ESTABLISHING ENTRY-EXIT TARIFFS – CASE: THE EU TARIFF NC

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Revenue Recovery Process

TAR NC splits the regimes into two categories:

price cap: The maximum transmission tariff is set: Target revenue
non-price cap: The revenue is set: Allowed revenue

Regulatory period: for which 'the general rules for the allowed or target revenue are set'

Tariff period: the time ,during which a particular level of reference price is applicable'

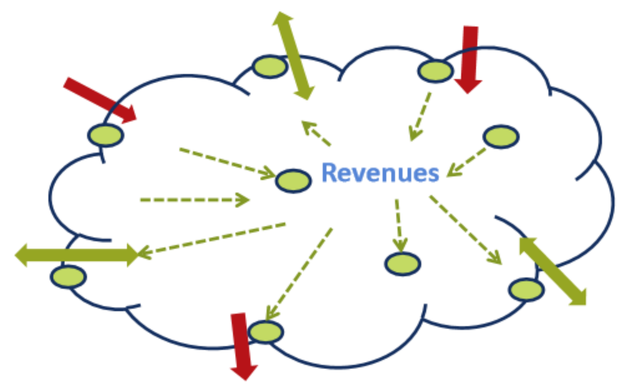
Allowed/Target Revenue Setting
Revenue Stream for a given regulatory period
Out of TAR NC Scope

Tariff setting
With RPM and adjustments Reserve prices are set for eac E/X point and eachh product based on assumed usage
TAR NC Scope

Capacity Sales and Revenue recovery

Revenue reconciliation
In case of non-price cap regime
TAR NC Scope

Entry-exit system



EU Regulation 715/2009 Article 13

Tariffs „shall be transparent, take into account the need for system integrity and its improvement and reflect the actual costs incurred, insofar as such costs correspond to those of an efficient and structurally comparable network operator and are transparent, whilst including an appropriate return on investments, and, where appropriate, taking account of the benchmarking of tariffs by the regulatory authorities. Tariffs, or the methodologies used to calculate them, shall be applied in a nondiscriminatory manner."

… „Tariffs, or the methodologies used to calculate them, shall facilitate efficient gas trade and competition, while at the same time avoiding cross-subsidies between network users and providing incentives for investment and maintaining or creating interoperability for transmission networks."

Tariffs for network users shall be non-discriminatory and set separately for every entry point into or exit point out of the transmission system. . Cost-allocation mechanisms and rate setting methodology regarding entry points and exit points shall be approved by the national regulatory authorities. By 3 September 2011, the Member States shall ensure that, after a transitional period, network charges shall not be calculated on the basis of contract paths."

„Tariffs for network access shall neither restrict market liquidity nor distort trade across borders of different transmission systems. Where differences in tariff structures or balancing mechanisms would hamper trade across transmission systems, and notwithstanding Article 41(6) of Directive 2009/73/EC, transmission system operators shall, in close cooperation with the relevant national authorities, actively pursue convergence of tariff structures and charging principles, including in relation to balancing."

TAR NC Article 7: Choice of 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 aim at:
- (a) enabling network users to <u>reproduce the calculation of reference prices</u> and their accurate forecast;
- (b) <u>taking into account the actual costs incurred</u> for the provision of transmission services considering the level of complexity of the transmission network;
- (c) ensuring <u>non-discrimination and prevent undue cross-subsidisation</u> including by taking into account the cost allocation assessments set out in Article 5;
- (d) ensuring that <u>significant volume risk related particularly to transports across an entry-exit system is not assigned to final customers</u> within that entry-exit system;
- (e) ensuring that the resulting reference prices <u>do not distort cross-border trade</u>.

Cost reflective	Minimise cross-subsidies	Non-discriminatory	Facilitate cross-border trade

APPLICATION

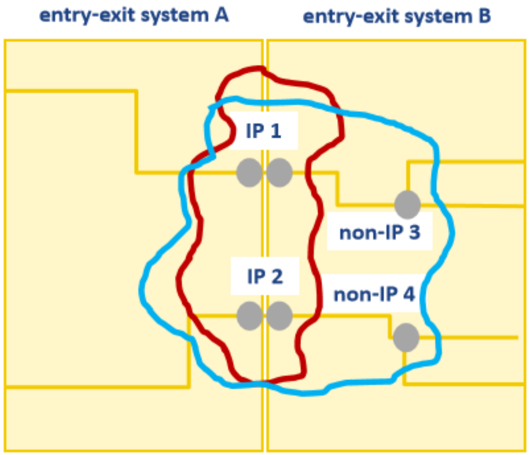
CAM NC

All to IPs

TAR NC

Partly to IPs only – 'limited scope' rules

Partly to IPs and non-IPs – 'broader scope' rules



TAR NC scope > CAM NC scope → **All points**

- Ch. I 'General provisions'
- Ch. II 'Reference price methodologies'
- Ch. IV 'Reconciliation of revenue'
- Ch. VII 'Consultation requirements' (except for Art. 28)
- Ch. VIII 'Publication requirements'
- Ch. X 'Final and transitional provisions'

TAR NC scope = CAM NC scope → **IPs only**

- Ch. III 'Reserve prices'
- Ch. V 'Pricing of bundled capacity and capacity at VIPs'
- Ch. VI 'Clearing and payable price'
- Ch. VII 'Consultation requirements' (only for Art. 28)
- Ch. IX 'Incremental capacity'

Implementation of TAR NC

- Flexible legal text
- ENTSOG Initiative: IDOC
  - Attempt to outline the implementation practices – good practices from ENTSOGs point of view
  - A tool to identify the difficult areas where discussions are coming up
- Living document, second version in October

TAR NC

Article 4: Transmission and non-transmission services and tariffs

TRANSMISSION AND NON-TRANSMISSION TARIFFS

- Article 4(1): A given service shall be considered a transmission service where both are met:
  - (a) The costs of such service are caused by the cost drivers of both technical or forecasted contracted capacity and distance
  - (b) The costs of such services are related to the investment in and operation of the infrastructure which is part of the regulated asset base for the provision of transmission services

  - *Where any of the criteria set out in points (a) and (b) are not complied with, a given service may be attributed to either transmission or non-transmission services subject to the findings of the periodic consultation by the transmission system operator(s) or the national regulatory authority and decision by the national regulatory authority, as set out in Articles 26 and 27.*

Currently, there are many services offered by TSOs which must be assessed in future against the TAR NC criteria above. Examples of such services are:

- Blending and/or ballasting (e.g. Belgium, Italy);
- Odourisation (e.g. Belgium, Denmark, France, Greece, Hungary, Ireland, Italy, Lithuania, Romania);
- Biogas services (e.g. France, Germany, Ireland, Italy, Lithuania);
- Services provided on regional networks (e.g. France, Italy);
- Dedicated compression services (e.g. France, Great Britain, Ireland, Lithuania, Poland);
- Dedicated metering services (e.g. Belgium, Lithuania, Germany, Ireland, Italy, France, Great Britain);
- Dedicated pressure services (e.g. Belgium, France, Germany, Ireland, Italy, Lithuania);
- Dedicated connections (e.g. Austria, Belgium, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Lithuania).

- **Article 4(3): Transmission services revenue shall be recovered by capacity-based transmission tariffs:**
  - As an exception, subject to the approval of NRA, a part of the transmission services revenue may be recovered only by the following ~~In addition~~ commodity-based transmission tariffs ~~may also be applied~~ which are set separately from each other:
    - Flow-based charge which shall comply with all of the following criteria:
      - Levied for the purpose of covering the costs mainly driven by the quantity of the gas flow;
      - Calculated on the basis of forecasted or historical flows, or both and set in such a way that it is the same at all entry points and the same at all exit points
      - Expressed in monetary terms or in kind.

allowing a distinction between all entry points and all exit points but not between separate entry points or separate exit points.

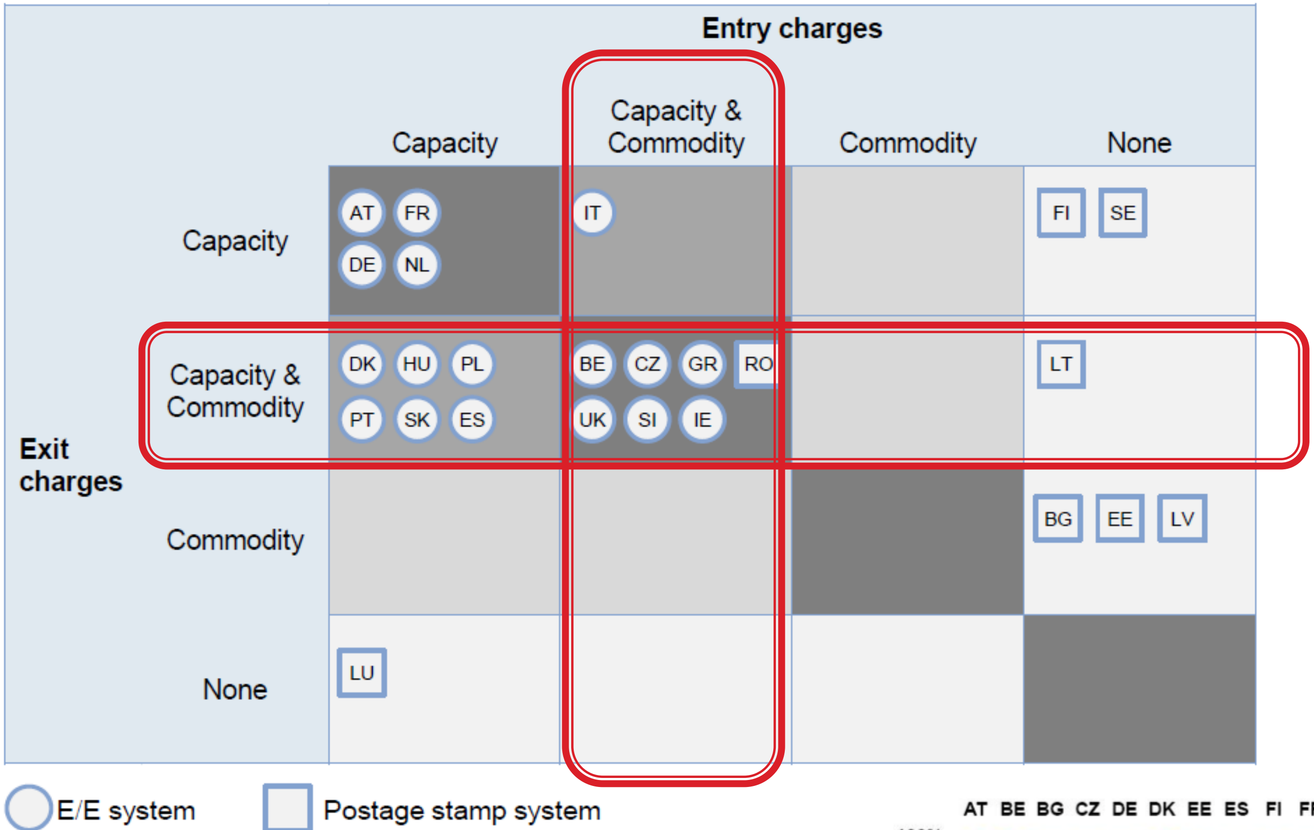
    - Complementary revenue recovery charge (CRRC) which shall comply with all of the following criteria:
      - Levied for the purpose of managing revenue under- and over-recovery;
      - Calculated on the basis of forecasted or historical capacity allocations and flows, or both~~;~~
      - Applied at points other than interconnection points
      - Applied after NRA makes an assessment of its cost refle[...] subsidisation between Ips and non-Ips,

CRRC can work in conjunction with adjustments to the application of RPM rescaling.

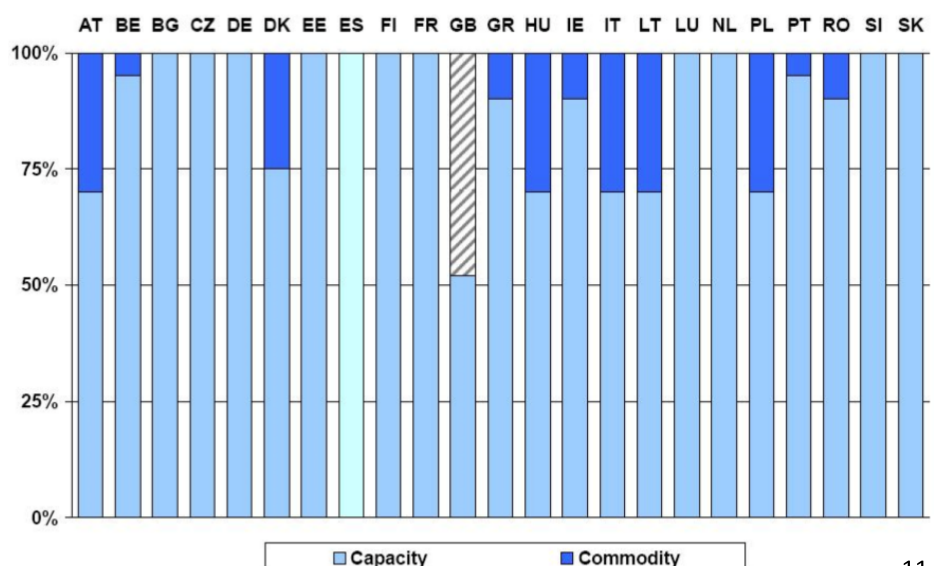
TAR NC does not require any specific methodology that applies to the ‚commodity' part; the sole requirement is periodic consultation.

Comparison of the Two Commodity Charges

COMPARISON BETWEEN A FLOW-BASED CHARGE AND CRRC					
Charge	**Aim**	**Which points**	**How expressed**	**Calculation**	**Approval requirements**
Flow-based charge	Cover the costs mainly driven by the quantity of the gas flow	All points	In monetary terms or in kind	On the basis of forecasted or historical flows, or both Same at all entry points and same at all exit points	Consultation per Article 26(1)
CRRC	Managing revenue under-/ over-recovery	Non-IPs	In monetary terms	On the basis of forecasted or historical capacity allocations, or both	Consultation per Article 26(1) NRA assessment of its cost-reflec-tivity and its impact on cross-subsidisation between IPs and non-IPs



DNV KEMA – COWI 2013



KEMA – REKK 2009

NON-TRANSMISSION SERVICES

- **Article 4(4): Revenue recovery for non-transmission services**
  - Cost-reflective, non-discriminatory, objective and transparent
  - Charged to the beneficiaries of a given non-transmission service with the aim of minimising cross-subsidisation between network users within or outside a Member State, or both.

  Where according to the national regulatory authority a given non-transmission service benefits all network users, the costs for such service shall be recovered from all network users.

TAR NC does not require any specific methodology that applies to the charge of the non-transmission services revenue; the sole requirement is periodic consultation.

the process for NRA approval differs for non-transmission services provided to network users, and for non-transmission services provided to parties other than network users

- Non-transmission services provided to network users are subject to the requirements of periodic consultation, NRA approval and review per Articles 26 and 27, and subject to publication per Article 30. The relevant requirements address: (1) the stakeholder concerns of additional transparency for charges that network users must pay; and (2) the need to preserve the confidentiality of potentially commercially sensitive information.
- TSOs may provide non-transmission services to parties other than network users, such as infrastructure operators and telecom service providers. If the recipient is not a network user, then the non-transmission service does not fall under the requirements mentioned above for non-transmission services provided to network users. In any case, Article 4(1) subjects the split between transmission and non-transmission services to periodic consultation, NRA approval and review per Articles 26 and 27.

CAPACITY PRODUCTS WITH CONDITIONS

Responsibility: subject to consultation per Article 26(1) by TSO/NRA, as NRA decides; subject to decision by NRA

Article 4(2)

Transmission tariffs may be set in a manner as to take into account the conditions for firm capacity products

Explanation: firm capacity products with 'conditions' for the efficient use of the network, and to maximise the offer of firm capacity taking into account market and network characteristics.

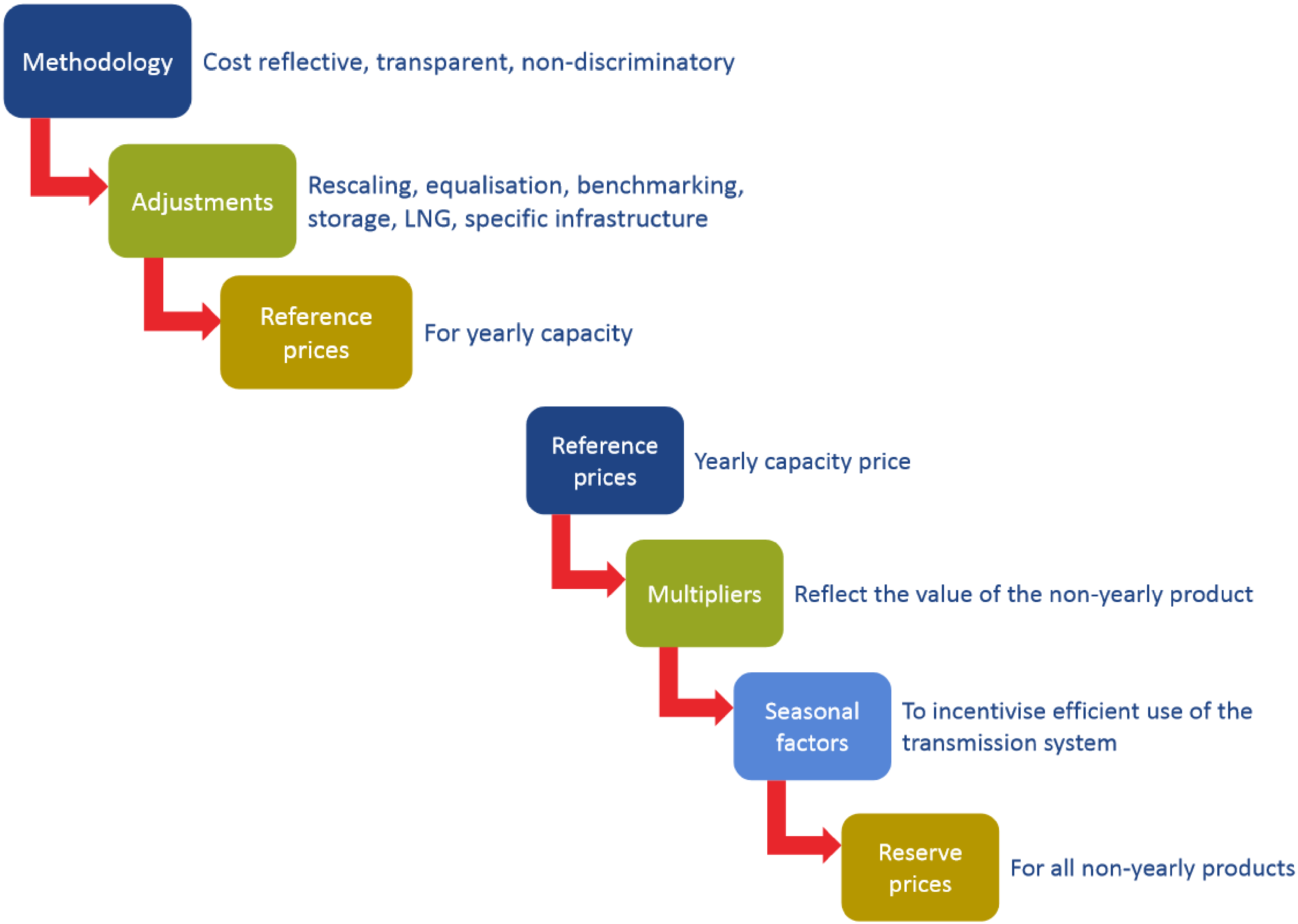
EXAMPLES OF FIRM CAPACITY PRODUCTS WITH 'CONDITIONS'

Firm capacity product with 'conditions'	Explanation	TSOs offering a given firm capacity product with 'conditions'
Restrictedly usable firm	Capacity that ensures firm freely allocable network access within an entry-exit-system on a firm basis within certain gas flows, within certain temperature ranges and/or entry-exit-system load/demand; Access to the VTP included	Thyssengas, Fluxys TENP, GRTgaz Deutschland, GTG Nord, OGE (called 'bFZK' in Germany – used on entry points to control local distribution of incoming flows; called 'TAK' if used at network points to storage facilities) Creos
Restrictedly allocable firm	Restrictedly allocable capacity ensures the injection of gas on a firm basis at entry point(s) and the with-drawal of gas at explicitly dedicated exit point(s) and vice versa on a firm basis Can use this capacity with 'explicitly dedicated exit point(s)', but not in combination with other exit/en-try points or VTP	bayernets, Fluxys TENP, OGE, GUD (called 'BZK' in Germany; if the distance between the entry and exit points is short, the product may be called 'Shorthaul') Fluxys Belgium (called 'Wheeling and OCUC – Operational Capacity Usages Commitments')[6)] GTS[7)]

Reference Prices

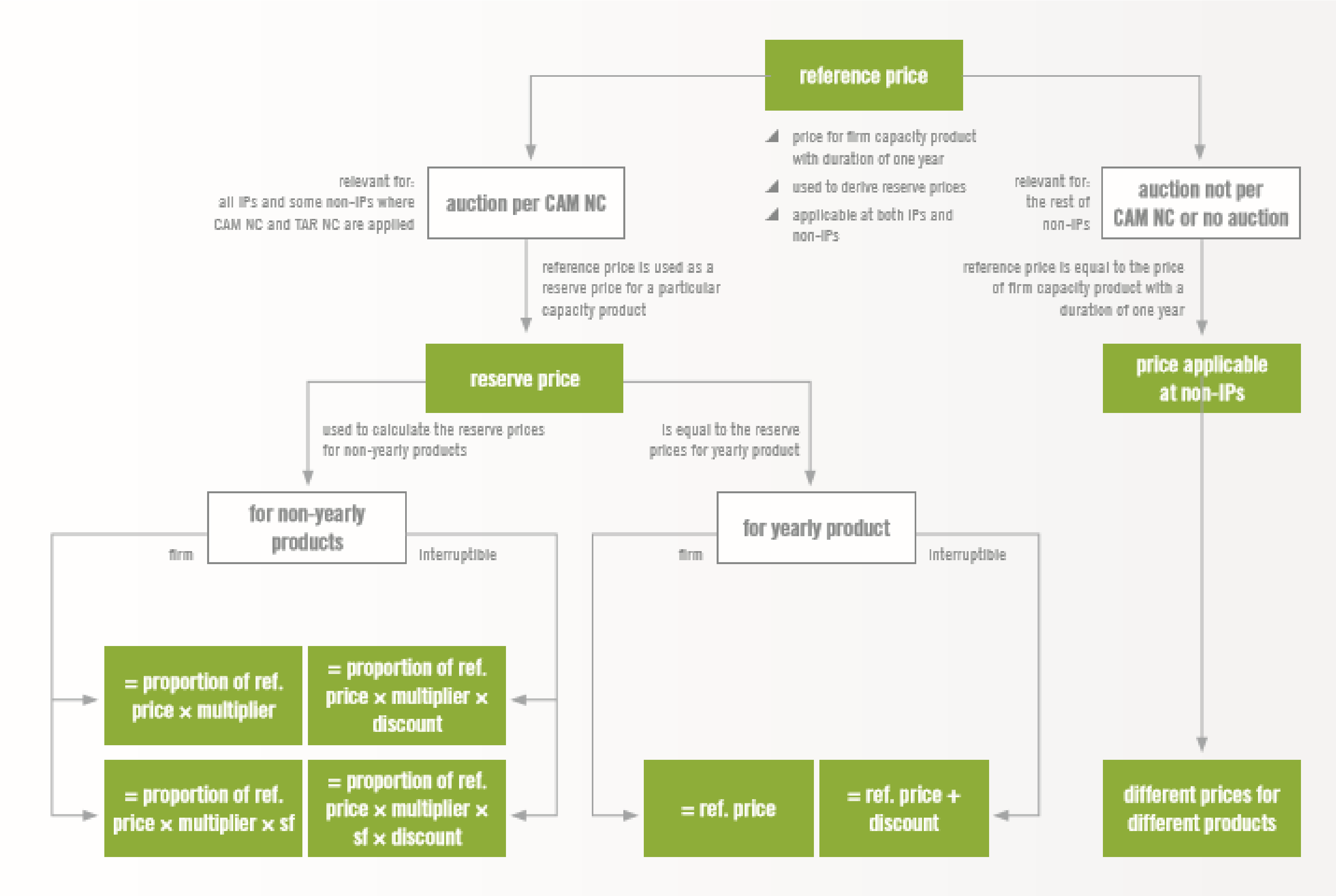
Only refers to the Capacity Part

RELATIONS


Methodology
Cost reflective, transparent, non-discriminatory
Adjustments
Rescaling, equalisation, benchmarking, storage, LNG, specific infrastructure
Reference prices
For yearly capacity
Reference prices
Yearly capacity price
Multipliers
Reflect the value of the non-yearly product
Seasonal factors
To incentivise efficient use of the transmission system
Reserve prices
For all non-yearly products

REFERENCE PRICES

- TAR NC Definition: A reference price is effectively a price for a firm capacity product with one year duration.



RPM General

- **The TAR NC does not insist on a particular RPM.**
- Instead, it specifies the requirements for such methodologies: their aims and the possible adjustments within the RPM.
- Chapter VII 'Consultation requirements' calls for a consultation document explaining how the proposed RPM meets such requirements.
- The TAR NC requires a **comparison of the resulting indicative reference prices to those derived from the clearly defined CWD counterfactual.**
- The TAR NC contemplates an initial NRA decision on a RPM, and a required consultation at least every five years thereafter.

TAR NC Article 7: Choice of Reference Price Methodology

- TSOs / NRAs have to **ensure compliance with five principles when evaluating a certain RPM:**
  - **Reproducibility:** network users should know the methodology to derive tariffs, should be able to reproduce the tariff calculations and should have the ability to forecast tariff developments over time.
  - **Cost-reflectivity:** tariffs should reflect the costs incurred by the TSO.
  - **Non-discrimination:** means that to the extent possible, TSOs should avoid cross-subsidies where some network users pay for others. The assessments set out for the CAA test the satisfaction of this principle.
  - **Volume risk management:** one group such as intra-system network users should not face tariff hikes to compensate for the diminishing use of the network by another group such as cross-system network users.
  - **Non-distortion of cross-border trade t**hrough reference prices implies that reference prices derived in accordance with RPM should ensure non-distorted economic signals for cross-border trade.

Current reference price methodologies in the EU within the Entry-Exit Tariff system

- **Postage Stamp**
  - The same reference price at all entry and exit points
- **Capacity Weighted Distance (CWD)**
  - The reference price at each entry (or exit) point is set considering the contribution of that point to the total cost of the system: the ‘weight’ of each entry (or exit) point is measured by its capacity-weighted distance from all exit (or entry) points;
- **Virtual Point Based**
  - Similar to the CWD; however the ‘weight’ of each entry (or exit) point is calculated according to the distance of that point from a focal virtual point of the network. This virtual point can be either calculated mathematically (VP – A) or it can be determined geographically (VP – B);
- **Matrix**
  - It’s principle: the reference price at each entry (or exit) point should reflect the actual investment costs of the TSO.

Current Reference Price Methodologies in the EU

Country	# of TSOs	Primary reference price methodology					
		P. Stamp	Virtual Point	CWD	Matrix	Asset alloc.	Other
Austria	2		✓(2)				
Belgium	1			✓			
Bulgaria	1	✓					
Croatia	1	✓					
Czech Rep	1					✓	
Denmark	1	✓					
Estonia	1	✓					
Finland	1						✓
France	2			✓(2)			
Germany	12	✓(11)		✓(Ontras)			
Greece	1				✓		
Hungary	2	✓(2)					
Ireland	1						✓
Italy	2				✓(2)		
Latvia	1	✓					
Lithuania	1	✓					
Luxembourg	1	✓					
Netherlands	2						✓(2)
Poland	1	✓					
Portugal	1				✓		
Romania	1	✓					
Slovakia	1				✓		
Slovenia	1				✓		
Spain	2	✓(2)					
Sweden	1	✓					
UK	4	✓(3)	✓(NatGrid)				
TOTAL	46	28	3	4	6	1	4

EC study, 2015

ADJUSTMENTS TO THE REFERENCE PRICE METHODOLOGY

- Benchmarking by NRA: reference prices are adjusted so that the resulting values meet the competitive level of reference prices;
- Equalisation: same reference price is applied to some or all points within a homogeneous group of points;
- Rescaling: the reference prices at entry or at all exit points or both are adjusted either by multiplying their values by a constant or by adding to or subtracting from their values a constant.
- Sotrage EX points: a discount of at least 50% shall be applied unless and to the extent a storage facility which is connected to more than one transmission or distribution network is used to compete with an interconnection point.
- Discount for increasing SOS may be applied to LNG and infrastructure developed with the purpose of ending the isolation of MSs

RESCALING

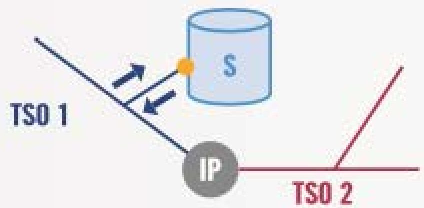
- The primary use of rescaling is to ensure the recovery of allowed revenue while respecting the entry-exit split.
- Rescaling can entail multiplying reference prices by a certain value, or adding / subtracting a certain value. The choice depends on the RPM used.
  - **Multiplication** can calibrate desired locational signals up or down, maintaining their percentage differences, while permitting an adjustment of expected revenue to match the allowed transmission services revenue.
  - **Addition** ensures the recovery of allowed revenue and can address the issue of zero or negative reference prices.

A simple example: Assume that tariffs post RPM are € 1, 2 and 3 for IP1, IP2 and IP3 respectively, but that they would only recover € 50 while the TSO's allowed revenue are € 100

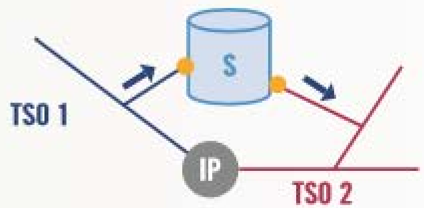
Discounts

Storage points

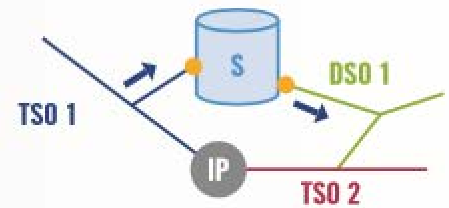
Default rule: storage connected to 1 TSO only → entry and exit discounts of **at least 50 %**



Exception 1: storage connected to 2 TSOs and in competition with an IP

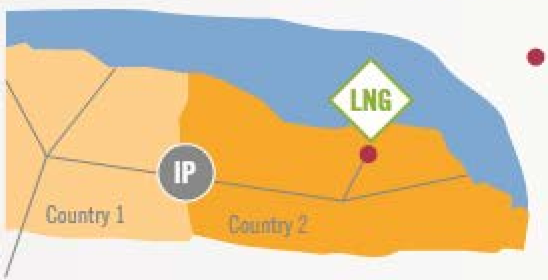


Exception 2: storage connected to 1 TSO and 1 DSO in competition with an IP



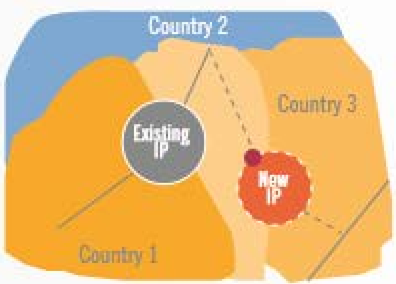
● TSO entry and exit points from/to storage

LNG entry points and other points to infrastructure to end isolation of MSs for security of supply purposes



● TSO entry point from LNG

Discounts possible at LNG entry point to reduce Country 2 dependence with IP Country 1



● TSO entry and exit points from/to infrastructure (here: new IP) to end isolation of Country 2

Discounts possible at the entry point or exit point of the new IP to end isolation of Country 2

STORAGE EE TARIFFS

Country	Discount to be applied to E/E tariffs	
	Entry from Storage to Network	Exit from Network to Storage
Austria	Free of charge	Highly discounted
Belgium	No discount	Free of charge
Bulgaria	70%	70%
Croatia	No discount	90%
Czech Rep	No general discount applied. The NRA decides on storage E/E tariffs	No general discount applied. The NRA decides on storage E/E tariffs
Denmark	Free of charge	Free of charge
France[34]	85%	85%
Germany	No general discount applied	No general discount applied
Hungary	-	-
Ireland	No discount on capacity change. TSOs decide on storage E/E tariffs	No discount on capacity change. TSOs decide on storage E/E tariffs
Italy	Applied when costs are allocated to each pipeline (14%)	Applied when costs are allocated to each pipeline (14%)
Latvia	-	-
Netherlands	25%	25%
Poland	80%	80%
Portugal	No discount	Free of charge
Romania	No discount	No discount
Slovakia	No discount	No discount
Spain	Free of charge	Free of charge
Sweden	Free of charge	Free of charge
UK	No discount on capacity charge, free of charge from commodity charge	No discount on capacity charge, free of charge from commodity charge
Estonia	No storage facility	
Finland		
Greece		
Lithuania		
Luxembourg		
Slovenia		

EC study, 2015

CWD: Reference Price Methodologies Counterfactual

- Only for comparison purposes with proposed RPM
  - All MSs will have to compare their RPM to CWD
- CWD strikes balance between the conflicting objectives of

Cost Reflectivity | Not too complex

- Share of the allowed revenue to collect from each entry or exit point should be proportionate to its contribution to the cost of the system's capacity and to the distance between it and all exit points or all entry points.
  - The resulting tariff would be uniform per unit of capacity and distance

Capacity weighted distance methodology

Parameters

- Part of the revenue to be recovered from capacity based transmission tariffs
- The forecasted contracted capacity at each entry point or a cluster of entry points and at each exit points or a cluster of exit points
- Where entry points and exit points can be combined in a relevant flow scenario, the shortest distance of the pipeline routes between an entry point or a cluster of entry points and an exit point or a cluster of exit points
- Entry/exit split shall be 50/50

Formulae

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

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

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

$$T_{En} = \frac{R_{En}}{FC_{En}}$$

CWD Calculation Example

Distance matrix (1.c & 1.d)

	km	Exits: IP 3	Exits: Consumption
Entries	IP 1	150	80
	IP 2	120	70

Forecasted contracted capacity (1.b)

	GWh/d	Exits: IP 3	Exits: Consumption	Total
Entries	IP 1			200
	IP 2			300
	Total	100	400	

Allowed Revenue (1.a & 1.e)

	Allowed Revenue	Entry-Exit-Split
Entry %	100.000 €	50%
Exit %		50%

Capacity-weighted average distance (2.a)

	km	Exits: IP 3	Exits: Consumption	Total
Entries	IP 1			94
	IP 2			80
	Total	132	74	

Weight of costs (2.b)

	%	Exits: IP 3	Exits: Consumption	AD x CAP	Weight of costs
Entries	IP 1			18,800	44%
	IP 2			24,000	56%
	AD x CAP	13,200	29,600		
	Weight of costs	31%	69%		

Revenue Split (2.c)

€	AR (€)
Entry	50,000
Exit	50,000

Revenues per point (2.d)

	€	Exits: IP 3	Exits: Consumption	Revenues
Entries	IP 1			21,963
	IP 2			28,037
	Revenues	15,421	34,579	

Tariffs (2.e)

	€/GWh/d	Exits: IP 3	Exits: Consumption	Tariff
Entries	IP 1			110
	IP 2			93
	Tariff	154	86	

TECHNICAL

HOMOGENEOUS GROUP OF POINTS, CLUSTERS

IP systems

Responsibility: subject to consultation per Article 26(1) by TSO/NRA, as NRA decides; subject to decision by NRA

- Homogeneous group of points:
  - Entry Ips, exit Ips, domestic entry points, domestic exit points, entry from storage, exit to storage, entry from LNG, exit to LNG, productiton entry points.
  - Homogeneity does not necessarily imply identical network use: e.g. intra-system and cross-system network uses.
  - The concept of ‘homogeneity’ does not itself depend on ‘vicinity’.
- Cluster of entry or exit points:
  - **Clustering is the treatment of a group of entry points or exit points as one entry point or one exit point prior to applying the RPM.** Such points <u>can belong to a homogeneous group or be located near each other.</u> With clustering, the selected homogeneous points or points in the vicinity of each other become a single ‘virtual’ point. The rules for ‘how to cluster’ are:
    - Clustering may apply to some points or all points of the same homogeneous group of points.
    - Clustering may apply to some points within the vicinity of each other.
    - <u>It is not possible to cluster entry points with exit points.</u>
  - The capacity of a cluster is the sum of the capacities of the points it brings together.
  - The RPM considers only a cluster in the aggregate, as opposed to its individual points, so the RPM produces a reference price for the cluster as a ‘commercial’ point although the ‘physical’ points still exist.
  - Where the RPM requires geographical coordinates for a cluster, it is possible to use a capacity-weighted average of the coordinates of its constituent points, or another approach.
  - <u>No specific provision in the TAR NC restricts the use of clustering.</u>
  - In practice, the <u>main motivation for clustering is a need to reduce the number of points for the application of the RPM.</u> In the absence of clustering, it may be cumbersome and impractical for the RPM to determine reference prices for hundreds of entry and exit points. Clustering offers the advantage of simplified considerations.

DISTANCE

- Shortest pipeline distance for CWD RPM:
  - Shortest distance of the pipeline routes between
    - an entry point or a cluster of entry points and an exit point or a cluster of exit points.
  - Clustering introduces two possibilities:
    - ‘Distance before cluster’: calculate the weighted average of the shortest pipeline distances of all physical points of the cluster. The weights can depend on the technical capacity.
    - ‘Cluster before distance’: select a focal point of the cluster, and then calculate the shortest distance of the pipeline routes from or to such a focal point. A dominant physical point of the cluster can constitute the focal point.
- TSO/NRA can consider such methodologies within a proposed alternative RPM (including a modified CWD), eg:
  - Average pipeline distance
  - Airline distance

Entry-Exit Split

- The entry-exit split may be either an input to the RPM or an output.
- Article 8(1)(e) requires the counterfactual CWD to use a 50 / 50 entry-exit split as an input.
- The TAR NC does not define the entry-exit split for the proposed and approved RPM, but Article 30(1)(b)(v)(2) requires its publication.
- In any case, the broader principles established by Article 13 of the Gas Regulation always apply.

TAR NC Resubmitted: Base case: 50/50, but NRA can modify
  - Based on cost drivers
  - And if better fulfils the following minimum objectives:
    - Minimise cross-subsidisation between network users, (between cross border and domestic network users)
    - Not create barriers to cross border trade
    - Avoid differences between the allowed revenue and the actually obtained revenue

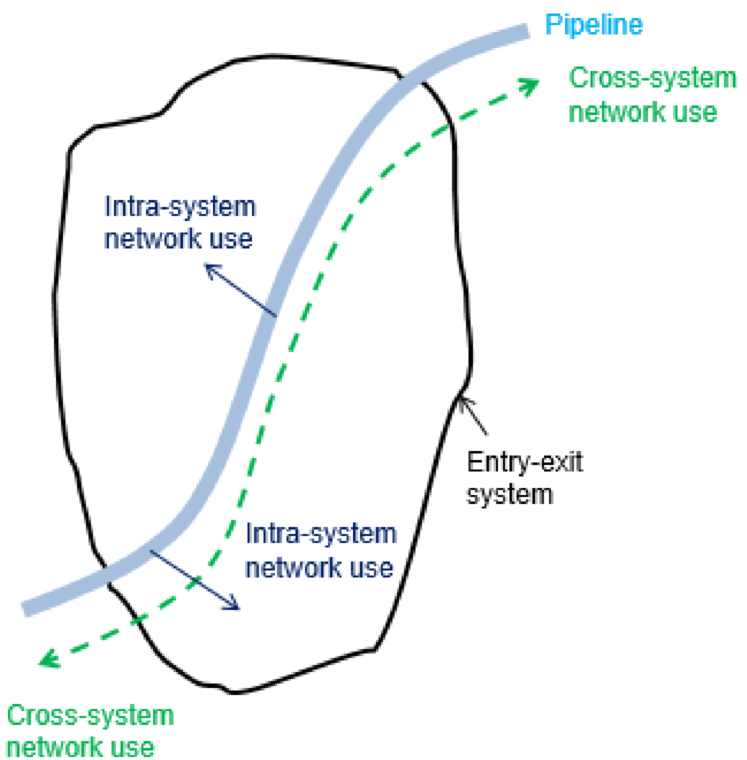
ARTICLE 5

Cost Allocation Assessments - CAA

CAA

- The CAA is one of the main provisions of the TAR NC
- It enters into force in 2017!!!
- It is for assessing the trade-offs between intra-system and cross-system flows

- 2 tests:
    - Ratios on capacity
    - Ratios on commodity
- Assessments:
    - No strict rule but justification is needed is it exceeds the 10% threshold



Goal is to minimise cross-subsidies in tariffs between intra-system and cross-system network uses

Cost allocation assessment: Capacity based transmission tariffs

- The cost allocation assessments shall indicate the degree of cross-subsidisation between intra-system and cross-system network use based on the proposed reference price methodology.
- Test:

$$Ratio_{cap}^{intra} = \frac{Revenue_{cap}^{intra}}{Driver_{cap}^{intra}} \qquad Ratio_{cap}^{cross} = \frac{Revenue_{cap}^{cross}}{Driver_{cap}^{cross}}$$

$$Comp_{cap} = \frac{2 \times \left| Ratio_{cap}^{intra} - Ratio_{cap}^{cross} \right|}{Ratio_{cap}^{intra} + Ratio_{cap}^{cross}} \times 100\,\%$$

The value of capacity-related cost driver(s) for intra-system/cross-system network use, such as the sum of the average daily forecasted capacities contracted at each intra-system entry point and intra-system exit point, or cluster of points, and is defined in a measurement unit such as MWh/day.

Where distance is used also as a cost driver, the capacity weighted average distance shall be used.

Where the results of the cost allocation comparison index exceed 10 %, the national regulatory authority shall provide the justification for such results.

Cost drivers

- Technical capacity; or
- Forecasted capacity; or
- Technical capacity and distance; or
- Forecasted contracted capacity and distance

Cost Allocation Assessment: Commodity Based Transmission Tariffs

- The cost allocation assessments shall indicate the <u>degree of cross-subsidisation between intra-system and cross-system network use</u> based on the proposed reference price methodology.
- Intra-system capacity ratio:

$$Ratio^{intra}_{comm} = \frac{Revenue^{intra}_{comm}}{Driver^{intra}_{comm}}$$

$$Ratio^{cross}_{comm} = \frac{Revenue^{cross}_{comm}}{Driver^{cross}_{comm}}$$

$$Comp_{comm} = \frac{2 \times \left| Ratio^{intra}_{comm} - Ratio^{cross}_{comm} \right|}{Ratio^{intra}_{comm} + Ratio^{cross}_{comm}} \times 100\,\%$$

The value of commodity-related cost driver(s) for intra-system/cross-system network use, such as the sum of the average daily forecasted flows at each cross-system entry and exit point, or cluster of points, and is defined in a measurement unit such as MWh

Where distance is used also as a cost driver, the commodity weighted average distance shall be used.

Where the results of the cost allocation comparison index exceed 10 percent, the national regulatory authority shall provide the justification for such results.

Cost drivers
- Amount of gas flows; or
- Amount of gas flows and distance

REVENUE CALCULATION

$Revenue^{intra}_{cap}$ $Revenue^{intra}_{comm}$

- Revenue from intra-system network use at entry points shall be calculated as:
  - (a) **the amount of allocated capacity** or, respectively, flows attributed to the provision of transmission services **for cross- system network use** at all entry points shall be deemed equal ~~or proportionate~~ **to the amount of capacity** or, respectively, flows attributed to the provision of transmission services for cross-system network use at all exit points;
  - (b) **the capacity** and, respectively, flows, determined as set out in point (a) of this paragraph **shall be used to calculate** the transmission services **revenue to be obtained from cross-system network use at entry points**;
  - (c) **the difference between the overall transmission services revenue to be obtained at entry points** and the resulting value referred to in point (b) of this paragraph **shall be equal to the transmission services revenue to be obtained from intra-system network use at entry points**.

How to allocate it to individual entry points?

COMMENTS

- It is not the relative importance of the cost drivers based on statistical analysis that matters but how the proposed methodology compares with the counterfactual on the basis of the same cost drivers.
- For both assessments, the intent is to guarantee against undue cross-subsidies on capacity or commodity by checking that the revenue-to-cost ratio for intra-system use is broadly similar to the revenue-to-cost ratio for cross-system use. **Any ratio above 10 % requires a justification** by the NRA in its decision under Article 27(4) following consultation under Article 26.

CAA CHALLENGES

- NRAs will have to determine how to carry out this assessment:
  - What are the cost drivers (most likely distance, capacity, commodity…)?
  - How to calculate distances for intra-system and cross-system flows?
  - How to split capacities used by both intra-system and cross-system flows (entry IPs, potentially IP with storages facilities…)?
  - → All these parameters will require assumptions (e.g. flow scenarios).
- The way to implement this assessment is key. It will have a significant impact on the reference price methodology (Chapter 2, which will have to be applied before May 2019).

EXAMPLE OF COST ALLOCATION ASSESSMENTS

Table A: Distances between Entries and Exits[1)]

TABLE A: DISTANCES BETWEEN ENTRIES AND EXITS						
		Distance (km)				
		Exit				
		IP 1	IP 2	IP Exit 5	IP 3	Consumption
Entry	LNG	650	820	840	420	460
	IP 1	0	350	520	360	200
	IP Entry 4	150	480	660	430	270
	IP 2	350	0	230	430	270
	IP 3	360	430	440	0	170

Cluster: weighted center is used

Consumption refers to 'intra-system network use. It is forecasted contracted capacity, as per Article 5 provisions.

- The distances are then determined according to the approach chosen for CAA by the TSO or NRA (no mandatory approach in the TAR NC)

Driver: Capacity * Average Distance

AVERAGE DISTANCE CALCULATION

Table A: Distances between Entries and Exits[1]

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	IP Entry 4	150	480	660	430	270
	IP 2	350	0	230	430	270
	IP 3	360	430	440	0	170

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

		Capacity (GWh/d)					
		Exit					
		IP 1	IP 2	IP Exit 5	IP 3	Consumption	Total
Entry	LNG						360
	IP 1						580
	IP Entry 4						580
	IP 2						500
	IP 3						40
	Total	150	60	260	220	3,000	
	Drivers for Exit Points	51,730	30,531	141,283	89,786	844,660	

Average distance (km) for each exit point to the group of entry points				
IP 1	IP 2	IP Exit 5	IP 3	Consumption
345	509	543	408	282

AD_{IP2}=(360*820+580*350+580*480+40*430)/(360+580+580+40)=509

- In this case for average distance calculations the „flow scenario" approach is used, however it is also possible to not apply it since Article 5 on CAA does not make it a requirement.

Cross-system and Intra-system Decomposition

Assumption:

- Contracted capacity at exit IPs corresponds to cross-system network use and contracted capacity at domestic consumption points correspond to intra-system network use.

Average distance (km) for each entry point		
	to intra exits	to cross exits
LNG	460	663
IP 1	200	436
IP Entry 4	270	460
IP 2	270	328
IP 3	170	413

The average distance to the 4 IP exits

The distance to Consumption point

Cost Drivers: Combination of Distance and Capacity

		Capacity (GWh/d)					
		Exit					
		IP 1	IP 2	IP Exit 5	IP 3	Consumption	Total
Entry	LNG						360
	IP 1						580
	IP Entry 4						580
	IP 2						500
	IP 3						40
	Total	150	60	260	220	3,000	
	Drivers for Exit Points	51,730	30,531	141,283	89,786	844,660	

$$\text{Driver}_{\text{exit,i}} = \overline{\text{Distance}}_{\text{exit}} \times \text{Capacity}_{\text{exit,i}}$$

Average distance (km) for each exit point to the group of entry points				
IP 1	IP 2	IP Exit 5	IP 3	Consumption
345	509	543	408	282

$$Entry\ Cap_{cross,i} = \frac{\sum Exit\ Cap_{cross,i}}{\sum Entry\ Cap_i} \times Entry\ Cap_i$$

Driver for each Entry (Intra-Use)	Driver for each Entry (Cross-Use)
110,132	79,951
77,146	84,688
104,147	89,393
89,782	55,001
4,522	5,536

$Entry_{IP1,\ Cross}=(150+60+260+220)/(360+580+580+500+40)*580=194$

$Entry_{IP1,\ intra}=580-194=386$

CAA CALCULATION

TABLE D: CAPACITY REVENUE. TARIFFS. ALLOCATION OF REVENUES AND CONDUCTION OF TEST

Capacity revenue (€)	800,000	
Entry share	40 %	
Exit share	60 %	
Entry revenues	320,000	
Exit revenues	480,000	
Entry revenues dedicated for Intra	212,869	Acc. to Art 5(5)(c)
Entry revenues dedicated for Cross	107,131	Acc. to Art 5(5)(b)
Exit revenues from Intra	366,000	
Exit revenues from Cross	113,060	
Revenue for Intra	578,869	
Revenue for Cross	220,191	
Cost driver for Entry Intra	385,728	
Cost driver for Exit Intra	844,660	
Cost driver for Intra	1,230,388	
Cost driver for Entry Cross	314,570	
Cost driver for Exit Cross	313,330	
Cost driver for Cross	627,900	

Exit tariffs				
IP 1	IP 2	IP Exit 5	IP 3	Consumption
98	147	220	147	122

Entry Tariffs	
LNG	265
IP 1	106
IP Entry 4	159
IP 2	133
IP 3	106

$$Ratio^{intra}_{cap} = \frac{Revenue^{intra}_{cap}}{Driver^{intra}_{cap}}$$

	Test
Ratio intra	0.4705
Ratio cross	0.3507
CAA	29.18 %
justification required	

How to calculate CAA?

Distance matrix

	km	Exits: IP 3	Exits: Consumption
Entries	IP 1	150	80
Entries	IP 2	120	70

Forecasted contracted capacity

	GWh/d	Exits: IP 3	Exits: Consumption	Total
Entries	IP 1			200
Entries	IP 2			300
	Total	100	400	

Forecasted Revenue

	€	Exits: IP 3	Exits: Consumption	Revenues
Entries	IP 1			21,963
Entries	IP 2			28,037
	Revenues	15,421	34,579	

1

2

3

Capacity-weighted average distance

km	i-s AD	c-s AD
Exit IP 3	-	132
Exit Consumption	74	-
Entry IP 1	80	150
Entry IP 2	70	120

2

Cost driver (example: AD x CAP)

	i-s CAP	c-s CAP	i-s CD	c-s CD
Exit IP 3	-	100	-	13,200
Exit Consumption	400	-	29,600	-
Entry IP 1	160	40	12,800	6,000
Entry IP 2	240	60	16,800	7,200
Sum	800	200	59,200	26,400

Revenue Allocation

€	i-s Rev	c-s Rev
Exit IP 3	-	15,421
Exit Consumption	34,579	-
Entry IP 1	17,570	4,393
Entry IP 2	22,430	5,607
Sum	74,579	25,421

4

4

Ratio calculation

	i-s	c-s
Ratio	1.26	0.96

5

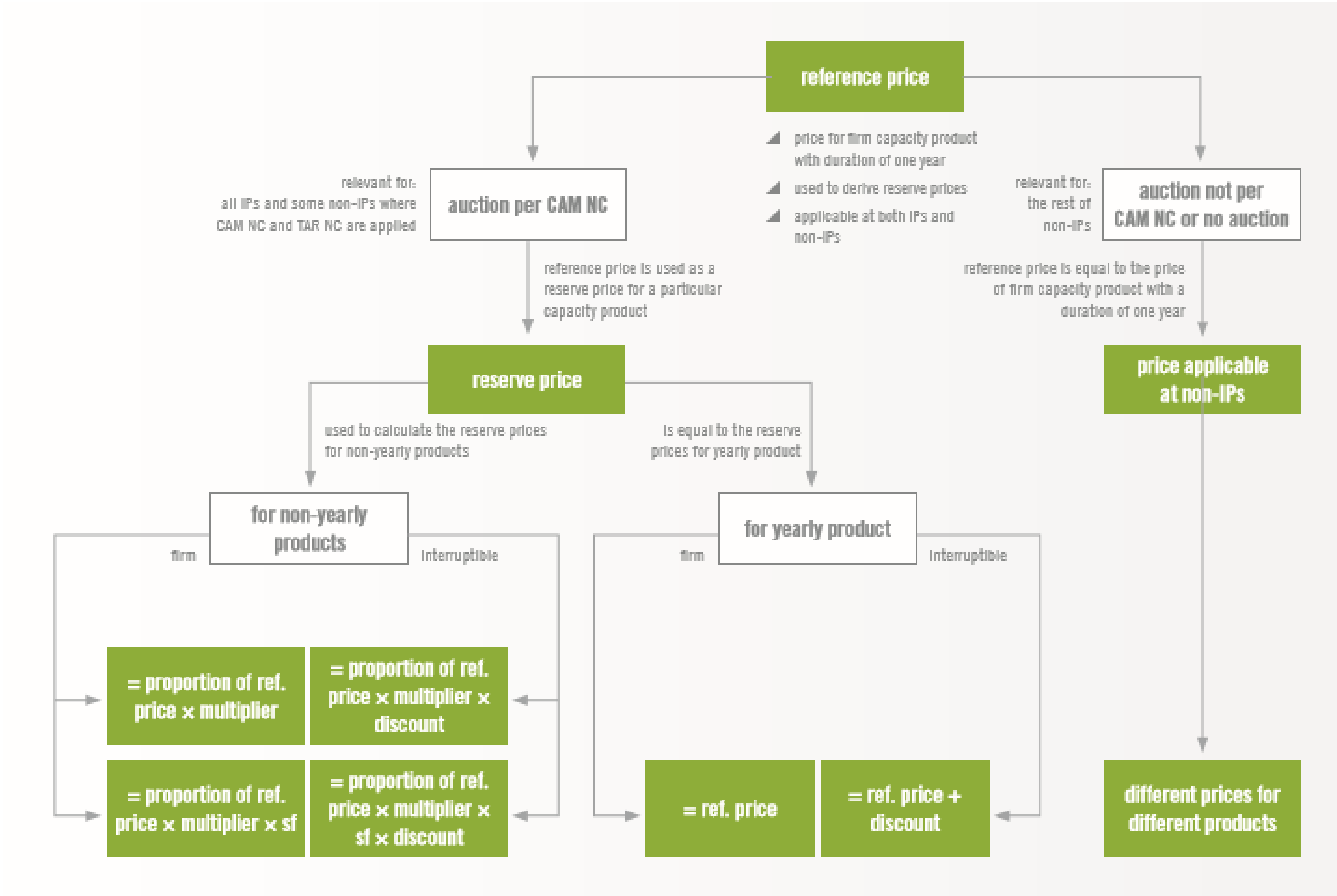
Assessment

27.0 %
Justification required

144

Reserve prices

Reserve Prices



Reserve Prices For Non-Yearly Products

- Reserve prices serve as a floor in the relevant capacity auction
- CAM NC Five standard capacity products:
  - Yearly, quarterly, monthly, daily, within-day
- For yearly standard firm capacity the reference prices shall be used as reserve prices.

Reserve price = time proportion of reference price x multiplier x seasonal factor

- TAR NC Defines the ranges for the respective multipliers
  - Quarterly and Monthly: 1-1,5
  - Daily and WD: 1-3;
    - in duly justified cases the level maybe less than 1 but higher than 0, or higher than 3
    - By April 2023 for daily and within-day shall be no more than 1,5, if by April 2021 the Agency issues a recommendation on this

In case of seasonal factors, the arithmetic average

- Same multiplier should be applied at a given IP for the same standard capacity product, however it could be different at all the IPs
- Non-within-day products must have reserve prices based on the number of days in the product, while within-day products must have reserve prices based on the number of hours.

$$P_{st} = m_i \times (p_y/365) \times d$$

$$P_{st} = m_{WD} \times (p_y/8760) \times h$$

Seasonal factors

- The purpose of seasonal factors is to foster efficient system use by allowing higher reserve prices in months with high utilisation rates, and lower reserve prices in low-utilisation months. ENTSOG considers that such pricing:
  - provides incentives to shift gas flows away from high demand periods;
  - avoids additional unnecessary investment, by encouraging network use in summer and discouraging it in winter.
  - TSOs can apply different set of seasonal factors per IP.
  - The 12 seasonal factors for monthly products provide the basis for calculating the seasonal factors for the other three capacity products: quarterly, daily and within-day.
  - Application of seasonal factors:

$$P_{st} = (m_i \times sf_i) \times (p_y/365) \times d$$

$$P_{st} = (m_{WD} \times sf_{WD}) \times (p_y/8760) \times h$$

Example of SF determination

For monthly standard capacity products:

Seasonal factors for monthly products are calculated using as an input the forecasted flows for each month. Only if the forecasted flows for one month (or more) are 0, forecasted contracted capacity should be used in the calculations.

(a) **For each of the months, calculate the forecasted flows or forecasted contracted capacity.**

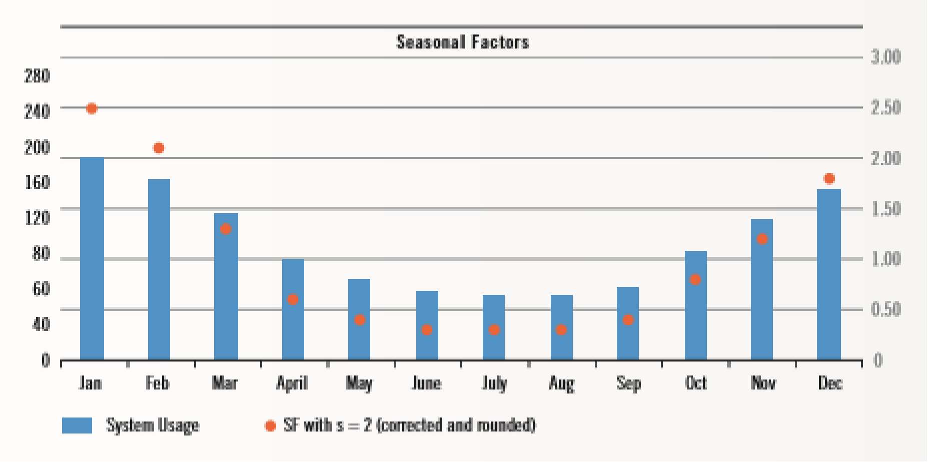
$$Month_i \rightarrow Flows_i$$

(b) **For each of the months, calculate the usage rate for each month**

$$Usage\ rate_i = \frac{Flows_i}{\sum_{i=1}^{12} Flows_i}$$

(c) **For each of the months, calculate the primary factor:**

$$Primary\ factor_i = Usage\ rate_i \times 12$$



* If one of the above calculated primary factors is equal to 0, then this value needs to be corrected. Its value will be changed to whichever is lower: (1) the lowest of the other primary factors; or (2) 0.1.

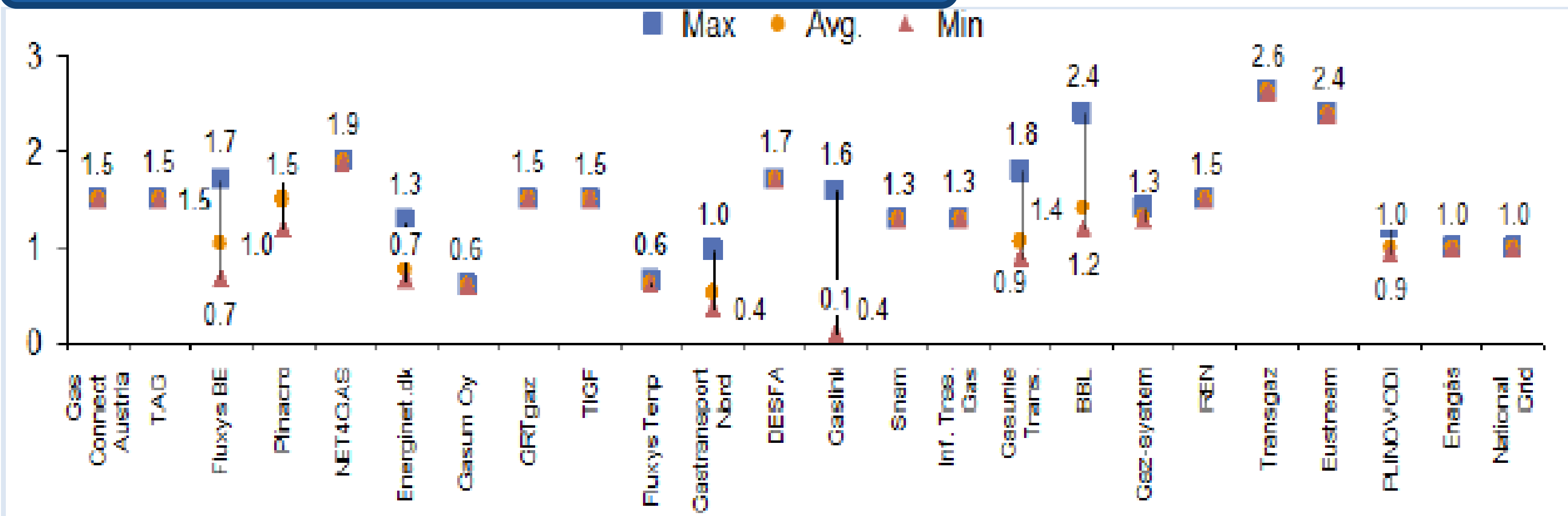
(d) **For each of the months, calculate the initial level of the seasonal factors:**

$$Initial\ SF_{monthly,i} = Primary\ factor_i^{\ s}$$

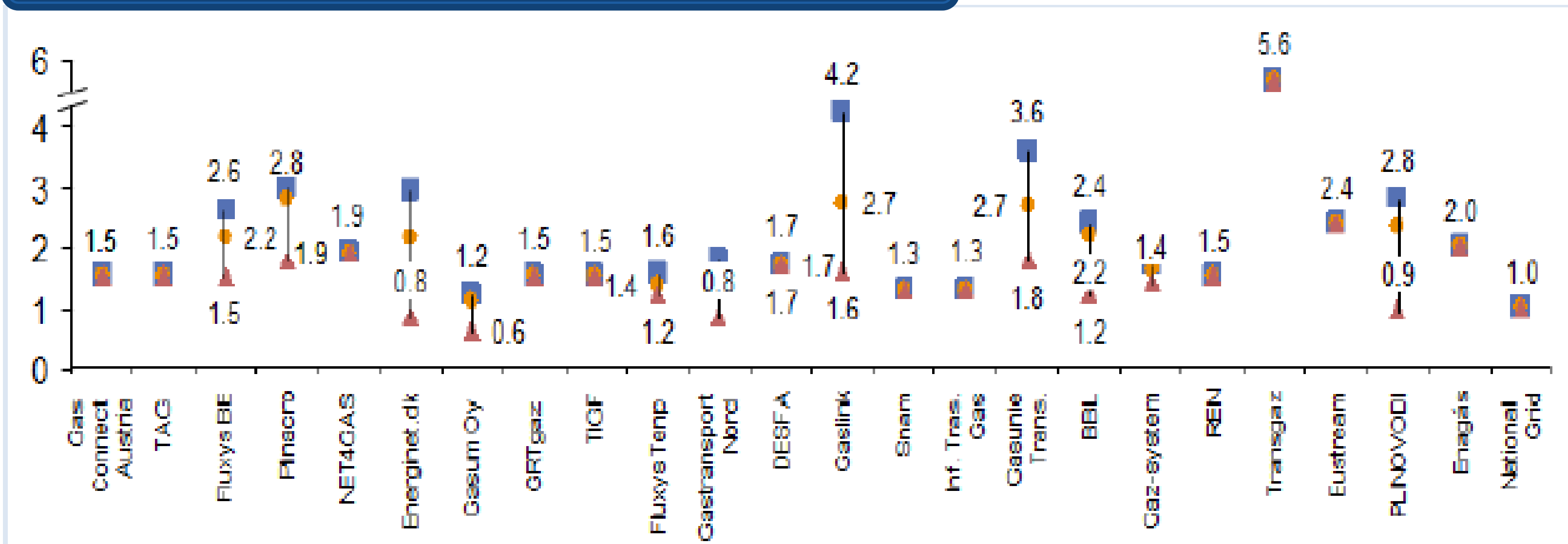
s is applied in order to penalise / incentivise more clearly the months that deviate the most from a flat usage. With s = 1, the seasonal factors are directly proportional to the use for the system. With 0 ≤ s < 1, seasonal factors would be 'softened' and can be utilised for cases where flow changes are extreme between the different periods.

MULTIPLIERS AND SEASONAL FACTORS

Monthly multipliers (Apr-Sept), average: 1.29

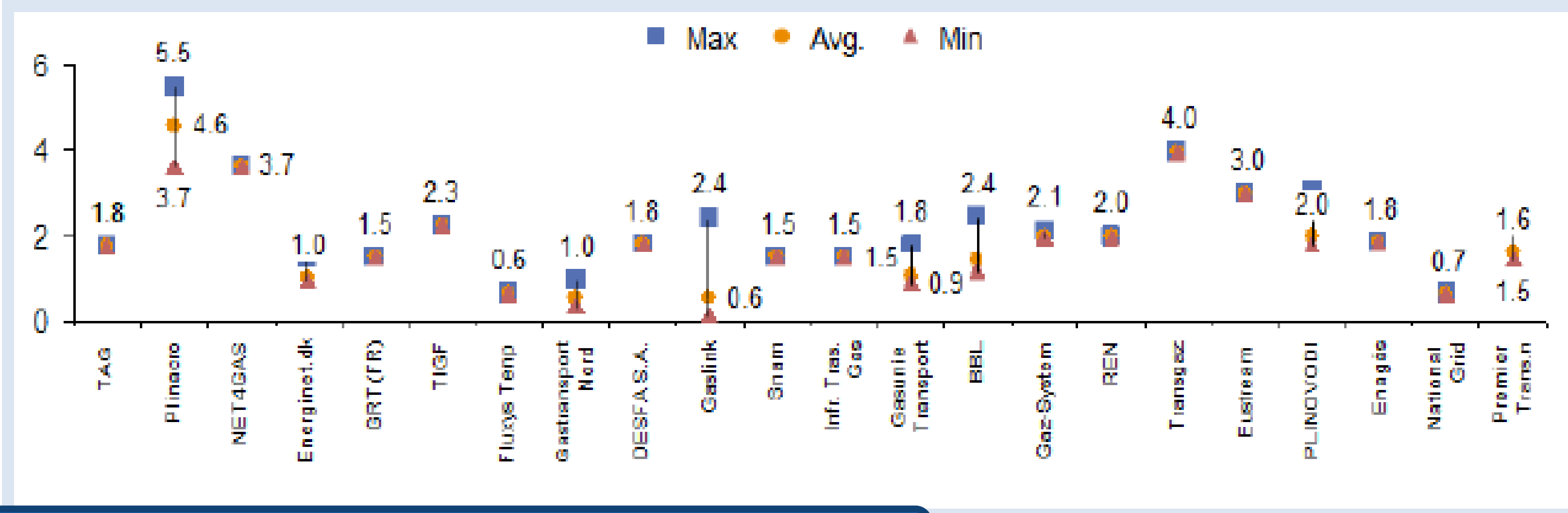


Monthly multipliers (Oct-March), average: 1.98

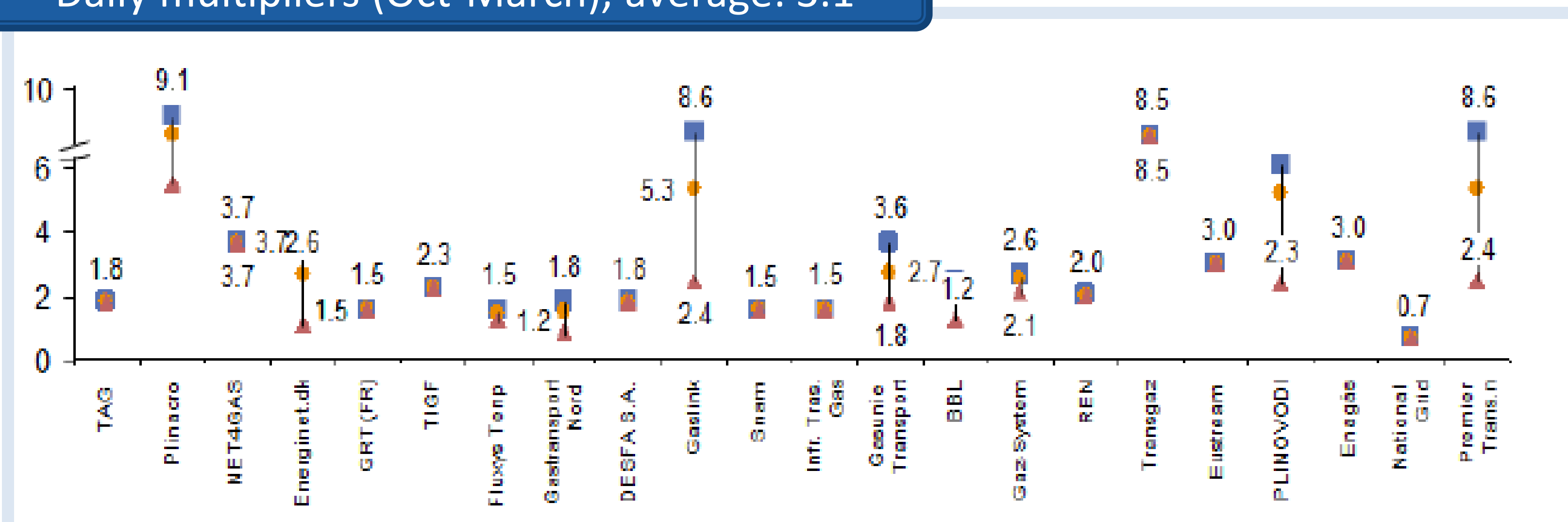


DAILY MULTIPLIERS

Daily multipliers (Apr-Sept), average: 1.9



Daily multipliers (Oct-March), average: 3.1



Reserve prices: Interruptible Capacity Pricing

Only for IPs

PRICING OF INTERRUPTIBLE CAPACITIES

Country	Approach to Interruptible Capacity		Discount applied
	Ex ante discount	Ex post discount	
Austria		✓(2)	-
Belgium	✓		From 20% up to 40%
Bulgaria		✓	-
Croatia		✓	-
Czech Rep.		✓	-
Denmark	✓		Ellund Exit: 10%, Dragør: En: 5%, Ex: 5%
Finland	No interruptible capacity		-
France	✓(2)		50%
Germany	✓(12)		Vary according to the TSOs (Min ~ 10% - Max ~40%)
Greece	✓		50%
Hungary	-		-
Ireland	No interruptible capacity		-
Italy	✓(2)		From 10% up to 20%
Netherlands	✓(2)		30%
Poland		✓	-
Portugal	✓		28%
Romania		✓	-
Slovakia		✓	-
Slovenia		✓	-
Spain	✓ (Enagas)		50%
UK	✓ (National Grid)		100% (only interruptible product sold is daily capacity)
Total	24	9	-

EC study, 2015

Discount compensation

Ex-Ante

- More elaborated in TAR NC
- Same discount in a given IP for the same standard capacity product
- Provides a reserve price for a standard interruptible product:

D=Pro*A*100
Pro = (N*Dint)/D*(CAPav int/CAP)

- A' applies to reflect the estimated economic value of the type of standard interruptible capacity product. In practice, it reflects that the costs of hedging interruption for a network user are higher than the probability of interruption
- Pro and A can be calculated separately for all 5 categories of standard capacity products and for each IP

Ex-Post

- Compensates in the event of interruption
- May be applied if no interruptions occurred due to physical congestion in the preceding gas year

Ex post compensation paid for each interrupted day shall be equal to **3 times the reserve price of daily firm standard capacity.**

Ex-ante calculation

Standard capacity product

- $D = 720$ h
- $CAP = 1{,}000{,}000$ units

Expected scale of interruption

- $N = 6$ interruptions
- $D_{int} = 12$ h
- $CAP_{av.int} = 100{,}000$ units

⇨ **Probability factor**

$$\mathbf{Pro} = \frac{6 \times 12}{720} \times \frac{100{,}000}{1{,}000{,}000} = 0.01$$

Adjustment factor

- $A = 20$

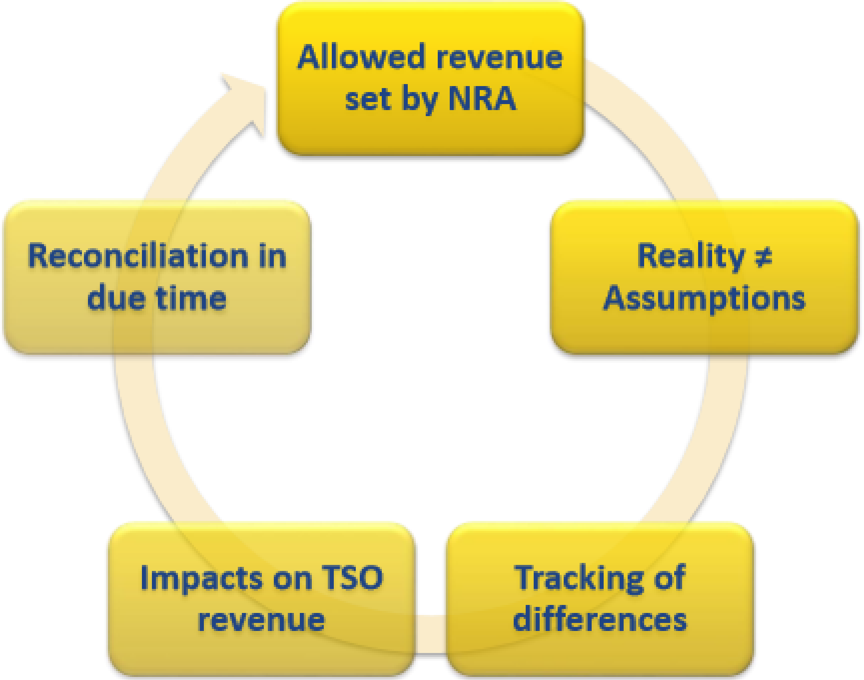
⇨ **Discount**

$$\mathbf{Di}_{\text{ex ante}} = 0.01 \times 20 \times 100\% = 20\%$$

Regulatory Account

Why a regulatory account

In case of non-price cap regimes



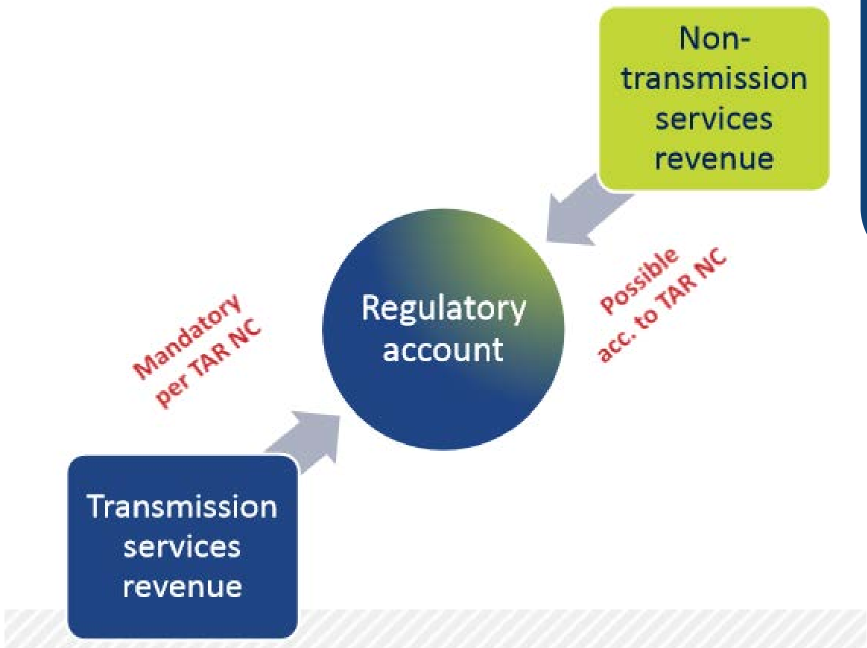
The purpose of the regulatory account is to compensate under- and over-recovery for a more stable and predictable TSO tariff from one period to the next, for the benefits of network users

Under-recovery and over-recovery trigger the need for tariff adjustments

A regulatory account records the difference between the TSO's allowed revenues and the revenues actually obtained during the same period.

The TAR NC requires each TSO functioning under a non-price cap regime to have one regulatory account recording the information on under- / over-recovery.

- The NRA can decide to require aggregated information, or information differentiated by source / aim showing the gap for each item.



If non-transmission services are included:

- It could be split into sub accounts
- Compensation results in less tariff variation
- But will result in cross-subsidisation

WAY OF ACCOUNT RECONCILIATION

The account is determined annually:
- Based on the difference between allowed and actually collected revenue
- In case of incentive schemes it can be parital
- NRA can decide to direct the auction premium to reduce physical congestion

Adjustment:
- The difference becomes a future input to the applied RPM:
  - Rescaling: Over recovery reduces it, Under recovery raises
    - Subject to the principle of avoiding significant differences between transmission tariffs in consecutive tariff periods
- Revenue reconciliation period:
  - It may be longer than a tariff period spreading it…
- CRRC could be an option at non-IPS

Application dates: overview

Entry into force, 6 April 2017

- Ch. I ‘General provisions’
- Ch. V ‘Pricing of bundled capacity and capacity at VIPs’
- Ch. VII ‘Consultation requirements’
- Ch. IX ‘Incremental capacity’
- Ch. X ‘Final and transitional provisions’

1 October 2017

- Ch. VI ‘Clearing and payable price’
- Ch. VIII ‘Publication requirements’

31 May 2019

- Ch. II ‘Reference price methodologies’
- Ch. III ‘Reserve prices’
- Ch. IV ‘Reconciliation of revenue’