INC Reality Check WG

Final considerations

GAC WS2 Meeting | 21 October 2016| St. Petersburg

INC reality check WG

Initiation
- At GAC WS2 meeting of 22 January 2016, Russian and European side of WS2 supported to organize a joint, ad-hoc, *reality check workgroup on Incremental*", under the management of ENTSOG

Output:
- To develop a more detailed understanding of the Incremental process, focus on CAM NC Articles 26-30;
- To test the INC process on the basis of a virtual but realistic case for additional cross-border capacity – NL-BE-FR INC realistic case;
- To propose improvements to CAM NC amendment, for the identified inconsistencies or bottlenecks of the INC process (based on the results of the "Reality Check"), to be considered within comitology process in Q2-Q3/2016.

Timing:
- February to October 2016

Organization and Stakeholder involvement

The INC Reality Check WG was chaired by ENTSOG INC Team

WG members:

- ENTSOG INC Team
- 16 TSOs – GTS, Fluxys Belgium, GRTgaz, Enagas, Ontras, Open Grid Europe, eustream, Gas Connect Austria, Gascade, NET4GAS, National Grid, Fluxys TENP, Gasunie Deutschland, SNAM, Gaz-System, FGSZ
- INC Prime Movers – Gazprom, IFIEC, IOGP and GIE
- European Commission (observer)

12 WG meetings since February 2016

» Kick off Meeting – 18 February – teleconference

» 2nd Meeting – 29 February – half day teleconference

» 3rd Meeting – 16 March – half day teleconference

» 4th meeting – 4 April – full day meeting

» 5th meeting – 13 April – full day meeting

» 6th meeting – 18 April – half day teleconference

» 22 April 2016 – Reporting of the first findings at GAC WS2 meeting

» 7th meeting – 19 May – full day meeting

» 8th meeting – 2 June – full day meeting

» 9th meeting – 20 June – teleconference

» 10th meeting – 27 June – full day meeting

» 1 July 2016 – Reporting of additional findings at GAC WS2 meeting

» 11th meeting – 13 September – full day meeting

» 12th meeting – 23 September – full day meeting

» 21 October 2016 – Final reporting of findings at GAC WS2 meeting

9 Recommendations of the WG to DG ENER

- Clarify booking horizon for existing and INC capacity ✔

- Absence of/late NRA decisions ✔

- Introduction of auction as a 'fallback' from alternative allocation mechanism ✔

- Improved definition of alternative allocation mechanism ✔

- Application of fixed price ✔

- Risk of hampering the INC process due to the intermediary annual auction ✔

- Flexibility in setting level of mandatory minimum premium ✔

- Transitional arrangements for existing INC capacity projects ⚠

- Less than 20% of INC CAP to be set aside for short term bookings* ⚠

7 recommendations adopted by DGENER when explained during comitology process

* End-consumers in general - and IFIEC in particular - did not share this recommendation

CAM NC amendment is approved

The CAM NC amendment was approved by the Gas committee (EU member states representatives) on 13 October 2016

- The Gas committee changed the CAM NC according to two last INC Reality check recommendations that were not initially adopted by DGENER

Article 31 – Transitional arrangements

- *In the case of incremental capacity projects initiated before entry into force, Articles 26 to 30 shall apply unless such projects have been granted the applicable approvals for capacity allocation by the respective national regulatory authorities before 1 August 2017.*

Article 30(4).5 – ST quotas in case of alternative allocation methodology*

- *If either booking duration or bids for higher amounts of capacity are prioritized, national regulatory authorities shall decide on setting aside an amount of at least 10% and up to 20% of the technical capacity at each interconnection point when applying Article 8(8). Capacity set aside in this manner shall be offered in accordance with Article 8(7).*

All 9 recommendations finally adopted during comitology meeting of 13 October 2016

* End-consumers in general - and IFIEC in particular - did not share this recommendation

Key findings of the reality check process

Four main elements have contributed to the success of the WG

- Excellent cooperation between TSOs and stakeholders on expert level

- Representative realistic case (virtual INC project) to unveil problems and solutions provided by the network code

- Mature version the NC to be checked against reality

- Balanced view of interests (TSOs, different type of network users)

9 recommendations of the WG fed into comitology process

- All recommendations have been included to CAM and TAR NC

Great opportunity to gain insights for TSOs and stakeholders on future network codes

Virtual realistic case NL-BE-FR project for Incremental capacity

DISCLAIMER

This presentation constitutes the final outcome of the discussions within the INC Reality Check Working Group which took place from February to October 2016. It has been prepared for the purposes of informing the Gas Advisory Council WS 2 at the meeting of October 21 2016.

The figures for tariff, investment cost and all other numbers are
- not binding,
- realistic – *not real* - given all the assumptions and simplification that have been taken into account,
- given without any prejudice with regards to possible future developments, be it tariff design changes, market circumstances changes or economic situation evolutions, and
- therefore by no means a binding reflection of what the tariff or other numbers will or would be in the future, should the virtual case materialize or not.

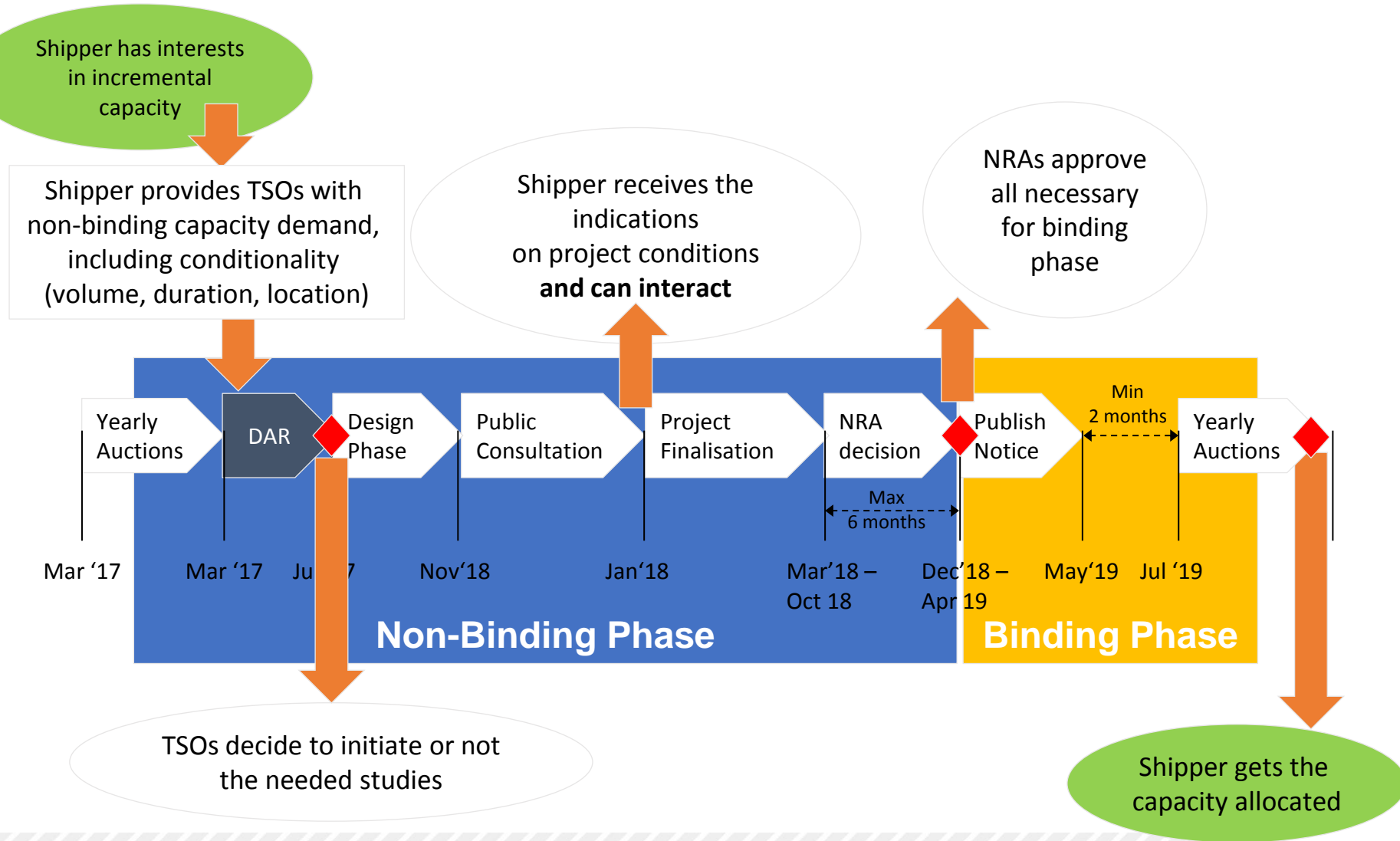# Virtual realistic case NL-BE-FR

Recap – INC Process

Recap – Demand Assessment

Recap – Offer level and associated projects

Economic aspects

Alternative Allocation rule

INC process steps

Shipper has interests in incremental capacity

Shipper provides TSOs with non-binding capacity demand, including conditionality (volume, duration, location)

Shipper receives the indications on project conditions **and can interact**

NRAs approve all necessary for binding phase

| Yearly Auctions | DAR | Design Phase | Public Consultation | Project Finalisation | NRA decision | Publish Notice | Yearly Auctions |

Max 6 months

Min 2 months

| Mar '17 | Mar '17 | Ju 7 | Nov'18 | Jan'18 | Mar'18 – Oct 18 | Dec'18 – Apr 19 | May'19 | Jul '19 |

Non-Binding Phase

Binding Phase

TSOs decide to initiate or not the needed studies

Shipper gets the capacity allocated

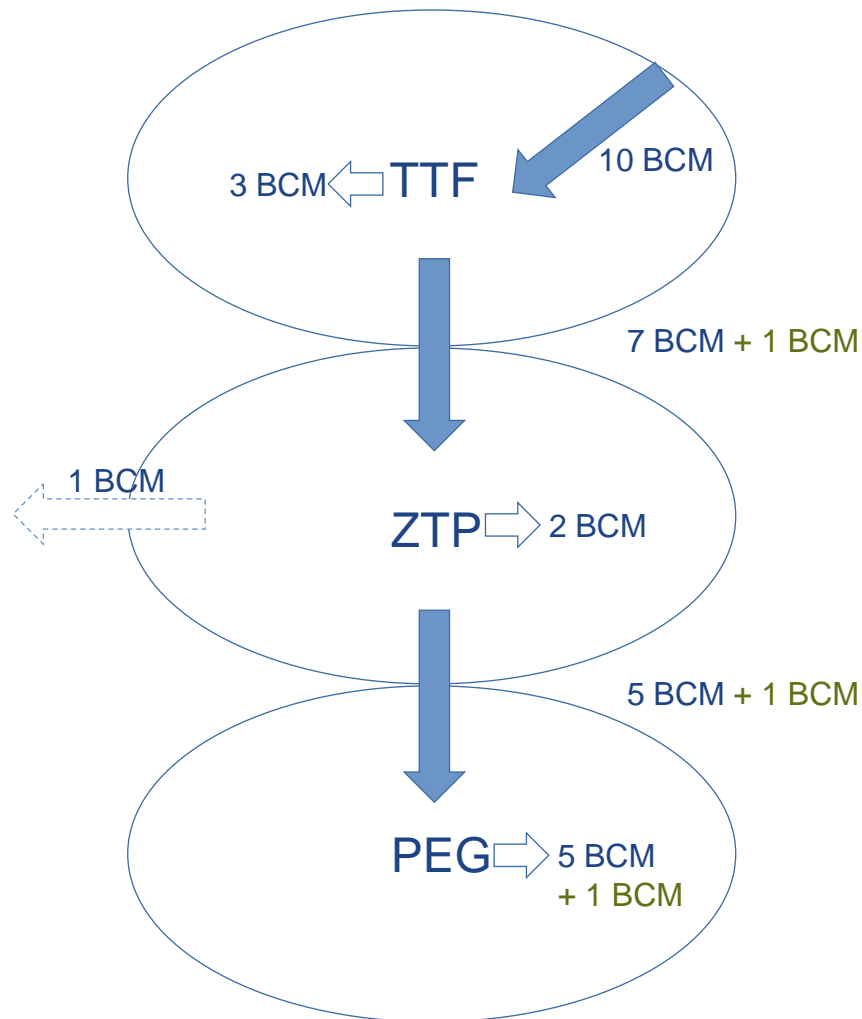# Virtual realistic case NL-BE-FR

Recap – INC Process

Recap – Demand Assessment

Recap – Offer level and associated projects

Economic aspects

Alternative Allocation rule

The (virtual) demand

GCV = 10 kWh/m³(n)
Load Factor = 8000h
1 BCM/y = 10 TWh/y → 1,25 GW

Gazprom
- NL→BE: 7 BCM = 8,75 GW
- BE→FR: 5 BCM = 6,25 GW
- Assumed 20 years, as from 2024
- All or none, over the route and years
- Fixed price option and alt. method

Industrial customer
- NL→BE: 1 BCM = 1,25 GW
- BE→FR: 1 BCM = 1,25 GW
- Assumed 10 years, as from 2024

Concerned infrastructure in NW-EU

Realistic case involves <u>existing</u> highly <u>meshed</u> networks

Zelzate

's Gravenvoeren

Alveringem

Blaregnies/Taisnières
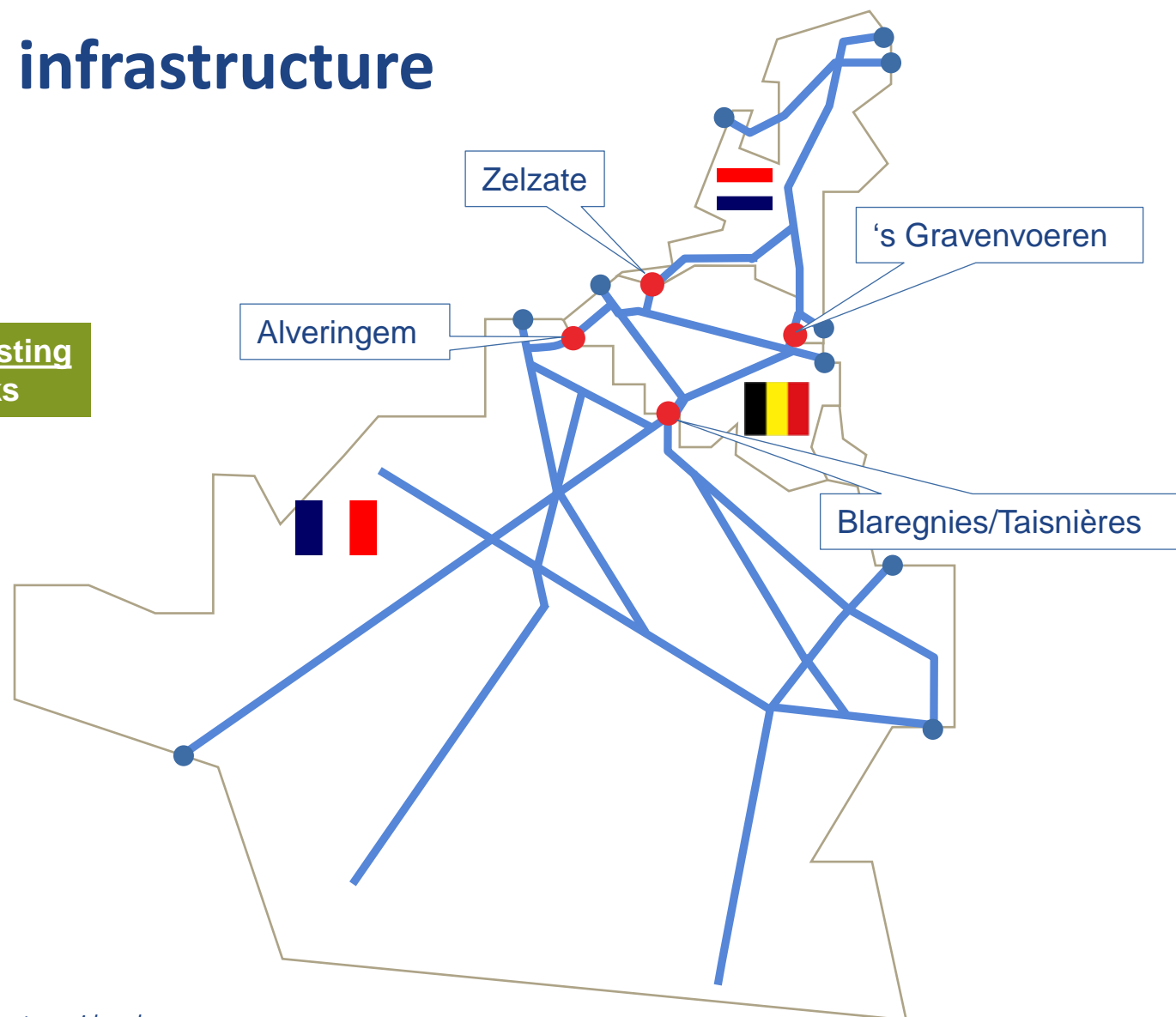
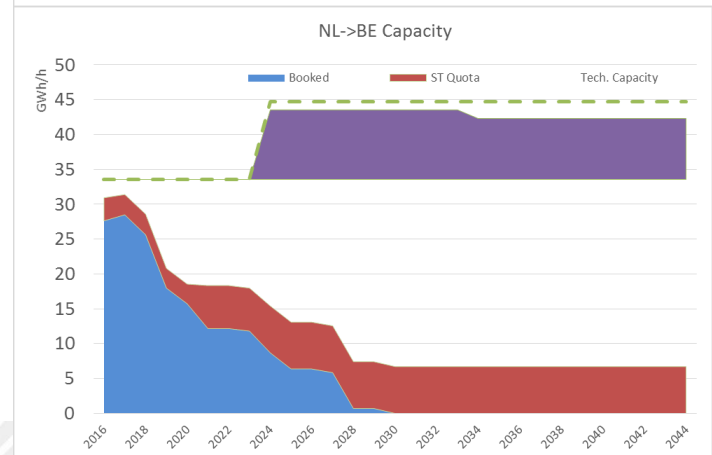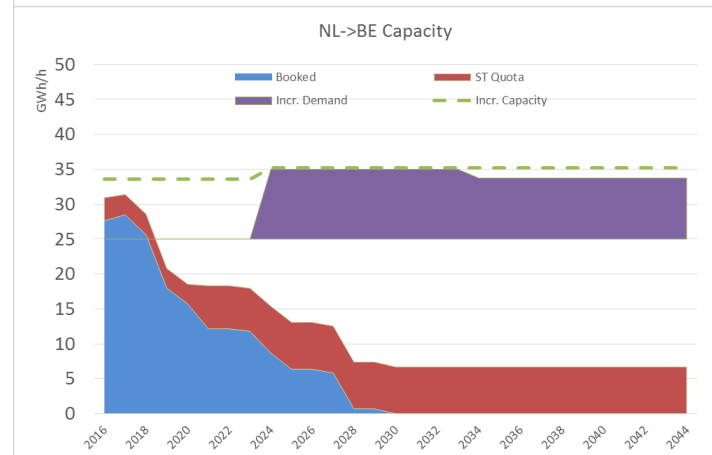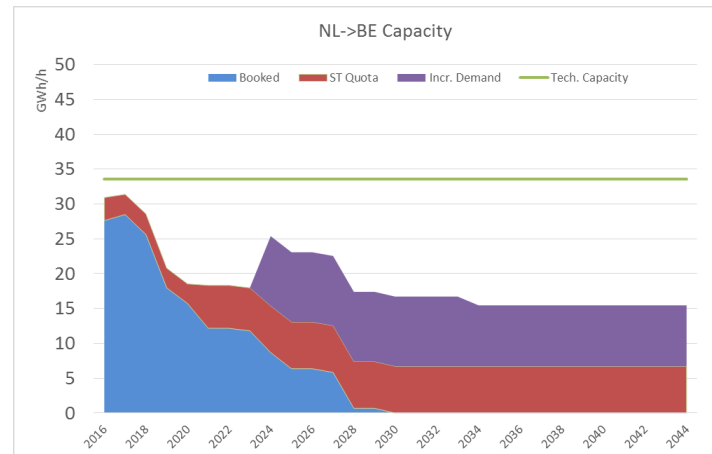*Simplified H-gas infrastructure – L-gas not considered*

Incremental Demand vs. Existing Capacity
NL→BE illustration

Option 1:
On top of Existing Contracts + Quotas
→ No Incremental capacity needed
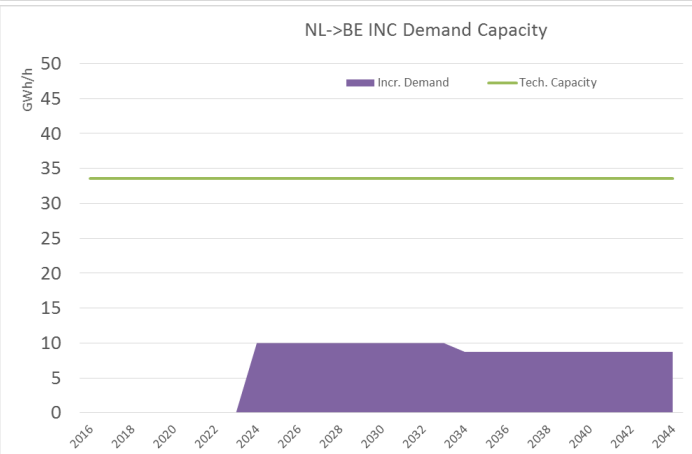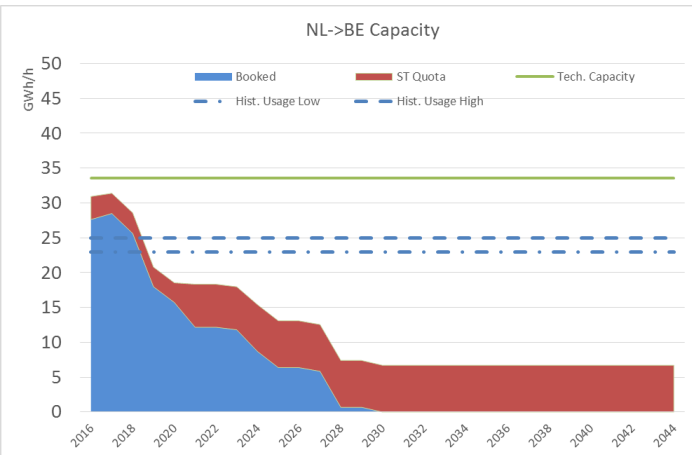
Option 2:
On top of High Hist. Usage
→ +1,6 GW, incl. 10% Quotas

Option 3:
On top of Existing Tech. Capacity
→ +11,1 GW, incl. 10% Quotas

DAR Conclusions => projected offer levels

NL->BE Capacity

BE to FR
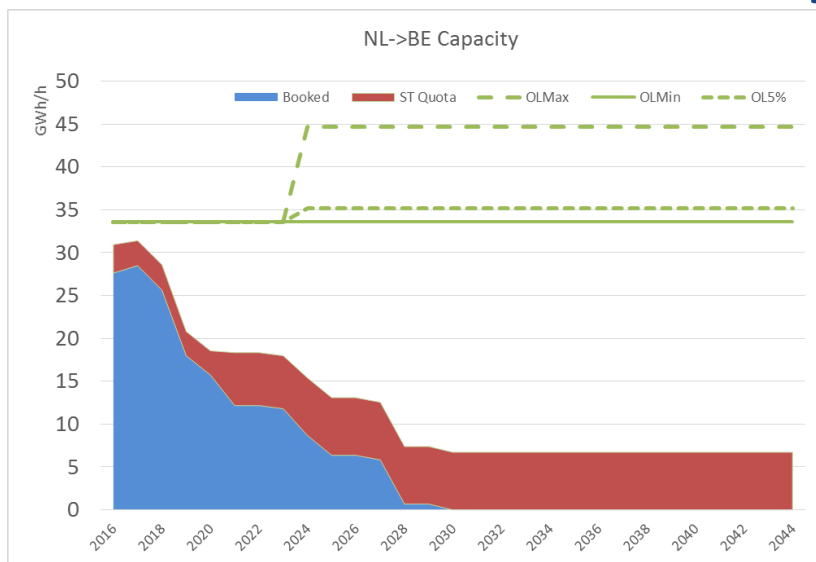
4 demand scenarios leading to 4 offer levels (OL)

- OL_{Min} = Existing Tech Capacity
- $OL_{5\%}$ = INC Demand met with 95% existing and 5% incremental
- $OL_{50\%}$ = INC Demand partially met with 50% existing and 50% incremental
- OL_{Max} = INC Demand on top of existing
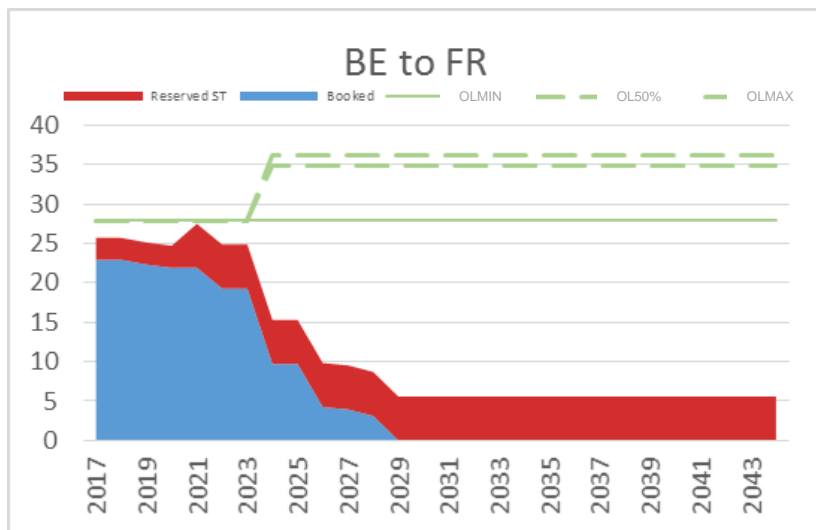
Quotas applied on all offered level (10% for the incremental part – 20% on existing)

OL_{Min} and $OL_{5\%}$ are the most realistic cases
$OL_{50\%}$ and OL_{Max} are studied for sake of illustration

Adequately integrating existing and incremental into a single process is realistic and key to success

Virtual realistic case NL-BE-FR

Recap – INC Process

Recap – Demand Assessment

Recap – Offer level and associated projects

Economic aspects

Alternative Allocation rule

Design: Concerned Infrastructure

Several options can be envisaged to realize offer levels, depending on how the flows will be split east or west-bound towards FR via BE

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NL

X   Y

BE

X   Y

FR
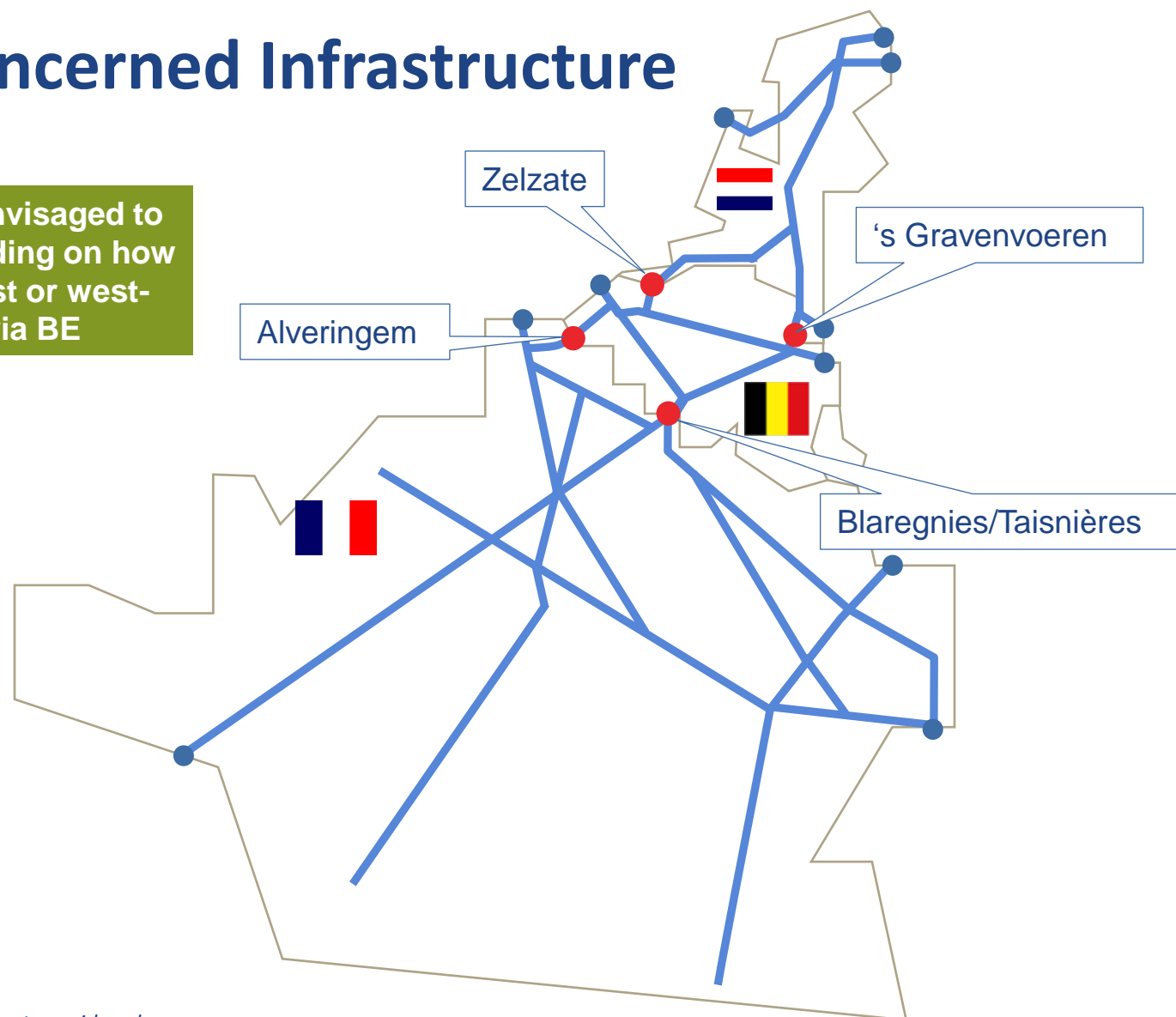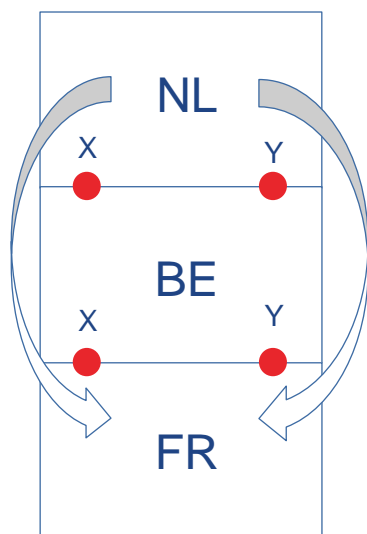
Simplified H-gas infrastructure – L-gas not considered

Reference cases for different offer levels

OL_{Min} → No investment needed, as this concerns only existing capacity

$OL_{5\%}$

- Minimal investments in pipelines and metering stations at all 4 IP's
- Minimal investments yields a marginal increase of the capacity, and maximum re-use of existing infrastructure

$OL_{50\%}$

- Several combinations above 600 M€
- 2 combinations are comparable on total cost ~550 M€

OL_{Max}

- Several options ranging ~1.5 G€ *(billion €)*
- 4 combinations are comparable on total cost ~1.3 G€

These case are worked-out for illustrative purposes*

CAPEX in M€	Exit NL	Entry BE	Exit BE	Entry FR	Exit FR	Total
OL_{Min}	-	-	-	-	-	-
$OL_{5\%}$	23	2	3	2	52	82
$OL_{50\%}$	41	95	125	190	95	546
OL_{Max}	177	160	250	615	165	1367

* Fluxys and GRTgaz costs are not considering the possible re-use of the L-gas infrastructure (transit capacity of ~10GW).
  GTS costs assume maximum synergy between H and L infrastructures

DESIGN: "OL$_{MAX}$" → Costs 1.3 – 1.5 G€*

Several combinations above 1.4 G€

- 4 combinations are comparable on total cost ~1.3 G€ …
- … but are based on different flow repartition East ↔ West
- Resulting in differences in investments in respective countries up to:
  NL 100 M€, BE 320 M€ and FR 240 M€

NRAs and TSOs collaboration is key to find the solution leading to the lowest total acceptable investment cost

Diagram 1:
- 78 M€ in GTS for EXIT
- 230 M€ in FLX for ENTRY
- 250 M€ in FLX for EXIT
- 615 M€ in GRT for ENTRY
- 165 M€ in GRT for EXIT*
- (0, 10, 0, 8)

Diagram 2:
- 78 M€ in GTS for EXIT
- 230 M€ in FLX for ENTRY
- 1 M€ in FLX for EXIT
- 855 M€ in GRT for ENTRY
- 165 M€ in GRT for EXIT*
- (0, 10, 8, 0)

Diagram 3:
- 177 M€ in GTS for EXIT
- 160 M€ in FLX for ENTRY
- 1 M€ in FLX for EXIT
- 855 M€ in GRT for ENTRY
- 165 M€ in GRT for EXIT*
- (5, 5, 8, 0)

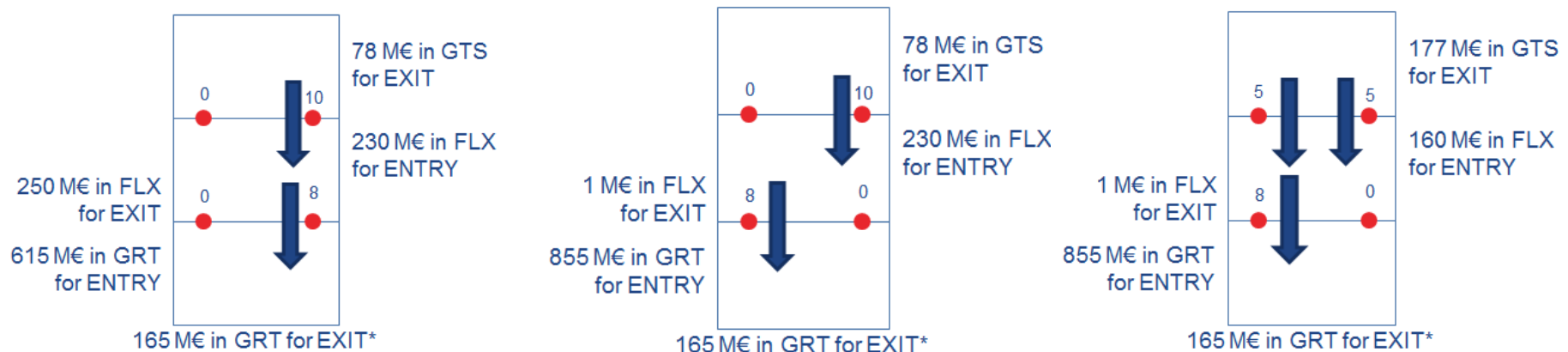* GRTgaz Exit cost: based on 1 extra CCGT in North and extra BZK transit towards CH. Could be 0 if based on substituted gas (no extra demand)
Fluxys and GRTgaz costs are not considering the possible re-use of the L-gas infrastructure (transit capacity of ~10GW) > Could be much lower

OL$_{MAX}$ Reference case

Reference case chosen out of 4 options with comparable overall cost but avoiding maximum cost in any individual national system

177 M€ in GTS for EXIT
160 M€ in FLX for ENTRY
250 M€ in FLX for EXIT
615 M€ in GRT for ENTRY
165 M€ in GRT for EXIT*
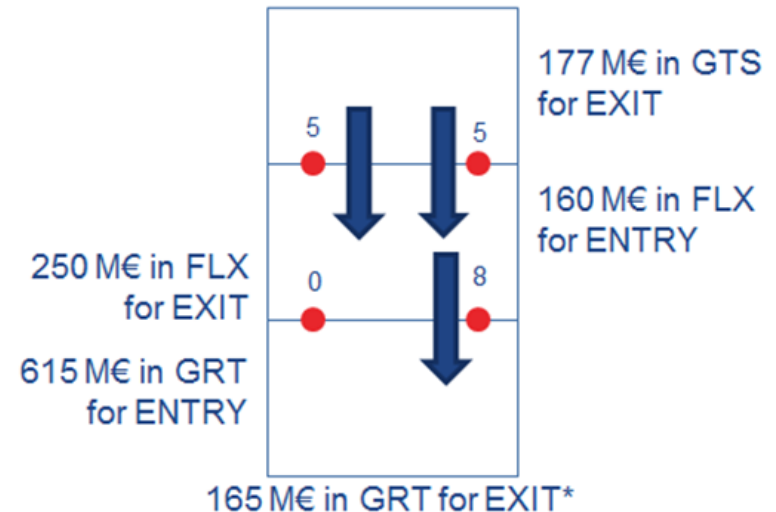
NL/BE	NL	BE	Sub-total NL-BE	BE/FR	BE	FR	Sub-total BE-FR	FREXIT		Total	TOT NL	TOT BE	TOT FR
100%GRA	78	230	308	100%BLA	250	615	865	CCGT+BZK	165	1338	78	480	780
100%GRA	78	230	308	100%ALV	1	855	856	CCGT+BZK	165	1329	78	231	1020
100%GRA	78	230	308	50%BLA-50%ALV	125	885	1010	CCGT+BZK	95	1413	78	355	980
100%ZZ	247	210	457	100%BLA	250	615	865	CCGT+BZK	165	1487	247	460	780
100%ZZ	247	210	457	100%ALV	1	855	856	CCGT+BZK	165	1478	247	211	1020
100%ZZ	247	210	457	50%BLA-50%ALV	125	885	1010	CCGT+BZK	95	1562	247	335	980
50%GRA-50%ZZ	177	160	337	100%BLA	250	615	865	CCGT+BZK	165	1367	177	410	780
50%GRA-50%ZZ	177	160	337	100%ALV	1	855	856	CCGT+BZK	165	1358	177	161	1020
50%GRA-50%ZZ	177	160	337	50%BLA-50%ALV	125	885	1010	CCGT+BZK	95	1442	177	285	980

DESIGN: Conclusion on offer levels

Lowest overall cost options are retained → most beneficial to the market
- Potential difficult choices have to be made due to the remaining number of options for each offer level

Each option is characterized by different investment profiles in each country → this will lead to different views – from different stakeholders

These views will be influenced by:
- Quotas
- F-factor
- Minimum mandatory premium

Cooperation between all NRAs & TSOs involved in such a project is key to select the most suitable combination for each Offer Level

Virtual realistic case NL-BE-FR

Recap – INC Process

Recap – Demand Assessment

Recap – Offer level and associated projects

Economic aspects

Alternative Allocation rule

Economic Test → necessary elements

PV of User Commitments >= f * PV of Increased Allowed Revenue

Present value (PV) of User Commitments
- (i)   the sum of the respective <u>estimated reference prices</u> and a potential auction premium and a potential <u>mandatory minimum premium</u> multiplied by the amount of <u>contracted incremental capacity</u>;
- (ii) the sum of a potential auction premium and a potential <u>mandatory minimum premium</u> multiplied by the amount of <u>available capacity that was contracted in combination</u> with the incremental capacity;

Present value (PV) of <u>increased Allowed Revenue</u>
- associated with the incremental capacity included in the respective offer level
- based on estimated costs

f -> f-factor
- The minimum proportion of project costs, to be "paid" via ex-ante user commitments

Reference Price - Illustration on the Belgian Case

Relevant tariff elements, relating to project
- − Entry from NL
- − Exit to France

Other tariffs are relevant to identify the impact of the project on other NUs
- − Other Entry tariffs*
- − Other Exit tariffs*

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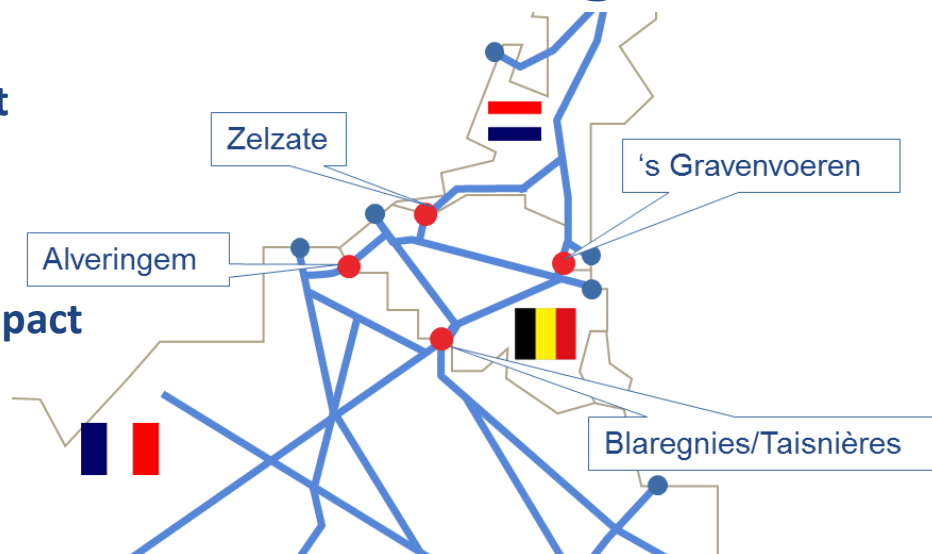
OL_{Min} → **Existing network without incremental**

300 M€

Entries	100	GW
Exit to France	40	GW
Others	100	GW

Allowed Revenue

Sales Expectations

Tariff Methodology

Reference Price

Entries	0,75	€/kWh/h/y
Exit to France	1,65	€/kWh/h/y
Others	1,56	€/kWh/h/y
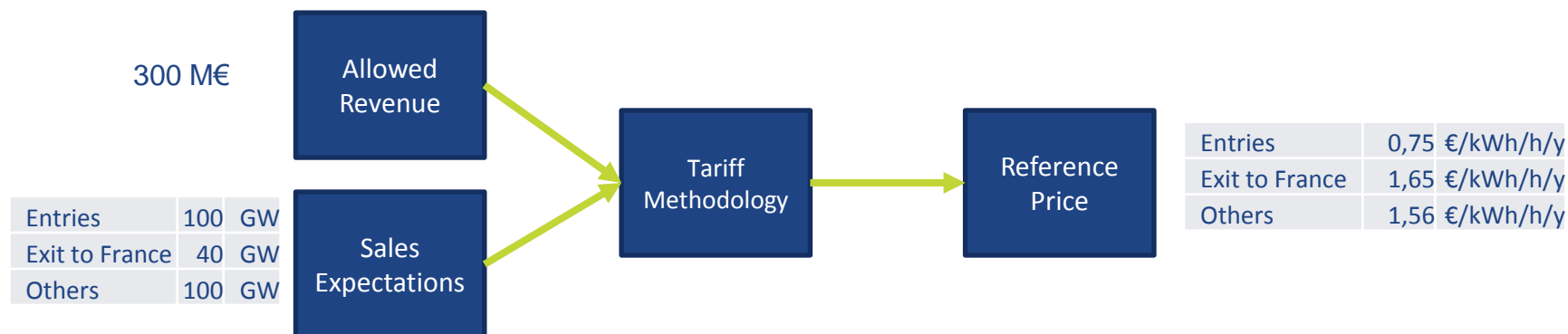
* Note that the Belgian tariff methodology foresees that all Entry tariffs are the same. Other exits are based on a weighted average for all IPs
** Subset of the total All. Revenue (RAB*WACC+DEPREC+OPEX), relating to those IP Entry and Exit services

OL~MAX~ Incremental Project Economic aspects

Economics

Investment	410	M€
WACC (nominal)	4,50%	
Opex	1%	of investment
Assumed Inflation	2%	
Depreciation	50	years

New capacity created thanks to incremental project

Entry capacity from NL	11,11	GW
Exit capacity to FR	8,89	GW
Short term quota	10%	

NPV calculated over 50 years: 518 M€

In year 1, allowed revenue increases by 30 M€ (~10% of the existing network)

years	RAB	RABxWACC	Depreciation	Opex	Total increase of TSO "allowed revenue" due to project
0	410,00				-
1	401,80	18,08	8,20	4,10	30,38
2	393,60	17,71	8,20	4,18	30,09
3	385,40	17,34	8,20	4,27	29,81
4	377,20	16,97	8,20	4,35	29,52
5	369,00	16,61	8,20	4,44	29,24
6	360,80	16,24	8,20	4,53	28,96
7	352,60	15,87	8,20	4,62	28,68
8	344,40	15,50	8,20	4,71	28,41
9	336,20	15,13	8,20	4,80	28,13
10	328,00	14,76	8,20	4,90	27,86
11	319,80	14,39	8,20	5,00	27,59
12	311,60	14,02	8,20	5,10	27,32
13	303,40	13,65	8,20	5,20	27,05
14	295,20	13,28	8,20	5,30	26,79
15	287,00	12,92	8,20	5,41	26,52
16	278,80	12,55	8,20	5,52	26,26
17	270,60	12,18	8,20	5,63	26,01
18	262,40	11,81	8,20	5,74	25,75
19	254,20	11,44	8,20	5,86	25,49
20	246,00	11,07	8,20	5,97	25,24
21	237,80	10,70	8,20	6,09	24,99
22	229,60	10,33	8,20	6,21	24,75
23	221,40	9,96	8,20	6,34	24,50
24	213,20	9,59	8,20	6,47	24,26
25	205,00	9,23	8,20	6,59	24,02
26	196,80	8,86	8,20	6,73	23,78
27	188,60	8,49	8,20	6,86	23,55
28	180,40	8,12	8,20	7,00	23,32
29	172,20	7,75	8,20	7,14	23,09
30	164,00	7,38	8,20	7,28	22,86
31	155,80	7,01	8,20	7,43	22,64
32	147,60	6,64	8,20	7,58	22,42
33	139,40	6,27	8,20	7,73	22,20
34	131,20	5,90	8,20	7,88	21,99
35	123,00	5,54	8,20	8,04	21,77
36	114,80	5,17	8,20	8,20	21,57
37	106,60	4,80	8,20	8,36	21,36
38	98,40	4,43	8,20	8,53	21,16
39	90,20	4,06	8,20	8,70	20,96
40	82,00	3,69	8,20	8,88	20,77
41	73,80	3,32	8,20	9,05	20,57
42	65,60	2,95	8,20	9,23	20,39
43	57,40	2,58	8,20	9,42	20,20
44	49,20	2,21	8,20	9,61	20,02
45	41,00	1,85	8,20	9,80	19,84
46	32,80	1,48	8,20	10,00	19,67
47	24,60	1,11	8,20	10,20	19,50
48	16,40	0,74	8,20	10,40	19,34
49	8,20	0,37	8,20	10,61	19,18
50	0,00	0,00	8,20	10,82	19,02
NPV					**€ 517,84**

Reference Price - Illustration on the Belgian Case

OL$_{5\%}$ → Investment of 5 M€ creating* ~1GW capacity, but securing full demand

AR increases

300,4 M€

Sales increase

Entries	110	GW
Exit to France	48	GW
Others	100	GW

Allowed Revenue

Sales Expectations

Tariff Methodology

Reference Price

All Tariffs decrease by 5,6%

Entries	0,71	€/kWh/h/y
Exit to France	1,56	€/kWh/h/y
Others	1,46	€/kWh/h/y

OL$_{MAX}$ → Investment of 410 M€* creating 11,1 GW Entry NL and 8,9 GW Exit FR**

AR increases

330 M€*

Sales increase

Entries**	110	GW
Exit to France	48	GW
Others	100	GW

Allowed Revenue

Sales Expectations

Tariff Methodology

Reference Price

All Tariffs increase by 3,8%

Entries	0,78	€/kWh/h/y
Exit to France	1,72	€/kWh/h/y
Others	1,62	€/kWh/h/y

* With a depreciation period of 50Y, a WACC of 4,5%, OPEX of 1% and 2% inflation rate
** Subject to 10% ST quotas > only 10 GW and 8 GW are considered as increased sales

Will the economic test pass with the reference price only?

Present value (PV) of User Commitments should deliver

- f * 518 M€
- ST quotas of 10%
- We assume f = 90% → 466 M€

If all incremental capacity was sold

- Max 20 years of booking
- it would only deliver 338 M€

Mandatory Minimum Premium will apply for OL$_{Max}$

	Capacities				Max booking without minimum premium			
	Available incremental capacity		Max incremental capacity sold in incremental auction		Reference price		Max revenue generated in initial auction	Economic test
	Entry from NL	Exit to FR	Entry from NL	Exit to FR	Entry from NL	Exit to FR		
	GWh/h	GWh/h	GWh/h	GWh/h	€/kWh/h/y	€/kWh/h/y	M€	
							€ 337,56	FALSE
					0,78	1,72		
1	11,11	8,89	10,00	8,00	0,80	1,75	21,98	
2	11,11	8,89	10,00	8,00	0,81	1,79	22,42	
3	11,11	8,89	10,00	8,00	0,83	1,82	22,87	
4	11,11	8,89	10,00	8,00	0,85	1,86	23,33	
5	11,11	8,89	10,00	8,00	0,86	1,89	23,80	
6	11,11	8,89	10,00	8,00	0,88	1,93	24,27	
7	11,11	8,89	10,00	8,00	0,90	1,97	24,76	
8	11,11	8,89	10,00	8,00	0,92	2,01	25,25	
9	11,11	8,89	10,00	8,00	0,94	2,05	25,76	
10	11,11	8,89	10,00	8,00	0,95	2,09	26,27	
11	11,11	8,89	10,00	8,00	0,97	2,13	26,80	
12	11,11	8,89	10,00	8,00	0,99	2,18	27,33	
13	11,11	8,89	10,00	8,00	1,01	2,22	27,88	
14	11,11	8,89	10,00	8,00	1,03	2,26	28,44	
15	11,11	8,89	10,00	8,00	1,05	2,31	29,01	
16	11,11	8,89	10,00	8,00	1,07	2,36	29,59	
17	11,11	8,89	10,00	8,00	1,10	2,40	30,18	
18	11,11	8,89	10,00	8,00	1,12	2,45	30,78	
19	11,11	8,89	10,00	8,00	1,14	2,50	31,40	
20	11,11	8,89	10,00	8,00	1,16	2,55	32,03	

Determining the Mandatory Minimum Premium

	Reference price		Min premium		Max revenue generated in initial auction	Economic test
	Entry from NL €/kWh/h/y	Exit to FR €/kWh/h/y	Entry from NL €/kWh/h/y	Exit to FR €/kWh/h/y	M€	
					€ 466,05	**VRAI**
	0,78	1,72				
1	0,80	1,75	0,0801	0,1756	30,35	
2	0,81	1,79	0,0817	0,1791	30,96	
3	0,83	1,82	0,0833	0,1827	31,58	
4	0,85	1,86	0,0850	0,1863	32,21	
5	0,86	1,89	0,0867	0,1901	32,86	
6	0,88	1,93	0,0884	0,1939	33,51	
7	0,90	1,97	0,0902	0,1977	34,18	
8	0,92	2,01	0,0920	0,2017	34,87	
9	0,94	2,05	0,0938	0,2057	35,56	
10	0,95	2,09	0,0957	0,2098	36,27	
11	0,97	2,13	0,0976	0,2140	37,00	
12	0,99	2,18	0,0996	0,2183	37,74	
13	1,01	2,22	0,1016	0,2227	38,49	
14	1,03	2,26	0,1036	0,2271	39,26	
15	1,05	2,31	0,1057	0,2317	40,05	
16	1,07	2,36	0,1078	0,2363	40,85	
17	1,10	2,40	0,1100	0,2410	41,67	
18	1,12	2,45	0,1122	0,2459	42,50	
19	1,14	2,50	0,1144	0,2508	43,35	
20	1,16	2,55	0,1167	0,2558	44,22	

Max bookings with minimum premium

MMP = 0,256 €/kWh/h/y, on top of reference price, being 2,5 €/kWh/h/y (inflated)

Set so that the Economic test will pass with all allocated binding bids

- Several hypotheses must be envisaged on binding bids, yielding a range of potential Mandatory Minimum Premium
- Hypothesis cover both the incremental and the existing capacity

We assumed

- 90% of the incremental capacity is booked during the auction for 20Y
- 80% of the existing capacity is booked during the auction for 20Y

Summary of tariffs for the different offer levels

Tariff in €/kWh/h/y	GTS			Fluxys Belgium			GRTGaz		
	Entry+Exit	MMP	Other*	Entry+Exit	MMP	Other*	Entry/Exit	MMP	Other*
OL_{Min}	2,92	-	2,60	2,41	-	2,31	4,3	-	5,1
$OL_{5\%}$	2,82 (-3%)	-	2,53 (-3%)	2,27 (-6%)	-	2,18 (-6%)	4,18 (-3%)	0,6 (14%)	4,96 (-3%)
$OL_{50\%}$	2,83 (-3%)	-	2,53 (-3%)	2,39 (-1%)	-	2,30 (-1%)	4,3 (-)	1,28 (30%)	5,10 (-)
OL_{Max}	2,86 (-2%)	-	2,55 (-2%)	2,50 (+4%)	0,26 (10%)	2,40(+4%)	4,54 (+6%)	2,46 (54%)	5.39 (+6%)

In all 3 cases, the $OL_{5\%}$ implies a general tariff reduction
- The typical "brownfield" (small investment, with maximum re-use of existing infrastructure) project implies essentially that network cost remain almost the same, but the new demand secures LT sales expectations

The $OL_{50\%}$ is neutral on the tariffs but a MMP would be necessary in FR**
- The envisaged investment are close to average network cost, but MMP needed to cover difference between booking horizon and depreciation horizon

The OL_{MAX} is closer to a greenfield example: tariff increase and MMP would be necessary in BE and FR
- Tariff increase relate to weight of ST quotas on which no sales expectations are taken
- MMP needed to cover difference between booking horizon and depreciation horizon

* Other refers to the sum of entry and exit tariff (average) towards points that are not concerned by the incremental process
** The GTS investment simulation is based on maximum re-use of L infrastructure as a consequence of Groningen phase-out.
  For illustrative purposes, this wasn't done in BE or FR to test the effect of new pipes investments

Sensitivities on the results

Sensitivities have been studied on the OL$_{MAX}$ case, illustrated on the Belgian network

1. What if existing capacity is sold before auction
   - → MMP increase expected
2. What if part of binding bids do not cover the full 20Y
   - → MMP increase expected
3. What if 20% ST quota instead of 10% - f-factor reduced from 90% to 80%
   - →All tariffs expected to increase if socialized
4. What if 20Y depreciation period for INC instead of 50Y
   - →Effect on Tariff and MMP expected

Results of Sensitivities – Illustration on OL$_{Max}$

Tariff in €/kWh/h/y	Fluxys Belgium		
	Entry+Exit	mMP	Other
OL$_{Max}$	2,50	0,26	2,40
Sens. 1	2,50	0,97 ↗	2,40
Sens. 2	2,50	0,3 ↗	2,40
Sens. 3	2,52 ↗	0,23 ↘	2,42 ↗
Sens. 4	2,59 ↗	0,13 ↘	2,49 ↗

1. existing capacity is sold before auction
2. part of binding bids do not cover the full 20Y
3. 20% ST quota instead of 10%
4. 20Y depreciation period for INC instead of 50Y

Any assumption with less binding bid assumption (either quantity or time) triggers a higher MMP

- Esp. on existing capacity, which can have a significant impact.
- This case is realistic if existing shippers would opt for a short term strategy.
- In this case, if INC shippers are not willing to support the full burden of the investment, the economic test will fail
- However OL$_{Min}$ remains evenly accessible → INC demand will be met using the existing infrastructure

Higher quotas trigger higher tariffs, for both the concerned IPs and other Network Users, when socialized

- Mechanically the MMP reduces, as f is reduced proportionally
- The total price on the INC route is broadly the same

Shorter depreciation period increases tariff level (higher yearly Allowed Revenue)

- Mechanically the MMP reduces as PV of Allowed Revenue globally decreases
- The total price on the INC route is slightly lower
- All in all this solution is realistic to reduce the risk of future stranded asset, which in the concerned time horizon (2025-2045-2075) is not un-material

How to treat the Minimum Mandatory Premium?

Revenues MMP into regulatory account
- Purpose is to compensate for the eventuality of future under recovery
- Allowed revenues are not affected
- A regulatory account covering a period of more than 20 years is considered complex

Revenues MMP are returned to market participants in the following year
- Purpose to compensate for future under recovery is not met
- Allowed revenues are not affected

Revenues MMP are used to compensate shareholder TSO for future under recovery
- Over recovery is returned to the market by reducing future tariffs
- Implies a temporally increase in allowed revenue

Conclusion:
- Revenues from minimum mandatory premium are to be discussed on a national level
- Shorter depreciation period for incremental is a viable alternative to avoid the issues above, but is not neutral in the distribution of costs over NU

Findings from the economic aspects

OL_{Min}
- No incremental investment needed and available capacity can cope with incremental demand

$OL_{5\%}$
- Incremental investment is marginal compared to average network cost, while sales expectations are increased with full INC Demand → lower tariffs

$OL_{50\%}$
- Premium paid on the route through FR but not on other places → different tariff consequences in different system varying from -3% to neutral.

OL_{Max}
- Investments are relative high in BE and FR and still low in NL* compared to existing network
- Tariffs increase from -2% to + 6% and MMP along the route to compensate ST quotas and depreciation period (e.g. ex-ante reduction of burden on future tariffs)

The code states that MMP has to be applied on existing infra structure
- rebooking on existing infra therefore significantly contributes to Econ test e.g. reducing the MMP for "pure INC" capacity
- If assumptions do not materialize during binding bids, the econ test will fail → but OL_{Min} will always succeed which allows securing access to capacity

* Note that GTS is in a position to re-use L-gas infrastructure which was factored in the calculation. For illustrative purposes, this wasn't done in BE and FR which explains the diversity of results in the different systems. Such re-use is however possible in the framework of physical phase-out of L-gas exports from NL.

Virtual realistic case NL-BE-FR

Recap – INC Process

Recap – Demand Assessment

Recap – Offer level and associated projects

Economic aspects

Alternative Allocation rule

Allocation according to CAM NC

Default in CAM is the ascending clock auction of yearly products (Article 29)
- Limited to 15 years in the future (e.g. 2017-2032)
- No conditionality w.r.t. to location or duration possible

Alternative allocation mechanisms (Article 30)
- Capacity is allocated in competition between parties, ascending clock is not mandatory
  - » Project involves more than two zones and bids are requested at two or more IPs
  - » Duration is extended to 15-20 years from the moment of startup
- Allows conditionality linking IPs in amounts and or duration
  - » In this case 10% - up to 20% - quotas can become mandatory subject to NRA approval

In conclusion: Due to conditionality on location and time horizon in the reality check, the alternative allocation mechanism is the way forward for both market parties and TSOs

4 Options were studied during Reality Check

Article 29 - Straightforward auction of yearly products
- Short term competition can result in loss of capacity for the long term shipper
- The conditionality's cannot be met and the project fails to meet the economic test

Article 30 - Allocate according NPV
- Long term shippers with the largest amount will ensure that the economic test is met. They will obtain their requested capacity.
- Up to 20% quotas have to be accepted. To be paid in case of socializing by the market or else by the winning shipper. Alternatives (e.g. side letter) are possible but carry risks in obtaining capacity

Article 30 - Allotment of capacity in lots and auction for each lot
- The method is based on the CAM quota principle, however avoiding "one size fits all" by taking into consideration information gathered in the non-binding phase
- The auction is divided in lots according to duration. Short term shippers compete for shorter term capacities (e.g. 10y) and long term shippers for long term capacities.
- Long term auction will meet the economic test and short term can only be met if other conditions are applied.
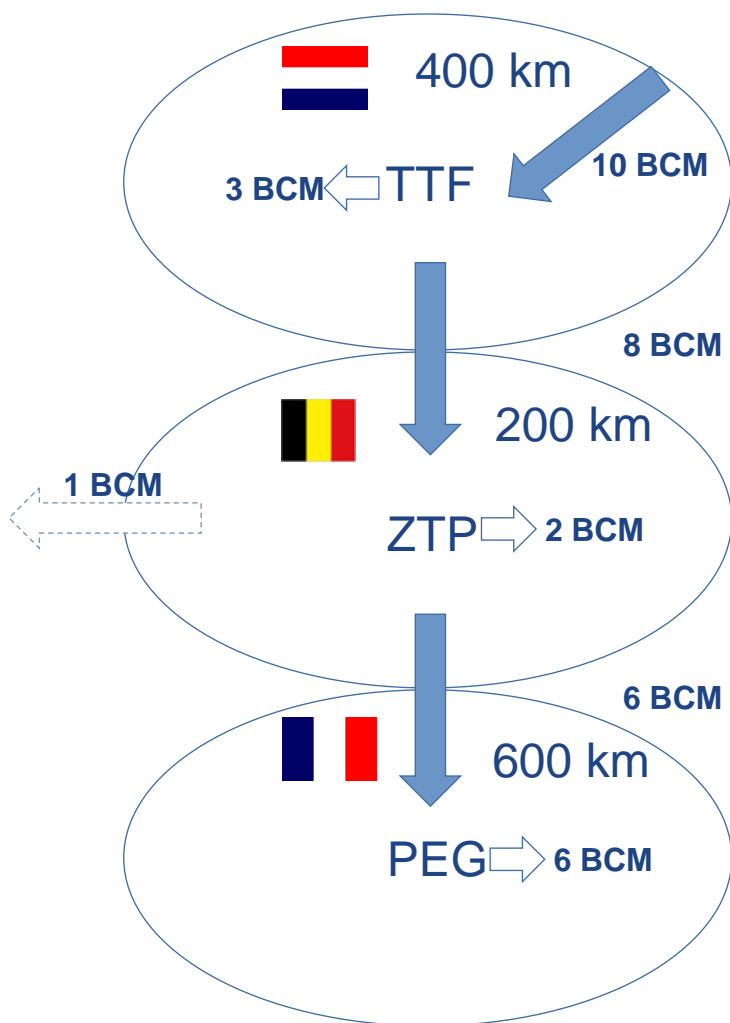
Article 30 - Legal finesse subject to NRA approval
- CAM leaves room for interpretation. Allocation rules could be found meeting conditionality's but circumventing quota's higher than 10%

Virtual realistic case NL-BE-FR project for Incremental capacity

CONCLUSIONS

Conclusions on volumes, costs and tariffs

Tariffs for 1200 km transport and access to three markets			
Offer level	**Investment M€**	**Tariff* €/kWh/h/y**	**Increase %**
OL$_{Min}$	-	9,63	-
OL$_{5\%}$	82	9,87	+2,5%
OL$_{50\%}$	550	10,8	+12%
OL$_{Max}$	1400	12,62	+28%

Costs are 97% to 50% lower than in a greenfield development

CAM guarantees IP access in all cases, be it existing or incremental

*Including MMP

GENERAL CONCLUSION ON VIRTUAL CASE

CAM NC is workable instrument to promote the development of new infrastructure, which is positive
- New capacity is built according to market demand
- Additional gas is brought to the EU gas markets
- Improved competition on gas markets → lower gas prices for final consumers
- Increased Security of Supply

Incremental cornerstones are
- Demand assessment → ensures the process is fed with valid market input (e.g. realistic non-binding indication so that Offer Levels are meaningful for the next phase)
- Offer Levels → allows to optimally make use of the existing system when and where relevant
- Design Phase → allows to select the appropriate investment case and requires close cooperation amongst TSOs and NRAs (minimizing total costs of investment and adequate burden sharing across affected parties)
- Economic Test → allows to detail the payable price according to several assumptions and to select the most adequate case in function of market willingness to pay → this was essentially the whole point of market-based investment

A successful Incremental capacity process requires several attention points
- The process can be perceived as cumbersome, lengthy and not necessarily flexible
- Lots of choices are to be made at early stages - with limited options to iterate and adjust in the course of the process
- Wrong assumptions could preclude the outcome if turning not in-line with the actual level of binding demand → non-binding phase is even more critical than before