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## INFORMATION PACKAGE 2

*All documents included in the Information Package are only intended to provide an initial and overall guidance to potentially interested shippers in the Baltic Pipe Project. Energinet advises shippers to also use other tools and seek other information for making calculations and evaluating a possible participation as shipper in the Baltic Pipe Project. Whereas Energinet has worked diligently to ensure that formulas, calculations, programming, etc. used and applied in the attached excel spread sheet and the other documents in the Information Package are correct, Energinet does not assume any liability for the content, calculations, use, completeness, etc. of the attached spread sheet or the other documents. In addition, Energinet has made assumptions on which the calculations are based. Such assumptions are Energinet's best estimate based on current market information. However, Energinet does not assume any liability for such assumptions.*

### 1. Introduction

This Information Package is prepared by Energinet with the purpose of providing potential participants in the Open Season 2017 information regarding the Danish aspects of the Baltic Pipe Project.

The Information Package 2 consists of:

- 1) Development of the Baltic Pipe Project's time schedule (chapter in this document)
- 2) Update on the Economic Test (chapter in this document)
- 3) Status on Energinet's implementation of the EU regulation on harmonised transmission tariff structure for gas (TAR NC) (chapter in this document)
- 4) Updated costs of transportation and tariff simulation (chapter in this document)
- 5) Economic model in Excel spreadsheet "Updated Economic Model" (separate document)
- 6) Guidelines for the economic model "Guideline for the economic model related to the Danish part of the OS 2017" (separate document). The guidelines should be read before using the Excel spread sheet.

### 2. Development of the Baltic Pipe Project's time schedule

The overall development of the Danish part of the Baltic Pipe Project is on track, and until now no major risks have been identified causing Energinet to change the planned commissioning date. Having said that, the Environmental Impact Assessment (EIA) process and permit pro-

cesses is considered to be the main risk for the Baltic Pipe Project's time schedule. Hence, Energinet plans to announce the project to the Danish EIA authorities during Phase 2 of the Open Season in order for the authorities to start the EIA process as soon as possible.

In this chapter, all activities described are preparations for the EIA process and/or the detailed engineering phase expected to start early 2018 provided a sufficient level of commitment in Open Season 2017 Phase 2 and a business case approval by Energinet's Supervisory Board in the beginning of 2018.

Energinet is responsible for three of the five components within the Baltic Pipe Project:

- The Norwegian Tie-In
- The Expansion of the Danish Transmission System
- The CS Zealand

By signing of the Framework Agreement between Energinet and GAS-SYSTEM in June 2017, Energinet was ready to launch the concept studies for two of the three projects within Energinet's responsibility, Norwegian Tie-In and the Expansion of the Danish Transmission System. For the third project within Energinet's responsibility, the CS Zealand, Energinet started preparation of a tender. Signing of contract and start of concept study for CS Zealand is expected by mid-September 2017. Concept studies for both Norwegian Tie-in, Expansion of the Danish Transmission System and CS Zealand are expected to be finalized by beginning of 2018.

For the component, Norwegian Tie-In, it has turned out being relevant to look into an alternative location of the receiving terminal. Location at the existing Nybro terminal owned by DONG Energy is the preferred option, but due to restoration of Tyra platform, which will involve Nybro terminal, it may be necessary to look at an alternative location. Energinet is currently performing a pre-feasibility study for the alternative location of the receiving terminal for the Norwegian Tie-In.

Regarding onshore Expansion of the Danish Transmissions System, Energinet has been looking into alternative routes compared with the Feasibility Study in order to optimize the solution in terms of costs and environmental impact.

In particular the landfalls by the North Sea, Little Belt, and Baltic Sea are in focus in the first part of the concept study phase. For part of the route, Energinet has found potential cost optimization, but for other parts, the cost estimates were deemed too low, i.e. the total cost estimates from Information Package 1 have all in all been confirmed so far.

For the CS Zealand, Energinet has been investigating different possible locations in order to find the most optimal location. In general, Energinet focuses on direct and open dialogue with affected municipalities and other relevant stakeholders in order to limit environmental impact and ease the Environmental Impact Assessment (EIA) process and other authority processes.

Offshore geophysical and geotechnical surveys in the North Sea and Little Belt were started after receiving the Order to Proceed end of July 2017 and they are expected to be finalized by September 2017. Contracts with consultants who will perform biological field investigations onshore have been signed and investigations have been initiated.

The planning process in Denmark is being determined; hence an important decision in order for the authorities to start the official Environmental Impact Assessment (EIA) process will be settled in the near future.

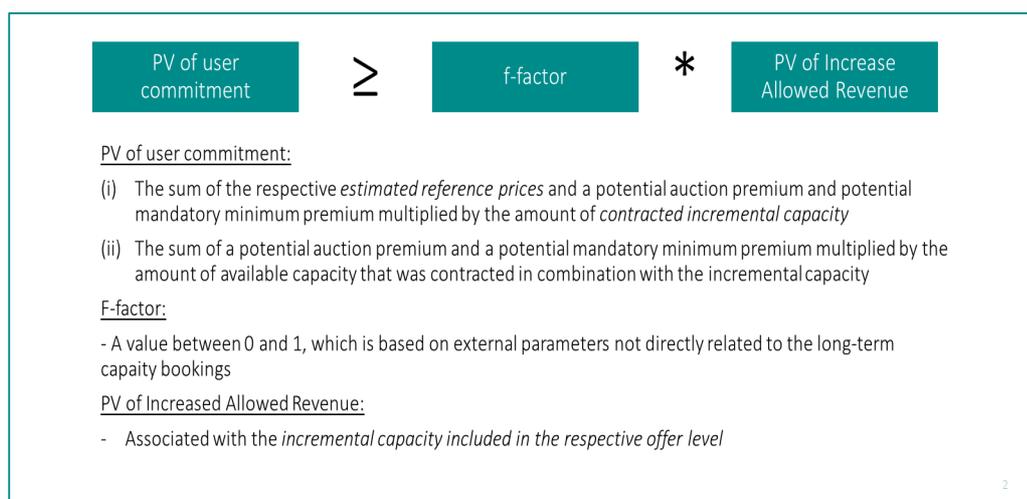
Focus for Energinet is also on the interface management towards GAZ-SYSTEM S.A.'s part of the Baltic Pipe Project. A common design basis is being developed based on previous agreements and findings from Feasibility Study. Finally, Energinet is currently developing the procurement strategy for the three components; Norwegian Tie-In, Expansion of the Danish Transmission System, and CS Zealand.

### 3. Update on the Economic Test

This part of the Information Package 2 gives further details on the Economic Test, which Energinet must perform as part of the OS 2017. **Please be aware that the final approach for the calculation for the Economic Test is under revision by the Danish Energy Regulatory Authority (DERA).**

According to the revised Capacity Allocation Mechanism Network Code (CAM NC)<sup>1</sup>, TSO's performing an incremental capacity project between two member states to create or increase capacity at an interconnection point, must each perform an Economic Test<sup>2</sup>. The overall purpose of the Economic Test is to make a test of one or more offer levels of capacity, testing if the estimated present value (PV) of user commitments (bookings) is higher than the present value of the estimated increase in the allowed or target revenue of the TSO, times an f-factor.

The elements and the overall formula are described below:



In a Danish context, it should be noted that the Baltic Pipe Project will not result in an increase in allowed revenue for Energinet, but will purely reflect the present value of the expected costs of the project. It should also be noted that capacity in regards to the Open Season 2017 is not allocated via an auction mechanism, and therefore no auction premium is included in the calculation.

The f-factor is a value between 0 and 1, which must be set by the regulator. The f-factor value is set based on an assessment of the influence of the following parameters:

- a) The amount of technical capacity set aside for short term capacity
- b) Positive externalities of the incremental capacity project on the market or the transmission network, or both

<sup>1</sup> Commission Regulation nr. 2017/459; repealing Regulation nr. 984/2013

<sup>2</sup> For more information on the Economic Test at GAZ-SYSTEM S.A., please go to <http://en.gaz-system.pl/press-centre/news/information-for-the-media/artykul/202552/>

- c) The duration of binding commitments of network users for contracting capacity compared to the economic life of the asset
- d) The extent to which the demand for the capacity established in the incremental capacity project can be expected to continue after the end of the time horizon used in the Economic Test

For example, if the f-factor is set at 1, it means that the expected costs of a project should be entirely covered by the expected value of the shipper commitments (bookings).

## 4. Status on Energinet's implementation of the Network Code on Harmonised Transmission Tariff Structures

Energinet is working on implementing the Network Code on Harmonised Transmission Tariff Structures for Gas by 1 October 2019.

### 4.1 Working Method

Energinet has called for a shipper task force on the subject and is currently carrying out monthly shipper task force meetings. 9 shippers have signed up for this. The shipper task force is expected to report the results and conclusions to the User Group on 4 October 2017 and in January 2018. All market participants registered in the Danish gas market is invited to participate in those User Groups.

### 4.2 Timeline

Energinet expects to publish a draft version of the application for the Danish Energy Regulatory Authority (DERA) in January 2018. Energinet will also arrange a public consultation on the subject in the spring of 2018 before sending the application to DERA mid-2018.

To follow the development of the future tariff methodology, please follow this link to Energinet's website: <https://en.energinet.dk/Gas/Tariffs-and-Fees>

### 4.3 Energinet's overall expectation to the result

It is Energinet's expectation that, from 1 October 2022, the tariff methodology will be uniform tariffs as stated in the paper "Tariff principles and market design in a Baltic Pipe Open Season" dated 2 November 2016.

### 4.4 Regulation of Energinet.dk

In September 2016 The Danish Government published a strategy for the regulation of the supply sector - electricity, gas, heating, waste management and water. See following link for a presentation of the strategy (in Danish language): <http://efkm.dk/aktuelt/nyheder/nyheder-2016/september/regeringen-vil-give-danskerne-2800-kr-med-en-mere-effektiv-forsyning/>

The strategy contains suggestions for overall principles regarding regulation of Energinet. Yet, no concrete proposals for changes in legislation governing Energinet have been made. The tariff simulations in this Information Package, and Energinet's "Analyseforudsætninger" (Analysis assumptions), is based on the current legislative framework for the economic regulation of Energinet. Assumptions regarding future legislation cannot be made in the information package as this would anticipate decisions in the government and Danish parliament (Folketinget) that have not been proposed or discussed.

## 5. Costs of Transportation and tariff simulation

### 5.1 Introduction

In this Information Package the Costs of Transportation is calculated for the Danish part of the OS 2017. The Costs of Transportation is based on a flow scenario and the estimated total costs (OPEX and CAPEX (incl. ABEX)), including existing cost base and estimated total flow in the Danish Transmission System, for a defined period of time.

Further, the Information Package includes a simulated transportation tariff, cf. chapter 5.2.

Energinet has published an abstract of the Feasibility Study conducted by Ramboll Denmark, Gazoprojekt and EY Poland published 6<sup>th</sup> of June 2017. Some of the costs and calculations in this Information Package differ from the costs and calculation published in the abstract of the Feasibility Study. However, please note that the information in this Information Package indicates the current view of Energinet on the economics related to the Danish part of the Open Season 2017 at the time of publication.

All years in the Information Package are stated in calendar years, and all values are stated in real terms, i.e. no inflation included.

The calculations in the Information Package are solely based on costs related to potential Danish components in the Baltic Pipe Project:

1. Norwegian Tie-In
2. Expansion of the Danish Transmission System
3. CS Zealand

It is expected that the costs of the Norwegian Tie-In and the Expansion of the Danish Transmission System will be fully included in the Danish cost base. Related to the cost of the CS Zealand, it is expected that Energinet covers:

- 36 per cent of CAPEX (excl. ABEX) up to 140 MEUR and all CAPEX (excl. ABEX) above 140 MEUR (if any)
- 50 per cent of the fixed OPEX
- All ABEX
- Variable OPEX related to flow above 7.5 BCM per calendar year
- If the sum of 50 per cent of fixed OPEX plus variable OPEX related to a flow of 7.5 BCM or below exceeds 12 MEUR/year or 10 MEUR/year respectively, depending on whether Energinet is obliged to pay electricity distribution tariff or not. Energinet covers the excessive amount. 30 per cent of the stated limit (12 MEUR or 10 MEUR) is adjusted for change in electricity price in price area DK2 over time<sup>3</sup>. Current expectations to the price development are stated in Energinet's "Analyseforudsætninger" (Analysis assumptions) from 2017, which are publicly available on Energinet's webpage. Please note that the caps are stated in real terms, i.e. no inflation is included.

In this information package it is assumed that CS Zealand is connected to the distribution grid, i.e. a cap of 12 MEUR/year is assumed.

<sup>3</sup> The remaining 70 per cent of the cost is adjusted yearly by inflation

## 5.2 Assumptions regarding tariff methodology

The tariffs charged today in the Danish Transmission System are based on an entry-exit principle.

Currently, the tariffs are differentiated between the different points in the Transmission System. However, in relation to making the current tariff methodology compliant with the coming regulation on Harmonised Transmission Tariff Structure for Gas (TAR NC), Energinet investigates the possibility of changing the tariff methodology to a transportation tariff. A transportation tariff will mean that the same tariff will be used for all points in the Danish Transmission System.

Please note that all changes in the tariff methodology are subject to approval by Danish Energy Regulatory Authority (DERA). Nevertheless, in this Information Package, the calculation method of the transportation tariff is used. Any referral to the transportation tariff in this Information Package is therefore not in accordance with the currently approved tariff methodology.

### 5.2.1 Definition of transportation tariff

The transportation tariff consists of three elements, a commodity tariff, entry capacity tariff and exit capacity tariff, and is calculated based on following formulas:

$$\textit{Transportation tariff} = \textit{Commodity tariff} + \textit{Entry capacity tariff} + \textit{Exit capacity tariff}$$

$$\textit{Commodity tariff} = \frac{\textit{Total OPEX}}{\textit{Total flow}}$$

$$\textit{Entry capacity tariff} = \textit{Exit capacity tariff} = \frac{\textit{Total CAPEX}}{\textit{Total capacity booking}}$$

## 5.3 Flow and capacity scenarios

The assumptions on flow and capacity bookings of the 0-reference users and OS 2017 contracts are described in the following.

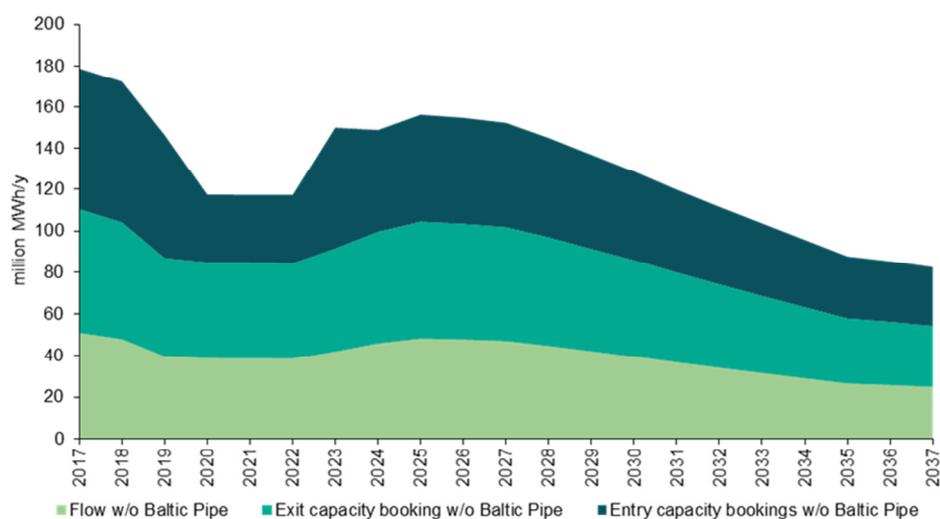
### 5.3.1 0-reference flow and -capacity bookings

Forecasts of the Danish gas transmission system's flow and capacity bookings without flow and capacity bookings coming from the Baltic Pipe Project (referred to as the 0-reference) are essential for calculating the transportation tariff.

Energinet's "Analyseforudsætninger" ("Analysis assumptions") is a general set of assumptions, which Energinet always applies in budgets, forecasts and analyses. The assumptions can be found on [www.energinet.dk](http://www.energinet.dk). In this model, "Analyseforudsætningerne" from July 2017 provides the basis for the expected 0-reference flow. The forecast of the 0-reference capacity bookings is based on Energinet's best estimate based on current market knowledge and is split between entry- and exit capacity.

The illustration below shows the expected development in 0-reference flow and capacity booking from 2017 to 2037.

**Fig. 1** Development in 0-reference flow and capacity bookings 2017-2037, million MWh/y



The largest change compared to Information Package 1 is the renovation of the Tyra gas field, expected to take place from 2019 until 2022, which causes the decrease in entry capacity bookings.

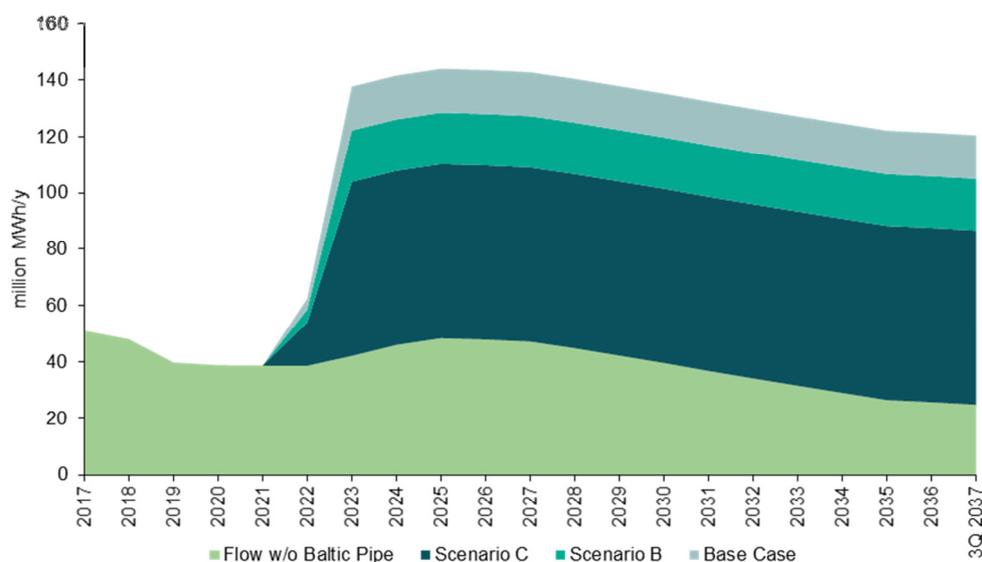
### 5.3.2 Base case flow and capacity bookings assumptions related to the OS 2017 Capacity Agreements

It is expected that the Baltic Pipe Project, if realized, will increase the total flow and capacity bookings in the Danish transmission system. Based on the assessment of the result of the OS 2017 Phase 1, Energinet will apply "Scenario A" from Information Package 1 as the base case assumption in the economic model. In order to illustrate the transportation tariff calculation on lower cases, scenario B and Scenario C from Information Package 1 are illustrated as well:

Scenario assumption	Capacity build (MWh/h/y)	Long contracts entry/exit capacity booking during OS 2017 (MWh/h/y)	Total entry/exit capacity during OS (MWh/h/y)
Base Case	13.411	12.070	12.511
Scenario B	13.411	10.058	10.426
Scenario C	13.411	8.047	8.341

It is assumed in the tariff simulations, that the load factor is 0.85 for OS 2017 capacity bookings for each shipper during the entire period 2022-2037, and it is assumed that a few short-term products are sold with a load factor of 0.75. The depreciation period of 30 years reflecting economic lifetime of the Baltic Pipe Project is based on an average load factor for each shipper of 0.85. The development in total flow, if the Baltic Pipe Project is realized, is illustrated below. The flow of the OS 2017 Capacity Agreements is assumed to start October 2022 and end September 2037:

**Fig. 2** Development in total flow pr. scenario, million MWh/y



#### 5.4 Updated CAPEX and fixed OPEX estimates for components within Danish part of the Baltic Pipe Project

In this section, the changes in CAPEX and OPEX assumptions are explained and shown.

##### 5.4.1 Changes in CAPEX estimates for components within Danish part of the Baltic Pipe Project

Since the publication of the Information Package 1, Energinet has transferred part of the Norwegian Tie-In scope to the Expansion of the Danish Transmission System. In total, the expected aggregated CAPEX estimate for all three components remains unchanged, compared to Information Package 1

The sizes of the CAPEX changes are shown below<sup>4</sup>:

Total CAPEX pr. component				
	Unit	Information Package 1	Information Package 2	Change
Norwegian Tie-in	MEUR	371	303	-67
Expansion of the Danish Transmission System	MEUR	310	376	66
CS Zealand	MEUR	140	142	2
<b>Total</b>	<b>MEUR</b>	<b>821</b>	<b>821</b>	<b>0</b>

##### 5.4.2 Changes in fixed OPEX estimates for components within Danish part of the Baltic Pipe Project components

The fixed OPEX estimates are still uncertain and estimated based on best practise in this early stage of the project. There has been smaller adjustment to the yearly fixed OPEX of certain components, mainly due to the fact, that fixed OPEX is calculated as a per cent of CAPEX for the Expansion of the Danish Transmission system and CS Zealand asset. The changes to fixed OPEX are as follows:

Fixed OPEX pr. component				
	Unit	Information Package 1	Information Package 2	Change
Norwegian Tie-in	MEUR/y	4	4	0
Expansion of the Danish Transmission System	MEUR/y	3	4	1
CS Zealand	MEUR/y	3	4	1
<b>Total</b>	<b>MEUR/y</b>	<b>11</b>	<b>12</b>	<b>1</b>

Please note that only 50 per cent of fixed OPEX of CS Zealand is included in the Danish cost base.

<sup>4</sup> Please note that the "Change" column does not add up to exactly zero, due to rounding differences

In 2023, fixed OPEX in the 0-reference is 32 MEUR and in Base Case 43 MEUR. Other years can be found in the Economic model in Excel spreadsheet "Updated Economic Model".

## 5.5 Costs of Transportation in different flow and capacity scenarios

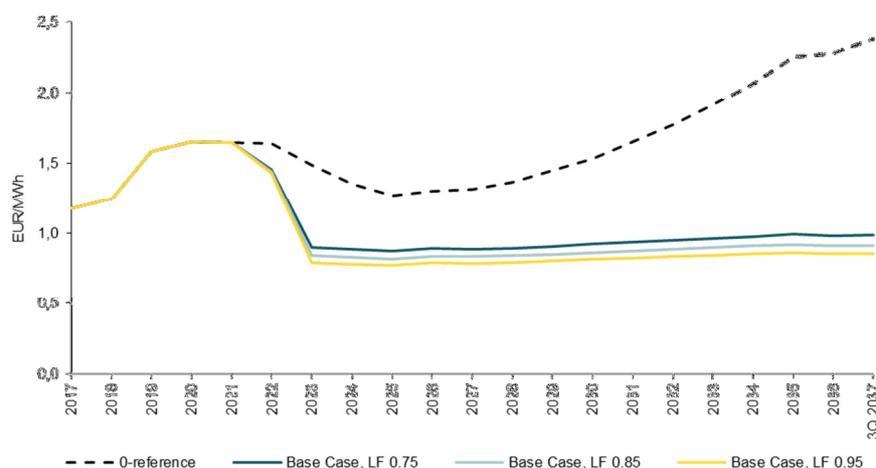
In this section, the development of the Cost of Transportation is described in different flow and capacity scenarios.

### 5.5.1 Development of the Costs of Transportation in different scenarios

During the Open Season 2017, only long term capacity is settled and there is still a high level of uncertainty related to the actual load factor. As mentioned above, the Base Case assumption is a load factor of 0.85. In order to illustrate the impact of different load factors, three scenarios are shown below. All scenarios assume Base Case assumptions related to the capacity bookings, while the load factor is assumed 0.75, 0.85 and 0.95.

Please note that the Costs of Transportation is a unit cost expressed as TOTEX divided by flow.

**Fig. 3** Development in the Costs of Transportation assuming Base Case capacity assumptions and a load factor of 0.95, 0.85 or 0.75

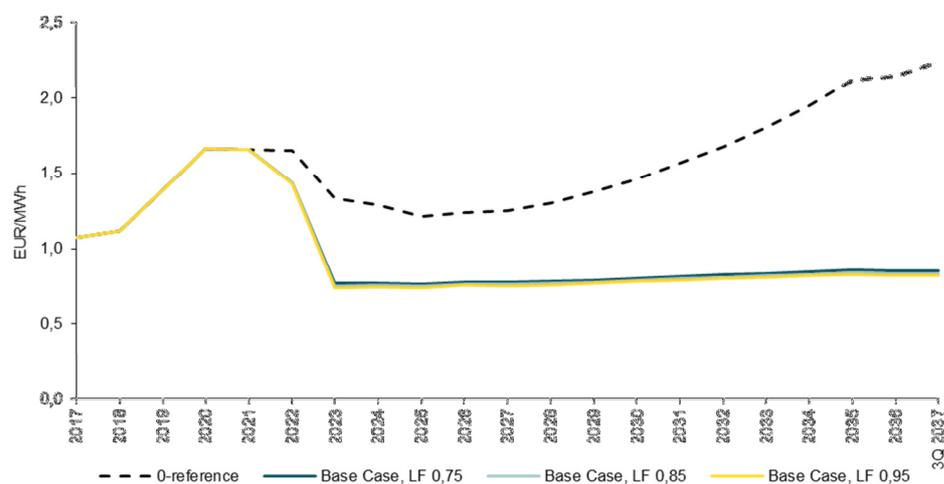


Compared to the Base Case with a load factor of 0.85, a load factor of 0.75 is expected to increase the average Cost of Transportation by 7 per cent, while a load factor of 0.95 is expected to decrease the average Cost of Transportation by 6 per cent from 2023 to 2036.

## 5.6 Tariff simulation for the OS 2017 period

In the calculations of the transportation tariff simulation, it is assumed that all costs related to the Norwegian Tie-In, Expansion of the Danish Transmission System and existing 0-reference cost base as well as the cost of CS Zealand to be included in Energinet's cost base, as described in 5.2, can be split among all users of the Danish gas system. The transportation tariff simulation applying Base Case assumptions but with different load factors, is calculated below.

**Fig. 4** Development in the transportation tariff with different load factor assumptions



Development in the transportation tariff in different scenarios				
		2025	2030	2035
0-reference	EUR/MWh	1.21	1.46	2.12
<b>Base Case, LF 0.85</b>	<b>EUR/MWh</b>	0.75	0.79	0.84
Base Case, LF 0.75	EUR/MWh	0.76	0.80	0.86
Base Case, LF 0.95	EUR/MWh	0.74	0.78	0.83

The average transportation tariff simulation with Base Case assumptions and a load factor of 0.85 is 0.79 EUR/MWh in the period 2023-2036. If the load factor is reduced to 0.75, the transportation tariff simulation increases by 2 per cent on average, while a load factor of 0.95 decreases the transportation tariff simulation by 2 per cent on average.