3.3.3 Preconditions and limitations

In accordance with Rules for Gas Transport, imbalances are not allowed during Emergency, unless otherwise instructed by Energinet. Also, Energinet are entitled to give direct instructions on nominations, and may alter nominations or exclude a shipper from the market, if instructions are not followed[16]. Therefore it is a precondition that all shippers who do not supply to the Danish exit zone are balanced.

This means that only shippers delivering gas for the Danish end-consumer market, which has not secured its supply to cover its demand, are imbalanced (short) in an emergency situation. The outcome of this point 3.3 is a suggestion to adjust the current price formula for emergency gas, delivered by Energinet to cover the imbalance of shippers not being able to deliver gas for its own end-consumer portfolio.

This analysis does not directly address possible changes to the market model on the basis of the Joint Balancing Zone (JBZ) project with Swedegas, which may affect the emergency rules. It is however given that emergency gas is reserved for the Danish protected market, which is also valid under JBZ in an emergency situation. This will be handled in the update of the Rules for Gas Transport for April 2019, in relation to JBZ.

3.3.4 Identification of the issue

In the current model, the price for shippers to have emergency gas delivered when not being able to the end-consumer demand is the Force Majeure price in Energinet's price list, which also covers emergency gas:

Current price formula for emergency gas

"The neutral gas price (as described under purchase and sale of balancing gas) and/or the actual documented costs[17]"

[16] Rules for Gas Transport, Clause 16.2.1

[17] https://en.energinet.dk/Gas/Tariffs-and-Fees

Energinet has identified a number of issues with the current formula during the analysis, mainly based on comments from the Emergency Workshop, and the evaluation (internal and external) of the latest Early Warning in February/March 2018. These issues are listed in table 2 below:

Identified issue	Description of issue
Incentive issue	The current method does not include any form of incentive, but uses the Neutral Gas Price (average market price on within-day market). The current price therefore gives less incentive to balance than the normal balancing prices (which includes adjustment prices and marginal prices), and does not give an strong incentive to secure the possible end-consumer demand for the season
Only local Danish gas price	During the latest Early Warning it became very clear how well-connected Denmark is to Germany when it comes to gas prices. It also became clear that the current emergency gas price formula is vulnerable towards flaws in, or lack of, pricing at the Danish gas exchange, which could occur during a crisis situation
Only reflects the gas price for the current gas day	The current formula only takes the gas price for the current gas day into account, and does not reflect the value of gas for the season. Both in the period prior to and especially in the beginning of the latest Early Warning, the Danish gas market experienced high withdrawal rates from the storage facilities, as gas prices and expectations of prices for the rest of the season gave incentive to empty stored gas as soon as possible
Lack of transparency	Unclear if and how the term "and/or the actual documented costs" in the current formula will be exercised in practice

Table 2: Identified issues towards the current price formula for emergency gas

The identified issues show that the current price formula for emergency gas may be vulnerable towards certain situations, and does not give a strong incentive for shippers to secure their supply to Danish consumers. Based on this, Energinet sees a need to adjust the formula, to include both a stronger incentive, and to reach a more robust formula that includes/covers possible market situations where pricing in Denmark is weak or non-existent.

3.3.5 Suggestion of new price formula for emergency gas

To address the identified issues, Energinet suggests the following formula, for calculating the price of emergency gas, and thereby the price of being in an imbalance, due to lack of gas towards a shippers end-consumer portfolio:

New price formula for emergency gas

"The highest Day-ahead Index set at either Gaspoint Nordic; Gaspool or Net Connect Germany during the current storage year"

Hereby follows a number of details and explanations in regard to the suggested formula:

- The emergency gas price is set end-of-day, based on the formula above

- The day-ahead Index is the average price
- The storage year runs from Gas Day 1 May - Gas Day 30 April
- In case of a gas crisis (being either Early Warning, Alert or Emergency) is ongoing when entering a new storage year, it is still the price from the previous storage year that is valid, until the crisis is cancelled

The table below lists how the new formula solves the issues identified above:

Identified issue	Solution from new formula
Incentive issue	The new formula includes the incentive that it is never possible to speculate against the emergency gas price, as it will always be the highest price set during the season. It also gives incentive to secure for more than an average winter
Only local Danish gas price	New formula includes gas prices from German gas hubs, which makes the formula more robust towards issues with the price formation in Denmark, and strengthens the connection/link towards the German price areas
Only reflects the gas price for the current gas day	The formula incudes the highest price set during the current storage year, and indirectly reflects the possible future value of the gas (is the situation expected to become better or worse)
Lack of transparency	Unclear element removed from the formula, so only market based element is left

Table 3: How the new formula will solve the identified issues

Besides the solutions to the identified issues, Energinet considers the new suggested formula as fair to market players, based on the following arguments:

- The new formula is only applied towards shippers that have not sufficiently secured their seasonal supply
- The new formula is based on market prices alone
- The new formula uses average prices and not marginal prices
- The new formula uses the most liquid gas price references in Denmark and Germany

4. Consequences of the methods

4.1 Removal of price caps

Based on the analysis in point 3.1 above, it is Energinet's view that removing the price caps will only have a minor impact on the price formation and thereby the imbalance prices in normal supply/demand situations. In general the Danish gas prices follow the German prices, and the within-day price is in normal cases almost always very close to the day-ahead price. Also Energinet has changed its trading procedures for yellow zone trades, reducing the likelihood of hitting a very high/very low marginal price far from the market price.

It is also worth mentioning that in those rare cases where the balancing price is far from the market price, balancing prices are transparent during the day which in general gives shippers

the opportunity to avoid possible very high/very low balancing prices, by balancing its portfolio, or by being long when prices are high for being short and vice versa.

4.2 Change of method for adjustment step 2

Since the introduction of the current balancing model, the System Commercial Balance has ended in the yellow zone more than 90 times[18]. For Energinet this indicates that the incentive towards avoiding ending in the yellow zone is not as strong as it should be.

Therefore this market measure will have an economic impact on market players, either in terms of a higher step 2 imbalance price, or in terms of shippers paying a higher price to avoid the step 2 price. As described in 3.2 above, this is necessary to create the right incentive to balance, to keep the system integrity in place.

4.3 Change of formula for imbalance prices in Emergency

Energinet want shippers to take greater responsibility for the security of supply. This is expected to have an economic consequence for market players having a portfolio in the Danish exit zone, as Energinet wants to create a general stronger incentive to save gas in storage/buy capacity at Ellund, and thus increasing the costs for shippers. As described in point 3.3 above, it is Energinet's opinion that shippers do not safeguard their portfolio to a sufficient level today, and therefore should have higher costs towards security of supply.

5. Market consultation

Energinet has sent the subjects discussed in this Submission in market consultation in 3 weeks from 30 May 2018 to 20 June 2018[19]. The full market consultation document is found in Appendix 3.

The market consultation document includes a description on how the market has been involved during the past year, where Energinet has held a number of User Groups, workshops and bilateral meetings to collect market opinions.

6. Time schedule

Energinet expects to implement the adjustements described in this Submission towards 1 April 2019.

[18] Energinet.dk Online

[19] Mail forwarded to all market participants via Anmodning@energinet.dk.

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Appendix 1: Public consultation

This "Appendix 1: Public consultation" is an appendix to Energinet's "submission of Methodology for Approval of changes to the balancing model" dated 3 July 2018.

On 30 May 2018, Energinet forwarded the public consultation on all Tyra market measures to all market participants via Anmodning@energinet.dk, including the balancing topics included in the Submission[1].

Energinet has received a total of 4 responses. The consultation responses are forwarded to DERA/DUR in connection with this Submission, together with the consultation document.

In the following the comments made in regard to the specific topics of this Submission are listed, including Energinet's response.

Comments made towards removal of price caps

- One market participant agrees that it is a good idea to remove the price caps
- At the same time the same market participant mentions that Energinet should be careful when trading in the yellow zone
- The market participant suggests that there should be a fallback solution on balancing prices, to avoid absurd prices due to critical incidents where only very few shippers have flexibility.

Energinet's response on comments towards pricecaps:

Energinet agrees that we should be careful when trading in the yellow zone. Since the introduction October 2014, Energinet has made a number of changes to the internal trading procedures, to secure that trades made in the yellow zone are made as close to market prices as possible, taking into account the physical need for gas. Energinet will investigate if additional changes to the procedure are required to reduce the possibility of unintentionally high/low yellow zone prices, to secure a trustworthy pricing of imbalances.

In regard to a possible fallback solution on balancing prices, Energinet will consider if explicit text could be added to the Rules for Gas Transport in this regard. Such a clause, if implemented, could entitle Energinet, on a sole discretion basis, to disregard certain balancing prices ex post, if certain criteria are met.

Comments made towards new method for calculating adjustment step 2 price

- One market participant agrees on introducing a dynamic method for calculating the step 2 price, so the percentage reflects the alternative cost of bringing gas to the market
- The same market participant highlights the importance for the market of knowing the actual price for a given gas year in due time

[1] Tyra Shutdown 2019-2022 – Market Consultation

- Another market participant suggests that it should not only be the cost of sourcing gas from Ellund which should be included in the calculation, as balancing gas can also be withdrawn from storage, where the cost of withdrawal in some months is higher than the transportation costs at Ellund.

Energinet's response on comments towards new calculation of adjustment step 2 price:
Energinet agrees that prices should be known well in advance before the start of the gas year. Energinet will include the price in the price sheet which is released before the annual auctions on PRISMA, typically in the beginning of June.

Energinet agrees that gas from storage should be taken into consideration, when calculating the transportation cost of bringing gas to the market. Storage withdrawal cost is now included into the formula.

Comments made towards imbalance prices in Emergency

- One market participant believes that the price should be based on actual spot prices, and not on a price which could have been set much earlier, using the WD marginal price (balancing price), instead of the Day-Ahead Index price that should be used
- Another market participant has the same position, with some more detail on which prices should be used to calculate the formula
- The same market participant also comments that the suggested formula will differentiate pure traders from shippers with an end-zone portfolio
- The same market participant believes that the cost of being short should be equally added towards a shipper being long
- A third market participant finds that instead of changing the formula, Energinet (or Gas Storage Denmark) should consider changing the rules of withdrawal restrictions, from a global restriction, to a restriction per shipper.

Energinet's response to comments towards imbalance prices in Emergency
Based on the User Group on imbalance prices in Emergency and the consultation responses, a number of shippers find that the imbalance price in Emergency (or the price for emergency gas) should be solely based on short-term spot prices (day-ahead and/or within-day prices). Their main argument is that imbalance prices should be based on the most recent price in a given situation, and not on potentially "historical prices", where a peak weeks or months before can end up as the relevant price for the current situation.

In short, Energinet's position is different. We do not consider gas prices set during the same storage year as historical, but part of the same season, as shippers' commercial choices early in a season can/will influence on prices later. The most recent Early Warning gave a good example of this; market players withdrew large amounts of gas from storage in January, which later lead to the Early Warning with high gas prices in end-February and March. With the new formula for emergency gas, it is possible that shippers had seen a greater risk ahead, and therefore would have chosen not to withdraw as heavily in January, and the Early Warning possibly would not have occurred.

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For Energinet this shows a good example of why the new formula must include a seasonal factor. In our view the seasonal factor is the most important element of the new formula, as it gives a stronger focus on thinking ahead, both when planning bookings of capacity and storage, but also during the storage season, where decisions early in a season does affect prices later.

Based on this reasoning, Energinet forwards the same method suggestion as was part of the market consultation.

Regarding the comment on that prices for being long (selling balancing gas to Energinet) should be the same as being short (buying price for being short, for receiving Emergency gas), Energinet do not agree. Setting the sell price for emergency gas at the same level as the buy price could make it very attractive to be long towards Energinet, instead of selling gas on the market, towards shippers being short. Thus, Energinet believe that setting a high price for being long could "drain" gas from the market, which otherwise could help to maintain the market in Emergency.

Regarding the comment on withdrawal restrictions, this has been forwarded anonymously to Gas Storage Denmark. Energinet do not see this as a solution that could replace the new formula for imbalance prices in Emergency, as we expect that forward prices will continue to be the strongest signal for market behavior and storage injection and withdrawal strategy.