User Group on the implementation of TAR NC

9 March 2017

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Agenda

- Tariff principles and market design in a Baltic Pipe future
- Background and TAR NC (Tariff Network Code)
  - Timeline
  - Scope and focus
  - Definitions
  - Overview of the tariff methodology as of March 2017
- Methodologies
    - CWD (Capacity Weighted Distance)
    - Uniform
- The way forward
  - Shipper Taskforce

Getting started

- Presentation of participants
- The aim of the User Group
- Ask, comment and suggest!!

- For your consideration:
  - Other relevant tariff methods to consider (besides capacity-weighted, uniform and differentiated cost allocation)?
  - How do you see the potentials effects of the different cost allocation methodologies?
  - Pros and cons guided by the overall criteria of transparency, cost-reflectiveness and non-discrimination?

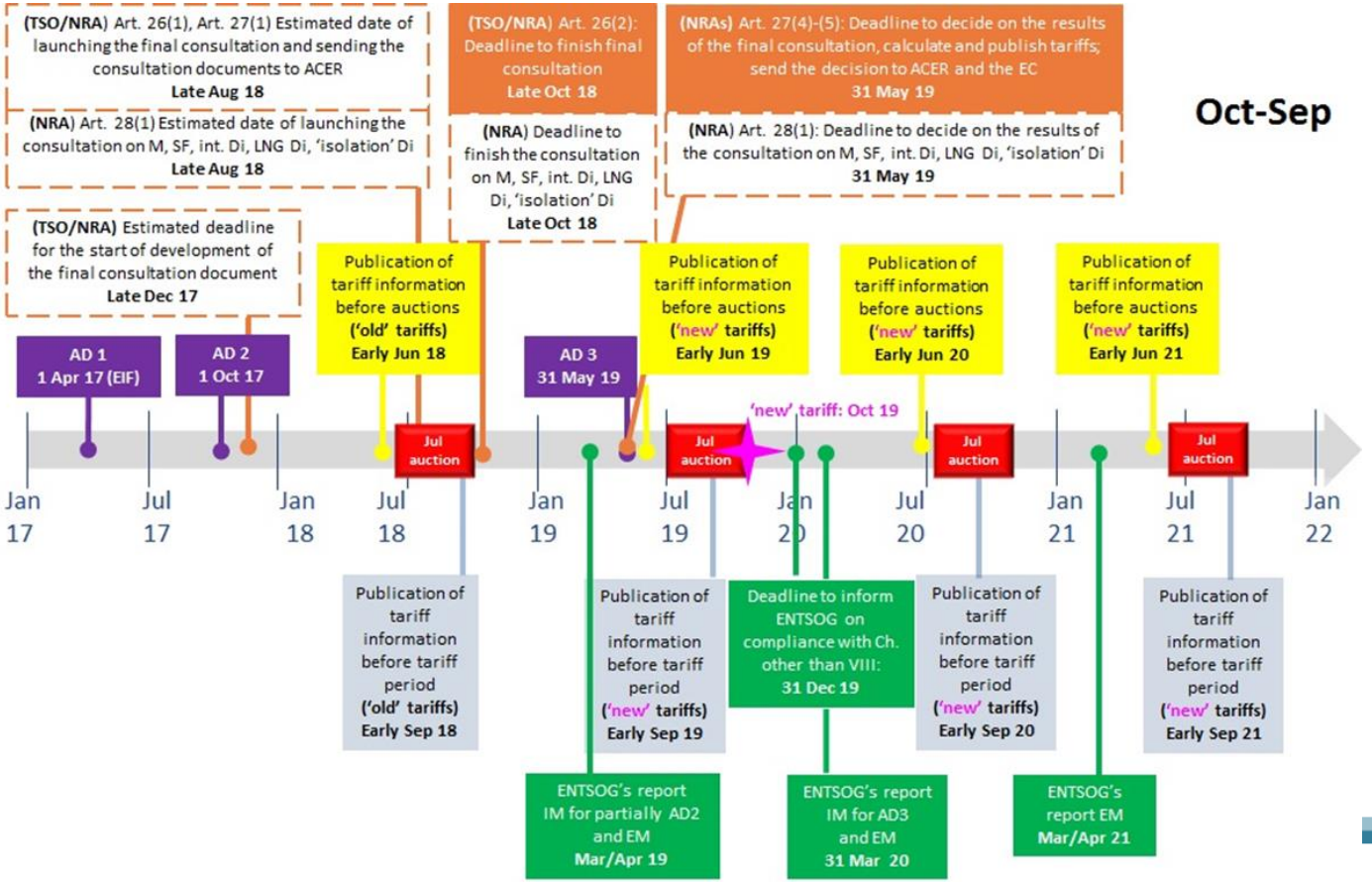
Baltic Pipe – tariff principles and market design

- A common entry point for the Norwegian tie in the North Sea and the Danish transmission system
- Uniform cost allocation at points in the Danish transmission system
- Extension of uniform cost allocation to common entry point in the North Sea
- Other tariff structure elements remain

Multiplier for long term capacity bookings

- With implementation of NC CAM and Open Season 2017 long term capacity bookings will be introduced to the Danish gas market
- Need to supplement existing structure of multipliers for daily, monthly, quarterly and yearly capacity bookings
- Energinet.dk will propose a multiplier of 0.90 for capacity bookings with duration ≥ 5 years for approval by DERA after market consultation.

Timeline



It is expected that the application on the future tariff methodology will be submitted to DERA by the end of year 2017 (oct./nov.)

Background and TAR NC – Scope and focus

Focus of the meeting

Ch. I 'General provisions'

Ch. II 'Reference price methodologies'

Ch. IV 'Reconciliation of revenue'

Ch. VII 'Consultation requirements'
(except for Art. 28 on discounts, multipliers and seasonal factors)

Ch. 'Publication requirements'
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Ch. X 'Fi

Ch. III 'Reserve

Ch. V 'Pricing ity and capacity at VIPs'

Ch. VI 'Clea

Ch. VII 'n requ
r Art. 28 on d ipliers and seasona

ublication requirements'
(only for Art. 31(2)-(3) on publication of certain tariff information on ENTSOG's TP)

Ch. IX 'Incremental capacity'

Apply to all entry and all exit points

TAR NC scope > CAM NC scope

Apply to IPs only

TAR NC scope = CAM NC scope

TAR NC

Article 7
Choice of a reference price methodology

The reference price methodology shall comply with Article 13 of Regulation (EC) No 715/2009 and with the following requirements. It shall:

(v) enable network users to reproduce the calculation of reference prices and their accurate forecast;

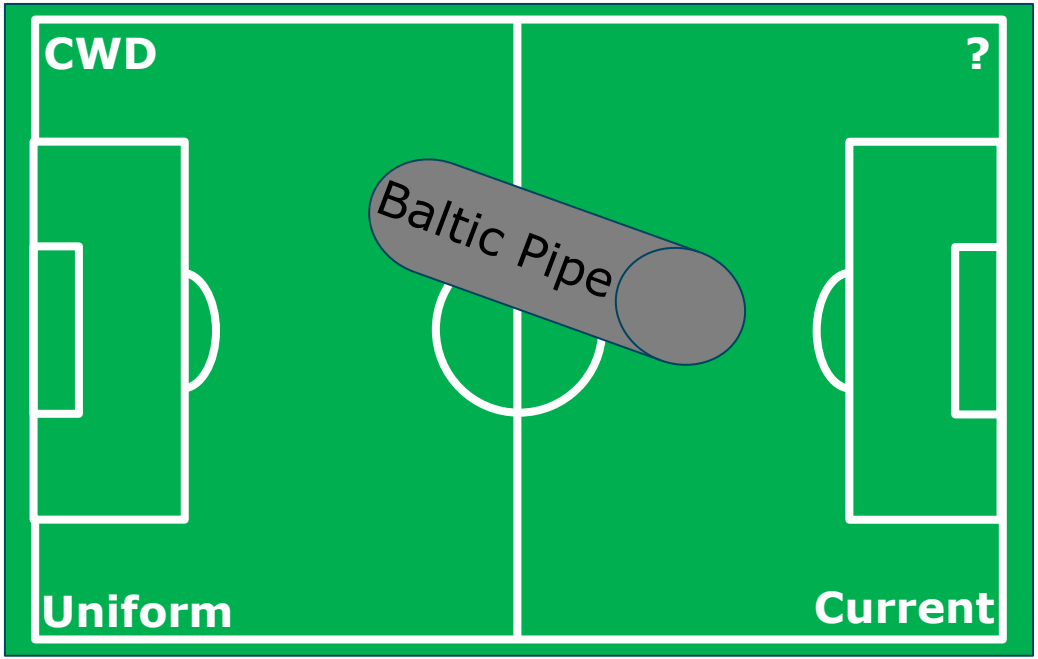
(w) take into account the actual costs incurred for the provision of transmission services considering the level of complexity of the transmission network;

(x) ensure non-discrimination and prevent undue cross-subsidisation including by taking into account the cost allocation assessments set out in Article 5;

(y) ensure that significant volume risk related particularly to transports between entry-exit systems is not assigned to final customers within an entry-exit system;

(z) ensure that the resulting reference prices do not distort cross-border trade

Setting the stage



Definitions

- Capacity-/commodity-split:
  - Capacity tariffs = recovery of CAPEX cost base
  - Commodity tariffs = recovery of OPEX cost base
- Entry-/Exit-split
  - Ex ante – all Entry are the same, all Exit tariffs are the same; Entry ≠ Exit
  - Ex post – all tariffs are the same; Exit = Entry
- Modeling of storage points and VP
  - Point of departure: as is today (100% rebate)
- Different terms and common confusion

Overall assumptions (2018/19 data)

Entry Points	Capacity in 10^3 $kwh_{ø}$/h/year (CAP_{En})
Nybro Entry	4,865
Ellund Entry	3,105
BNG Entry	225
	8,195

Exit Points	Capacity in 10^3 $kwh_{ø}$/h/year (CAP_{Ex})
DK-Zone	4,161
Ellund Exit	1,195
Dragør Exit	1,498
	6,854
Total entry and exit	15,048

Cost base	mDKK
Total	430
CAPEX-/OPEX-split	52%/48%
Capacity cost base	223.6
Entry-/exit-split	50/50

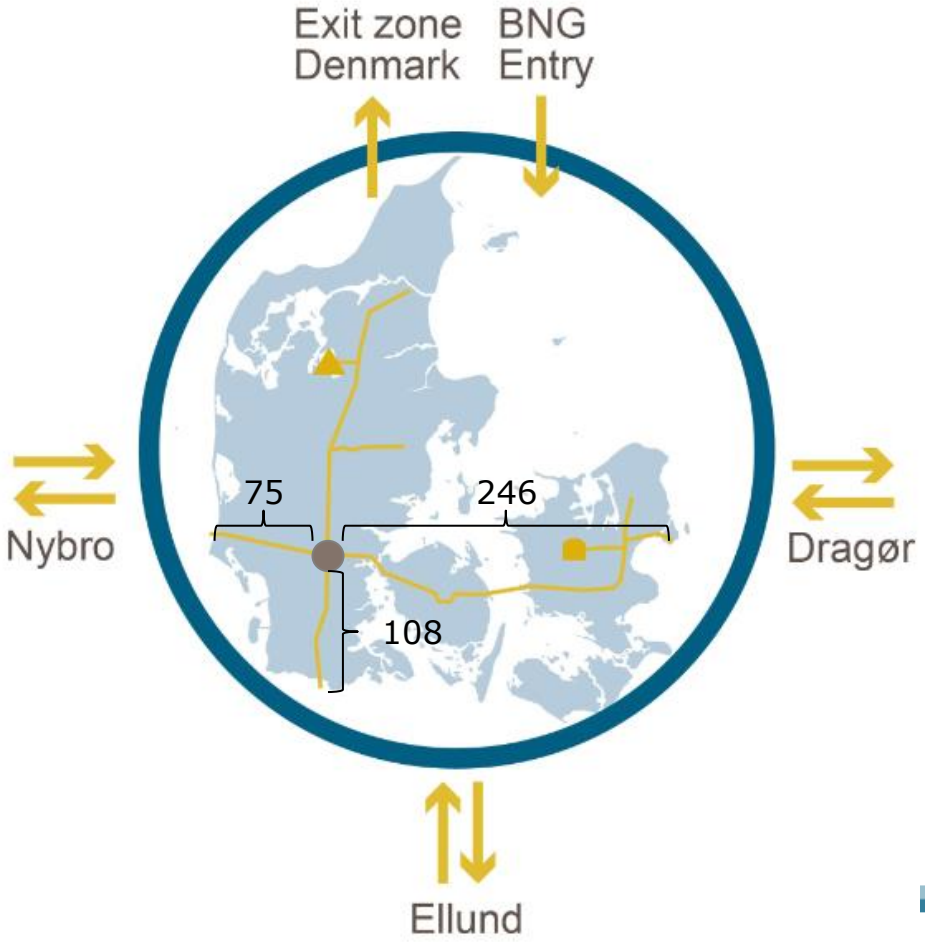
Over-/underrecovery 0 mDKK

Prior to a decision/realisation of a Baltic Pipe

Distances

Entry Points	Distance to Egtved (km) D_{En}
Nybro Entry	75
Ellund Entry	108
BNG Entry	0

Exit Points	Distance to Egtved (km) D_{Ex}
DK-Zone	0
Ellund Exit	108
Dragør Exit	246

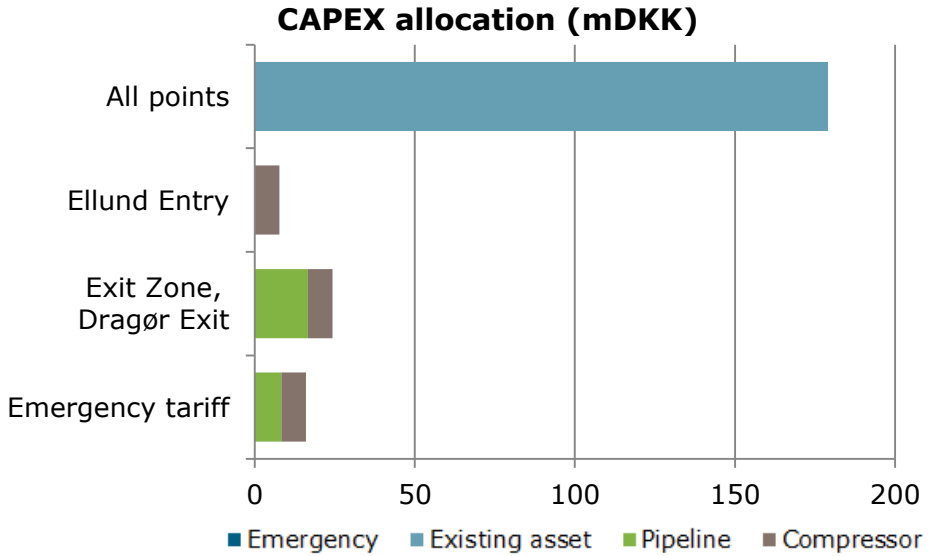


Methodologies

- Current method
- Capacity Weighted Distance (default benchmark method)
- Uniform with and without 50/50 E-/E-split

Overview of the tariff methodology as of March 2017

- A quick walk through the calculations today – differentiated tariffs



Example – Exit DK Zone

$$Tariff_{\substack{DK\ Zone \\ Dragør}} = \frac{CAPEX_{Existing\ assets}}{Forecasted\ capacity_{All}} + \frac{\frac{2}{3}CAPEX_{Pipeline} + \frac{1}{3}CAPEX_{Compressor}}{Forecasted\ capacity_{\substack{DK\ Zone \\ Dragør}}}$$

$$Tariff_{\substack{DK\ Zone \\ Dragør}} = \frac{180{,}238{,}599}{15{,}048{,}023} + \frac{\frac{2}{3}22{,}424{,}787 + \frac{1}{3}20{,}936{,}613}{5{,}658{,}920}$$

$$= 11.98 + 3.87 = 15.85\ \text{DKK/kWh/h/year}$$

$$Tariff_{\substack{Ellund \\ Entry}} = \frac{CAPEX_{Existing\ assets}}{Forecasted\ capacity_{All}} + \frac{\frac{1}{3}CAPEX_{Compressor}}{Forecasted\ capacity_{\substack{Ellund \\ Entry}}}$$

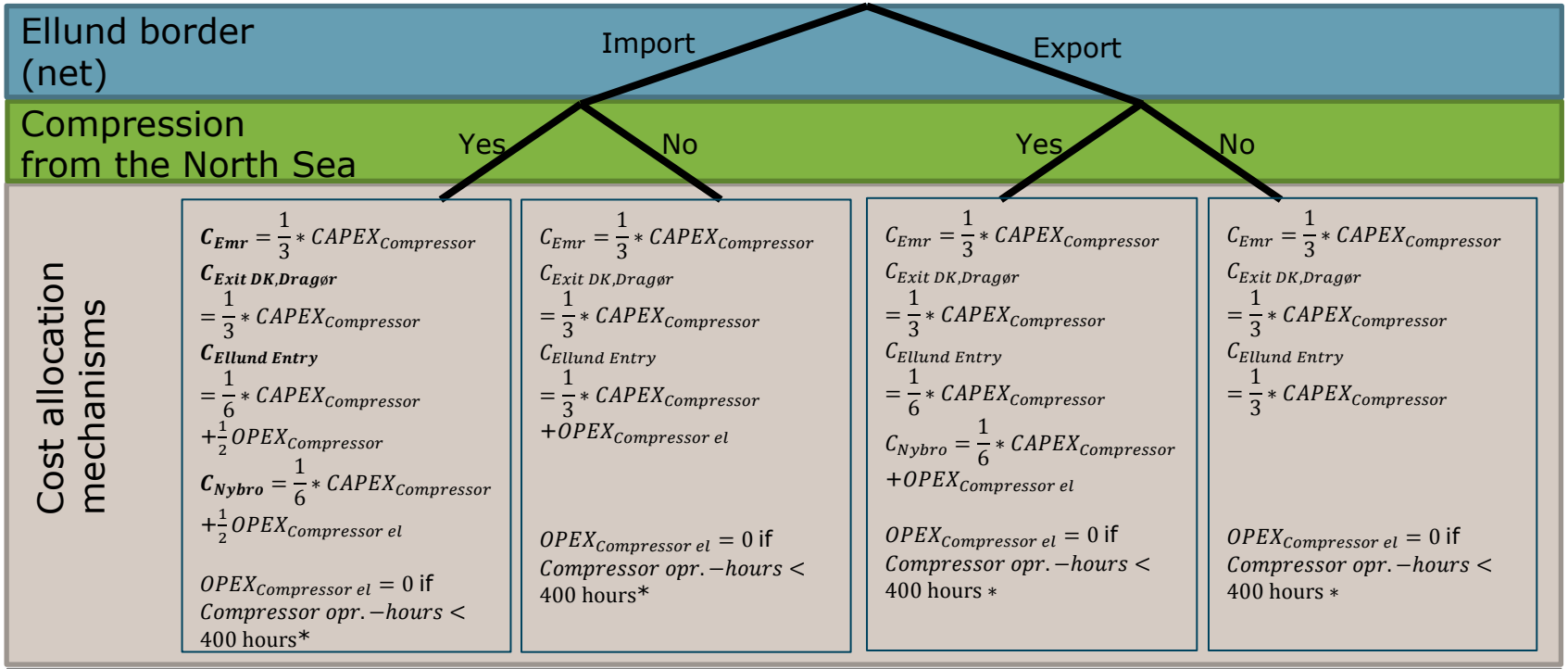
$$Tariff_{\substack{Ellund \\ Entry}} = \frac{180{,}238{,}599}{15{,}048{,}023} + \frac{\frac{1}{3}20{,}936{,}613}{3{,}105{,}405}$$

$$= 11.98 + 2.34 = 14.32\ \text{DKK/kWh/h/year}$$

Entry Points	T_En (DKK/kWh/h/year)
Nybro Entry	11.98
Ellund Entry	14.32
BNG Entry	11.98

Exit Points	T_Ex (DKK/kWh/h/year)
DK-Zone	15.85
Ellund Exit	11.98
Dragør Exit	15.85

Scenarios: Allocation of compressor CAPEX



* If the compressor hours exceeds 400 hours annually and flow scenario is net exports Germany, allocated fuel costs over 400 hours to Ellund entry if there is no agreed lower gas pressure in Nybro, and 50/50, if agreed lower gas pressure in Nybro

Capacity Weighted Distance (1)

- Default and benchmarking methodology

- Article 26 93. (c):

(vi) where the proposed reference price methodology is other than the capacity weighted distance reference price methodology detailed in Article 8, its comparison against the latter accompanied by the information set out in point (iii);

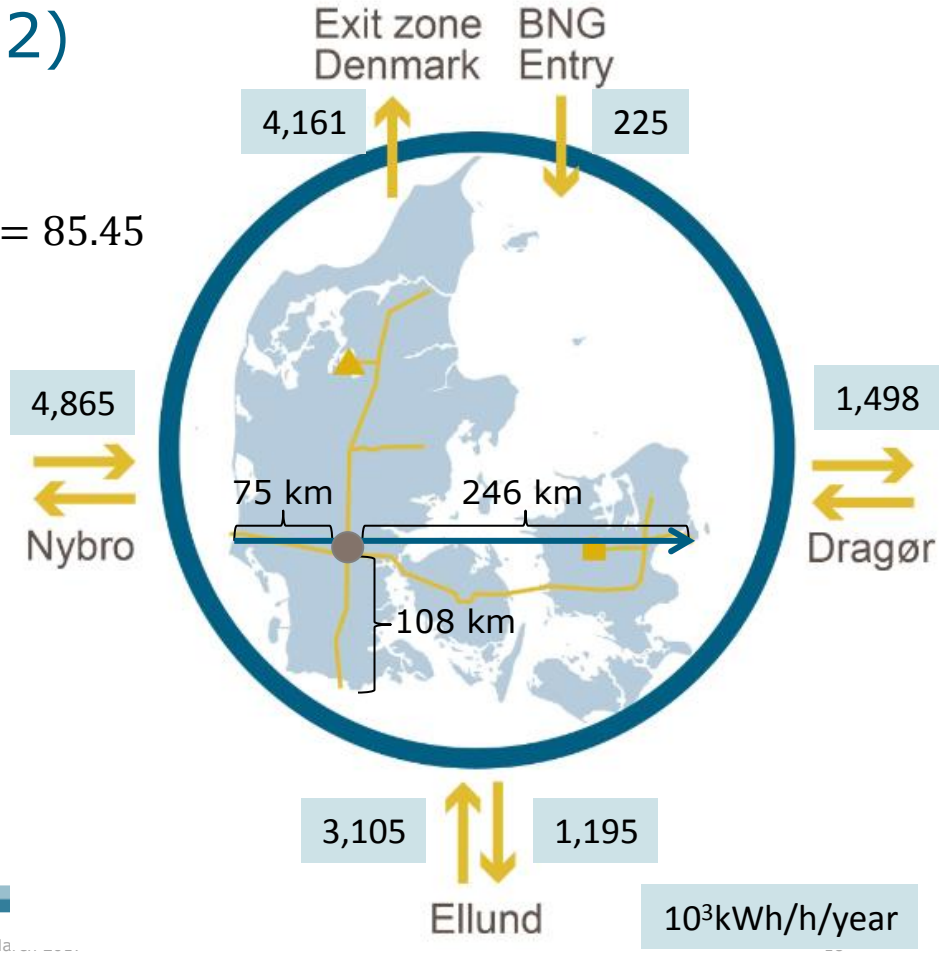
Capacity Weighted Distance (2)
Exampel – Exit DK Zone

$$AD_{Ex} = \frac{\sum_{all\ En} CAP_{En} \times D_{En,Ex}}{\sum_{all\ En} CAP_{En}} = \frac{4{,}865\times75+3{,}105\times108+225\times0}{8.195} = 85.45$$

$$W_{c,Ex} = \frac{CAP_{Ex} \times AD_{Ex}}{\sum_{all\ Ex} CAP_{Ex} \times AD_{Ex}} = \frac{4{,}161\times85.45}{985{,}316} = 0.36$$

$$R_{Ex} = W_{c,Ex} \times R_{\sum Ex} = 0.36 \times 111.80 = 40.35$$

$$T_{Ex} = \frac{R_{Ex}}{CAP_{Ex}} = \frac{40.35}{4{,}161} = 9.70 \text{ DKK/kWh/h/year}$$



Capacity Weighted Distance (3)

1. Calculate weighted average distances:

Entry Points	AD_EN (km)
Nybro Entry	147.59
Ellund Entry	142.94
BNG Entry	72.59
Exit Points	AD_EX (km)
DK-Zone	85.45
Ellund Exit	111.59
Dragør Exit	331.45

$$AD_{En} = \frac{\sum_{all\ Ex} CAP_{Ex} \times D_{En,Ex}}{\sum_{all\ Ex} CAP_{Ex}}$$

$$AD_{Ex} = \frac{\sum_{all\ En} CAP_{En} \times D_{En,Ex}}{\sum_{all\ En} CAP_{En}}$$

2. Calculate the weight of cost:

Entry Points	W_c,EN
Nybro Entry	0.61
Ellund Entry	0.38
BNG Entry	0.01
Exit Points	W_c,EX
DK-Zone	0.36
Ellund Exit	0.14
Dragør Exit	0.50

$$W_{c,En} = \frac{CAP_{En} \times AD_{En}}{\sum_{all\ En} CAP_{En} \times AD_{En}}$$

$$W_{c,Ex} = \frac{CAP_{Ex} \times AD_{Ex}}{\sum_{all\ Ex} CAP_{Ex} \times AD_{Ex}}$$

Capacity Weighted Distance (4)

3. Identify the part of the transmission services revenue to be recovered

	Pct.	mDKK
R	1	223.6
R_sumEN	0,5	111.8
R_sumEX	0,5	111.8

4. Calculate the part of R to be recovered

Entry Points	R_En (mDKK)
Nybro Entry	68.13
Ellund Entry	42.12
BNG Entry	1.55
Exit Points	R_Ex (mDKK)
DK-Zone	40.35
Ellund Exit	15.13
Dragør Exit	56.33

$$R_{En} = W_{c,En} \times R_{\sum En}$$

$$R_{Ex} = W_{c,Ex} \times R_{\sum Ex}$$

5. Divide the resulting values with the forecasted booked capacity at each point

Entry Points	T_En (DKK/kWh/h/year)
Nybro Entry	14.01
Ellund Entry	13.56
BNG Entry	6.89

Exit Points	T_Ex (DKK/kWh/h/year)
DK-Zone	9.70
Ellund Exit	12.66
Dragør Exit	37.61

$$T_{En} = \frac{R_{En}}{CAP_{En}} \qquad T_{Ex} = \frac{R_{Ex}}{CAP_{Ex}}$$

Sensitivity

	Effect on tarrif at (DKK/kWh/h/year)	Nybro Entry	Ellund Entry	BNG Entry	DK-Zone	Ellund Exit	Dragør Exit
10 pct. increase in capacity at	Nybro Entry	-0.80	-0.51	-0.02	-0.07	0.11	-0.04
	Ellund Entry	-0.78	-0.49	-0.02	0.13	-0.18	0.05
	BNG Entry	-0.40	-0.25	-0.01	-0.24	0.08	0.16
	DK-Zone	-0.08	0.10	-0.01	-0.34	-0.13	-0.47
	Ellund Exit	0.43	-0.46	0.02	-0.44	-0.17	-0.61
	Dragør Exit	-0.12	0.10	0.02	-1.31	-0.50	-1.80

Marginal effect of 10 pct. target revenue increase	DKK/kWh/h/year
Nybro Entry	0.52
Ellund Entry	0.50
BNG Entry	0.25
DK-Zone	0.88
Ellund Exit	1.74
Dragør Exit	3.63

Uniform

Ex-ante E/E-split:

Entry Points	T_En (DKK/kWh/h/year)
Nybro Entry	13.64
Ellund Entry	13.64
BNG Entry	13.64

Exit Points	T_Ex (DKK/kWh/h/year)
DK-Zone	16.31
Ellund Exit	16.31
Dragør Exit	16.31

$$T_{En} = \frac{0{,}5 \times CAPEX}{CAP_{En}} = \frac{111.8}{8.195} = 13.64 \text{ kr./kWh/h/year}$$

$$T_{Ex} = \frac{0{,}5 \times CAPEX}{CAP_{Ex}} = \frac{111.8}{6{,}854} = 16.31 \text{ kr./kWh/h/year}$$

Ex-post E/E-split:

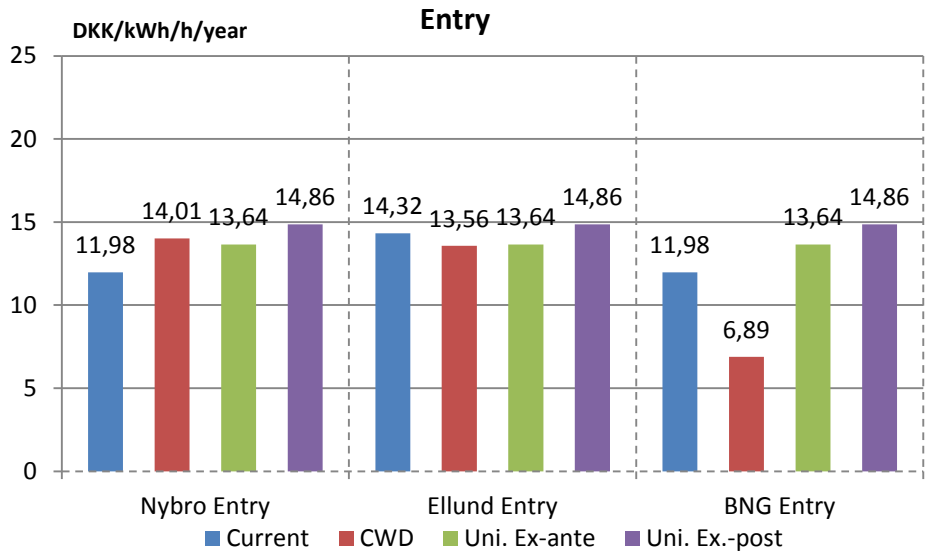
Entry Points	T_En (DKK/kWh/h/year)
Nybro Entry	14.86
Ellund Entry	14.86
BNG Entry	14.86

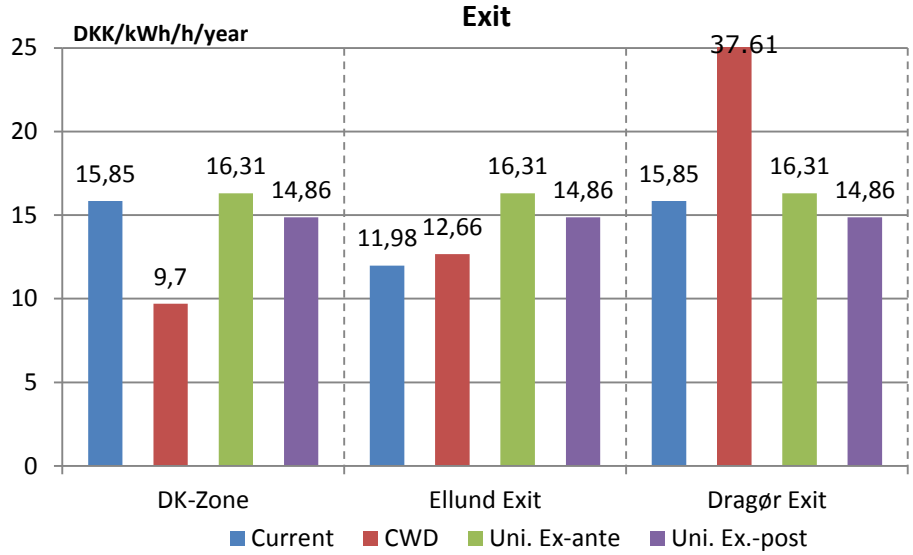
Exit Points	T_Ex (DKK/kWh/h/year)
DK-Zone	14.86
Ellund Exit	14.86
Dragør Exit	14.86

$$T_{En} = T_{Ex} = \frac{CAPEX}{CAP_{All}}$$

$$= \frac{223.6}{15.048} = 14.86 \text{ kr./kWh/h/year}$$

Comparison of cost allocation methods





Invitation to a Shipper Taskforce

- Shippers will be involved in the development of a new tariff methodology for the Danish gas market
- Will report to the User Group
- Working group:
  - Active participation is required
  - Developing examples
  - Discuss effects and incentives
- First meeting in April
- Sign up by sending a mail to gastariffs@energinet.dk, no later than 27 March 2017

Maximum of 8 participants (one per company)

Questions and comments

Back to the beginning:

- Other relevant tariff methods to consider (besides capacity-weighted, uniform and differentiated cost allocation)?
- How do you see the potentials effects of the different cost allocation methodologies?
- Pros and cons guided by the overall criteria of transparency, cost-reflectiveness and non-discrimination?

Other considerations:

- How to reach a common understanding of the proper cost allocation principle?
- Process towards implementation of the full TAR NC (the less decisive elements of the code: transparency, reconciliation, bundling etc.)
- How to initiate future changes? Impact on the methodology of changes to energy policy, regulation, organisation and market conditions

Thank you!

Please feel free to contact me

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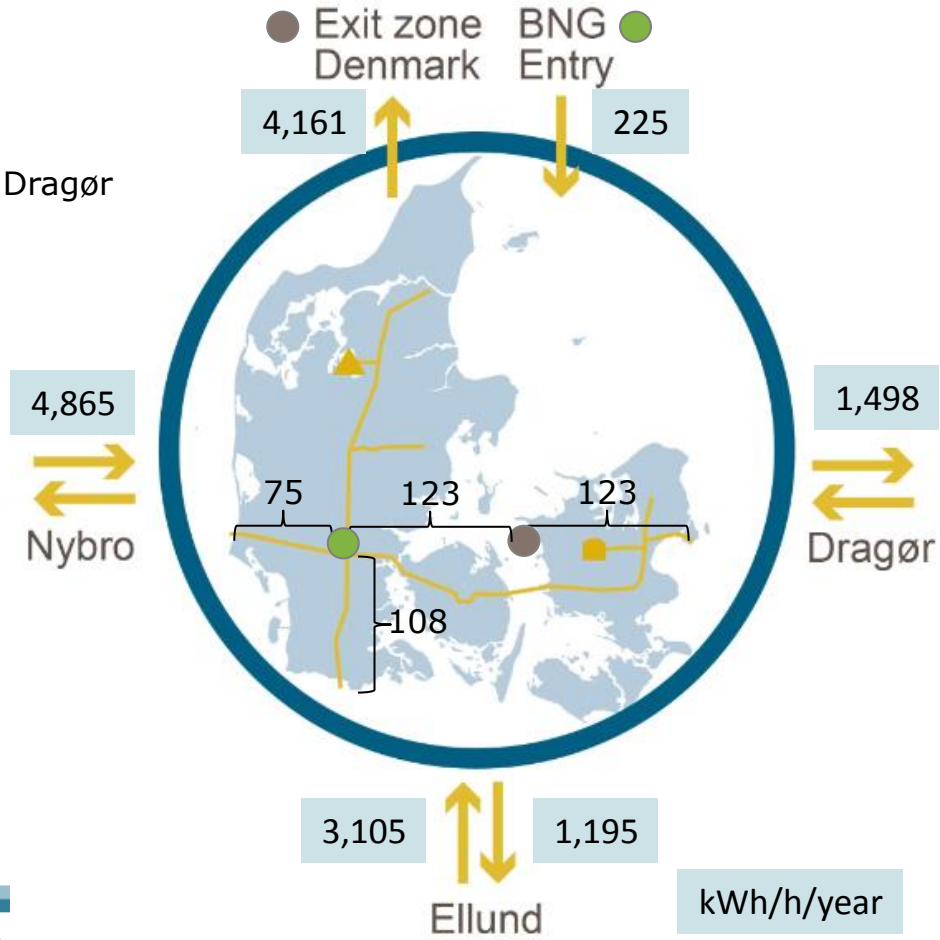
Appendix

Sensitivity – CWD (1)

- DK Exit is placed halfway between Egtved and Dragør
- BNG Entry remains in Egtved

Entry Points	Distance to DK-Zone (km) D_{En}
Nybro Entry	198
Ellund Entry	231
BNG Entry	123

Exit Points	Distance to DK-Zone (km) D_{Fx}
DK-Zone	0
Ellund Exit	231
Dragør Exit	123



Capacity Weighted Distance (2)

1. Calculate weighted average distances:

Entry Points	AD_EN (km)
Nybro Entry	265.14
Ellund Entry	217.62
BNG Entry	190.14
Exit Points	AD_EX (km)
DK-Zone	208.45
Ellund Exit	264.37
Dragør Exit	331.45

$$AD_{En} = \frac{\sum_{\text{all Ex}} CAP_{Ex} \times D_{En,Ex}}{\sum_{\text{all Ex}} CAP_{Ex}}$$

$$AD_{Ex} = \frac{\sum_{\text{all En}} CAP_{En} \times D_{En,Ex}}{\sum_{\text{all En}} CAP_{En}}$$

2. Calculate the weight of cost:

Entry Points	W_c,EN
Nybro Entry	0.64
Ellund Entry	0.34
BNG Entry	0.02
Exit Points	W_c,EX
DK-Zone	0.52
Ellund Exit	0.19
Dragør Exit	0.30

$$W_{c,En} = \frac{CAP_{En} \times AD_{En}}{\sum_{\text{all En}} CAP_{En} \times AD_{En}}$$

$$W_{c,Ex} = \frac{CAP_{Ex} \times AD_{Ex}}{\sum_{\text{all Ex}} CAP_{Ex} \times AD_{Ex}}$$

Capacity Weighted Distance (3)

3. Identify the part of the transmission services revenue to be recovered

	Pct.	mDKK
R	1	223.6
R_sumEN	0,5	111.8
R_sumEX	0,5	111.8

4. Calculate the part of R to be recovered

Entry Points	R_En (mDKK)
Nybro Entry	71.80
Ellund Entry	37.62
BNG Entry	2.38
Exit Points	R_Ex (mDKK)
DK-Zone	57.74
Ellund Exit	21.02
Dragør Exit	33.04

$$R_{En} = W_{c,En} \times R_{\sum En}$$

$$R_{Ex} = W_{c,Ex} \times R_{\sum Ex}$$

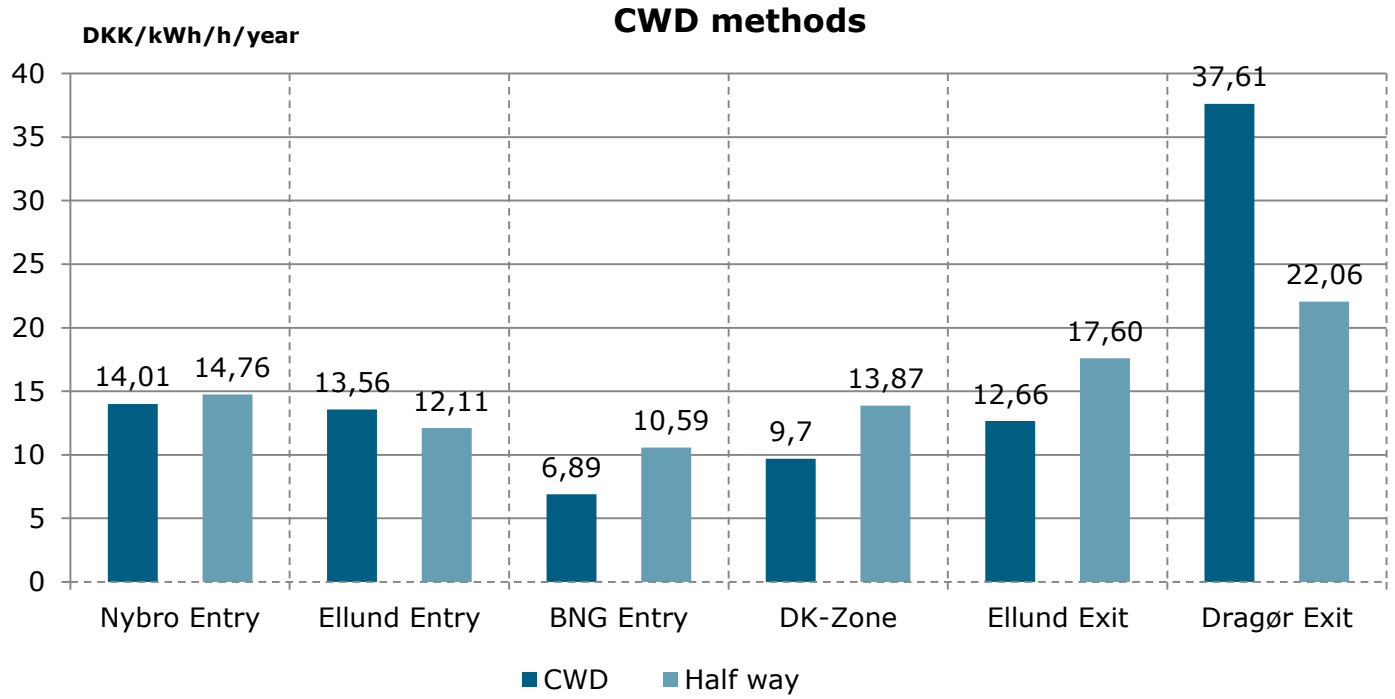
5. Divide the resulting values with the forecasted booked capacity at each point

Entry Points	T_En (DKK/kWh/h/year)
Nybro Entry	14.76
Ellund Entry	12.11
BNG Entry	10.59

Exit Points	T_Ex (DKK/kWh/h/year)
DK-Zone	13.87
Ellund Exit	17.60
Dragør Exit	22.06

$$T_{En} = \frac{R_{En}}{CAP_{En}} \qquad T_{Ex} = \frac{R_{Ex}}{CAP_{Ex}}$$

Comparison

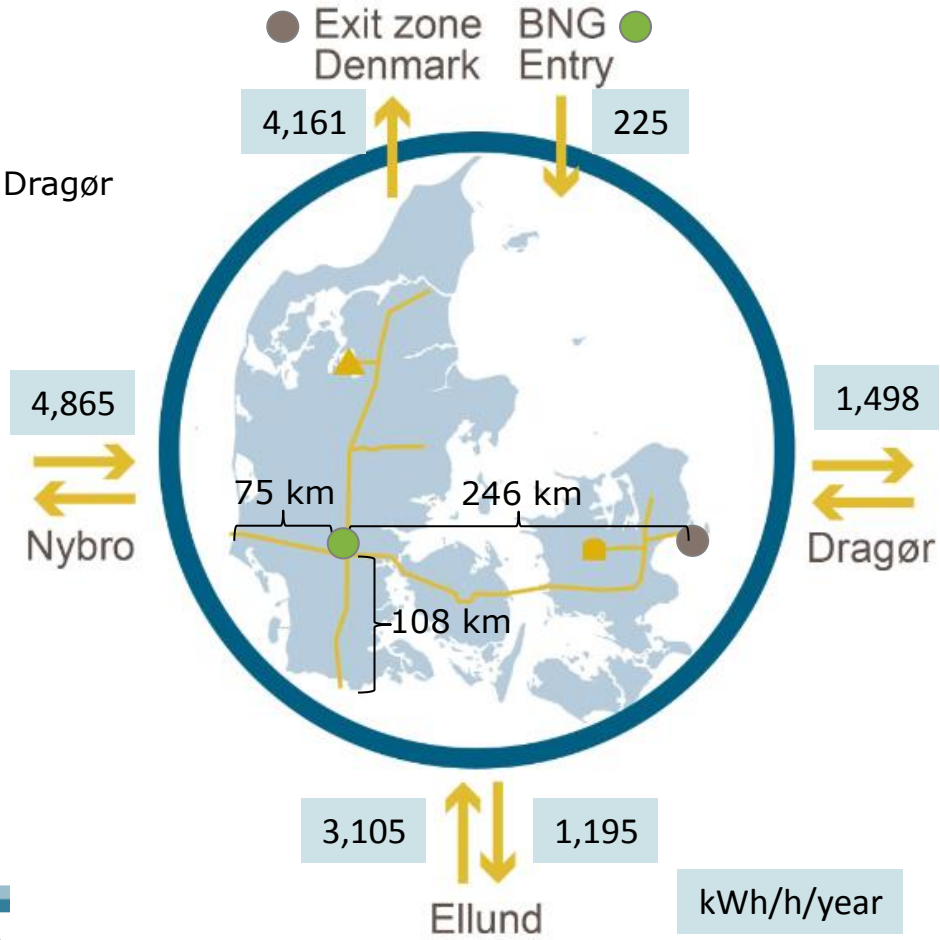

CWD methods
DKK/kWh/h/year
40
35
30
25
20
15
10
5
0
14,01
14,76
13,56
12,11
6,89
10,59
9,7
13,87
12,66
17,60
37,61
22,06
Nybro Entry
Ellund Entry
BNG Entry
DK-Zone
Ellund Exit
Dragør Exit
CWD
Half way

Sensitivity 2 – CWD (1)

- DK Exit is placed halfway between Egtved and Dragør
- BNG Entry remains in Egtved

Entry Points	Distance to DK-Zone (km) D_{En}
Nybro Entry	321
Ellund Entry	354
BNG Entry	246

Exit Points	Distance to DK-Zone (km) D_{Ex}
DK-Zone	0
Ellund Exit	354
Dragør Exit	0



Capacity Weighted Distance (2)

1. Calculate weighted average distances:

Entry Points	AD_EN (km)
Nybro Entry	382.70
Ellund Entry	292.30
BNG Entry	307.70

Exit Points	AD_EX (km)
DK-Zone	331.45
Ellund Exit	417.15
Dragør Exit	331.45

$$AD_{En} = \frac{\sum_{all\ Ex} CAP_{Ex} \times D_{En,Ex}}{\sum_{all\ Ex} CAP_{Ex}}$$

$$AD_{Ex} = \frac{\sum_{all\ En} CAP_{En} \times D_{En,Ex}}{\sum_{all\ En} CAP_{En}}$$

2. Calculate the weight of cost:

Entry Points	W_c,EN
Nybro Entry	0.66
Ellund Entry	0.32
BNG Entry	0.02

Exit Points	W_c,EX
DK-Zone	0.58
Ellund Exit	0.21
Dragør Exit	0.21

$$W_{c,En} = \frac{CAP_{En} \times AD_{En}}{\sum_{all\ En} CAP_{En} \times AD_{En}}$$

$$W_{c,Ex} = \frac{CAP_{Ex} \times AD_{Ex}}{\sum_{all\ Ex} CAP_{Ex} \times AD_{Ex}}$$

Capacity Weighted Distance (3)

3. Identify the part of the transmission services revenue to be recovered

	Pct.	mDKK
R	1	223.6
R_sumEN	0,5	111.8
R_sumEX	0,5	111.8

4. Calculate the part of R to be recovered

Entry Points	R_En (mDKK)
Nybro Entry	73.33
Ellund Entry	35.75
BNG Entry	2.72
Exit Points	R_Ex (mDKK)
DK-Zone	64.95
Ellund Exit	23.47
Dragør Exit	23.38

$$R_{En} = W_{c,En} \times R_{\sum En}$$

$$R_{Ex} = W_{c,Ex} \times R_{\sum Ex}$$

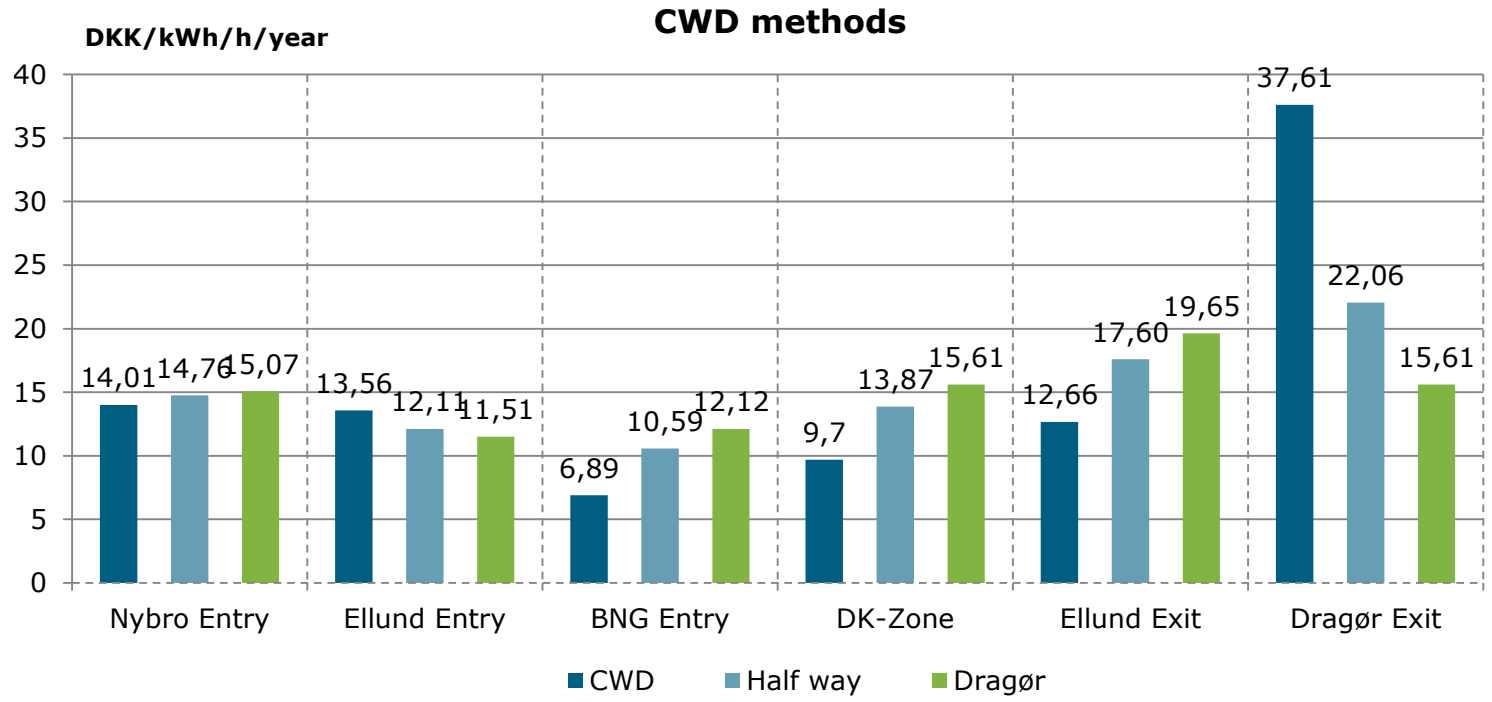
5. Divide the resulting values with the forecasted booked capacity at each point

Entry Points	T_En (DKK/kWh/h/year)
Nybro Entry	15.07
Ellund Entry	11.51
BNG Entry	12.12

Exit Points	T_Ex (DKK/kWh/h/year)
DK-Zone	15.61
Ellund Exit	19.65
Dragør Exit	15.61

$$T_{En} = \frac{R_{En}}{CAP_{En}} \qquad T_{Ex} = \frac{R_{Ex}}{CAP_{Ex}}$$

Comparison


CWD methods
DKK/kWh/h/year
40
35
30
25
20
15
10
5
0
14,01
14,76
15,07
13,56
12,11
11,51
6,89
10,59
12,12
9,7
13,87
15,61
12,66
17,60
19,65
37,61
22,06
15,61
Nybro Entry
Ellund Entry
BNG Entry
DK-Zone
Ellund Exit
Dragør Exit
CWD
Half way
Dragør

Q&A

Q&A (1)

Q: Is the estimate for capacity used in the calculation a forecast or is it actual utilization?
A: The capacity used in the presentation is a forecast for 2018/2019

Q: How will the new tariff methodology handle if there are two compressor stations in the Danish transmissions system, if the Baltic pipe project is realized?
A: The model is not decided

Q: Placing Exit DK in Egtved seems to be a extreme scenario?
A: Yes! In the appendix you'll find scenarios placing Exit DK halfway between Egtved and Dragør and in Dragør.

Q&A (2)

Q: Many large projects, what are Energinet.dks thoughts on the timeline?
A: The intension is to submit a the application for the new tariff methodology at the end of 2017 (Oct./Nov.). However if needed we have the opportunity to postpone the submission to October 2018.

Q: What is the scope of the Shipper Taskforce?
A: Mainly the Chapter 2 of the TAR NC, "Reference Methodology". But other issues relevant for the tariffs will also be discussed.