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Session 3: Network codes

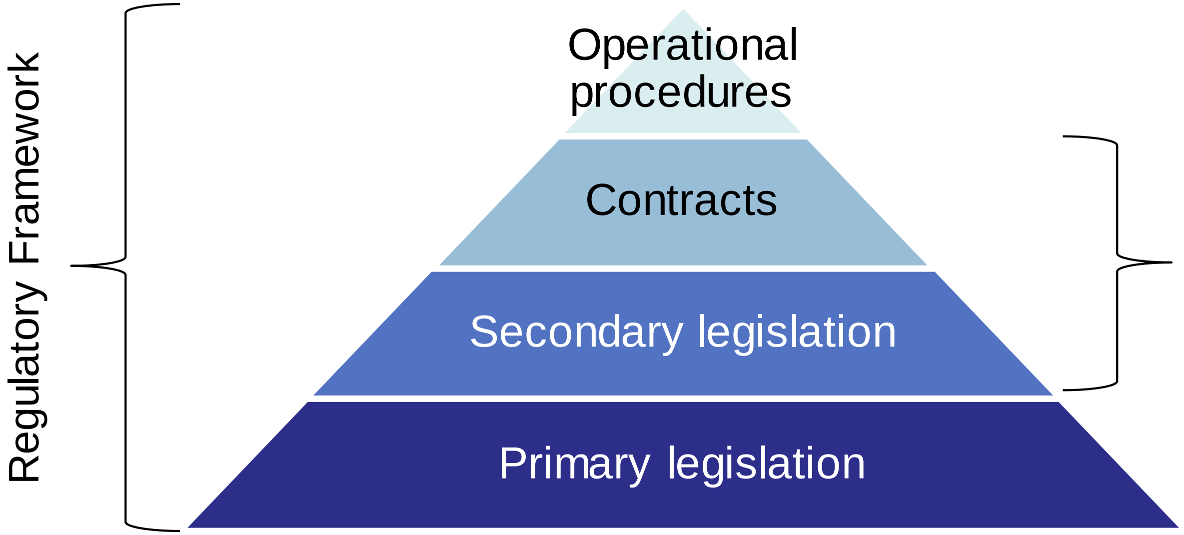
Workshop on gas market design, Brasília

23 August 2018

Network codes can do the trick

as European experience showed

- Opening of Brazilian gas market began in 2009 (Law 11.909)
  - Why Petrobras still has a de facto monopoly?



e.g. clear definition of roles and responsibilities, transparency, data exchange and communication

e.g. harmonized GTA (gas transmission agreements) and general terms and conditions approved by the regulator (ANP Ordinance 11/2016)

e.g. network codes set/approved by the regulator ✓

e.g. Gas Law (Law 11.909/2009 ✓, Gas para Crescer Bill expected)

  - Petrobras had and still has access to flexibility, information, control rights, etc. that potential competitors do not have
    - ► Detailed rules are necessary to create a level playing field in all areas

The transition is challenging

Amending GTAs and developing network codes takes time

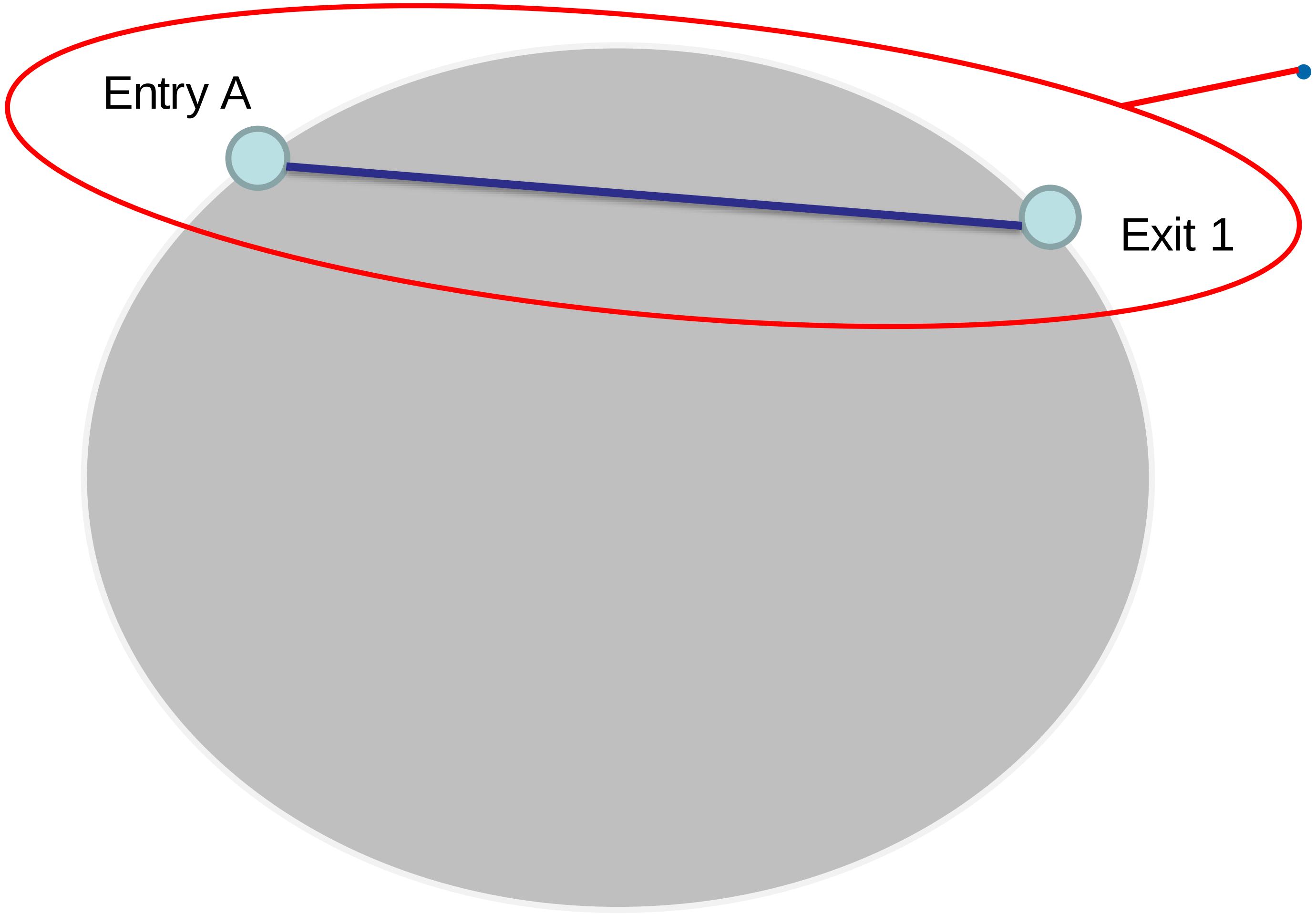
- Duration of reform steps and phasing of reform
  - Amending GTAs to the entry-exit model
  - Splitting GSAs (gas supply agreements) into capacity contracts and commodity contracts (if relevant)
  - Developing a methodology for setting entry and exit tariffs
  - Developing a set of network codes underlying the entry-exit model
    - Congestion management
    - Capacity allocation
    - Balancing
    - Interoperability and data exchange
  - Based on European experience, the reform steps could be implemented within 4 years

Amending GTAs to the entry-exit model

- Amending existing gas transmission agreements (GTAs)
  - What rights and obligations do existing GTAs stipulate?
  - Is there a risk of termination of existing GTAs upon their amendment?
  - What is the design of the new entry-exit model?
  - ➢ Identify need for amendments

- EU/Austrian experience
  - Key objective: amend all existing GTAs to bring them in line with the entry-exit system → no dual system of legacy contracts and new contracts
  - Carry out transition/contract amendments in a way that do not lead to contract terminations, i.e. main contractual elements (tariff, contracted capacity quantity and quality) do not substantially deteriorate

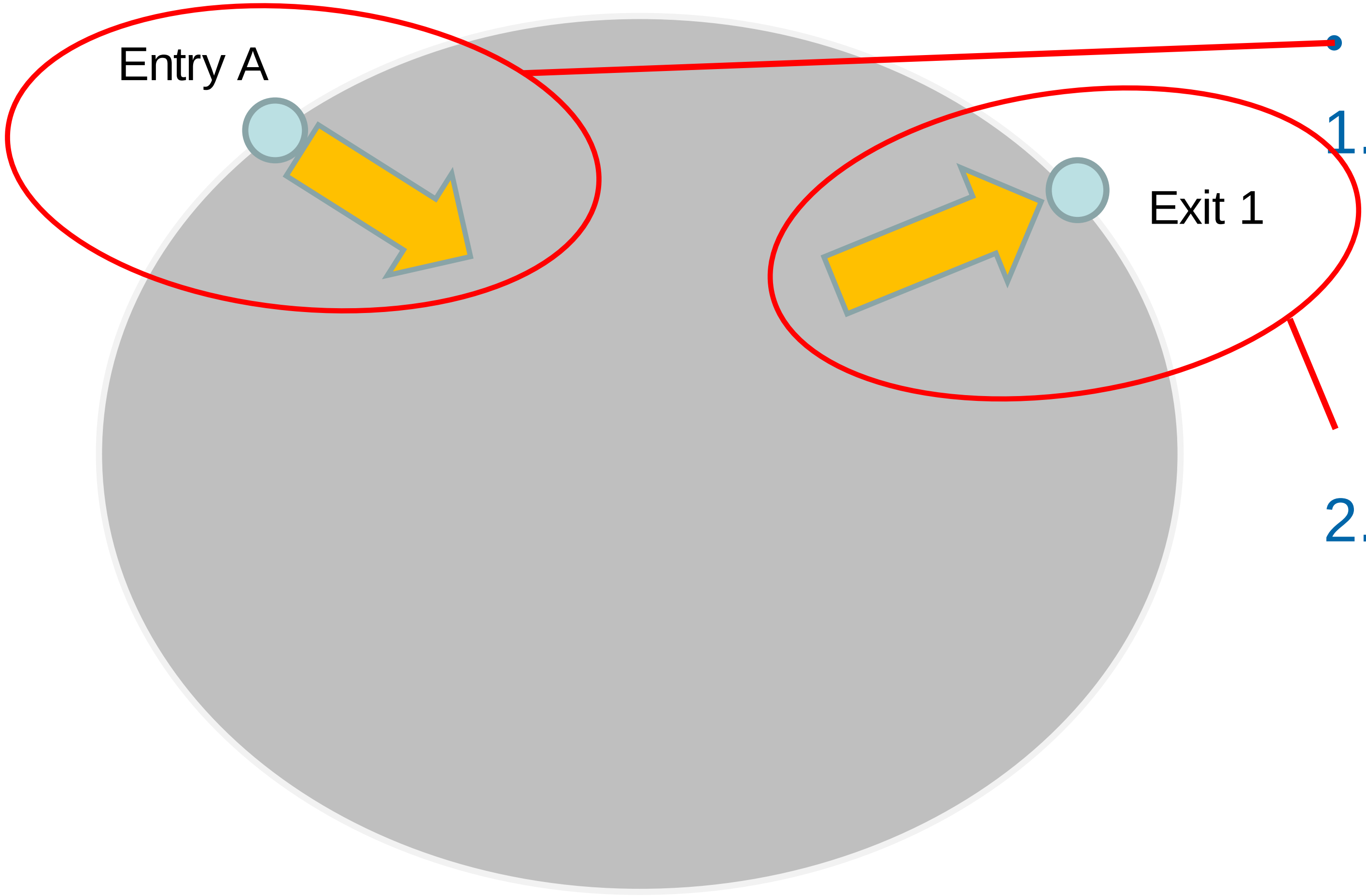
Illustrative example:
Amending existing GTAs – before



- One point-to-point contract
  - Firm capacity right to flow gas from Entry A to Exit 1
    - Contracted capacity: 10.000 kWh/h
    - Tariff: 5 EUR/kWh/h/year

Illustrative example:

Amending existing GTAs – after



- Two contracts

1. Entry contract
   - Firm capacity right to enter gas at Entry A
     - Contracted capacity: 10.000 kWh/h
     - Tariff: 2 EUR/kWh/h/year
2. Exit contract
   - Firm capacity right to exit gas at Exit 1
     - Contracted capacity: 10.000 kWh/h
     - Tariff: 3 EUR/kWh/h/year

► Main elements remain unchanged

Freeing-up contracted capacity is key

Several congestion management mechanisms exist in Europe

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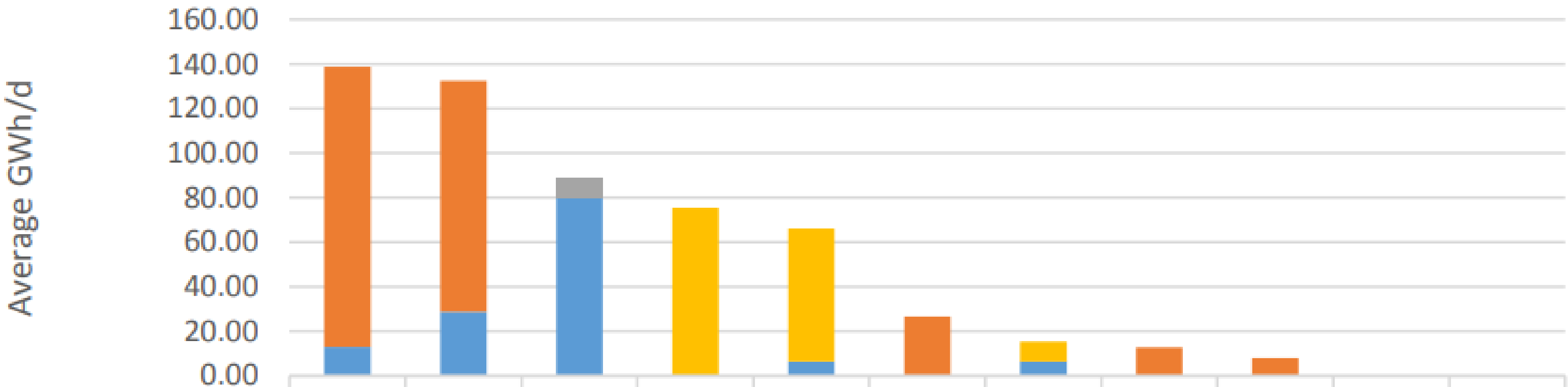
- Capacity surrender could be a useful tool to start with
  - Network user may request (and TSO shall accept) the surrender of firm capacity that was contracted by the network user at an entry or exit point
  - The TSO offers the surrendered capacity to interested market parties
  - The TSO allocates surrendered capacity only after any available (primary) capacity has been allocated
- Measure is cost-neutral and free of risk for TSOs
  - Payment obligation of primary capacity holder remains unchanged until surrendered capacity is re-allocated at equal economical conditions
  - The network user retains its rights and obligations under its existing capacity contract in any case to the extent the capacity has not be re-allocated successfully
- We are not aware of any contract terminations in Europe in relation with the application of the capacity surrender

► Petrobras should be obliged surrender the necessary capacity (in full) at city gates for customers that are supplied by an alternative supplier

Capacity surrender – European experience

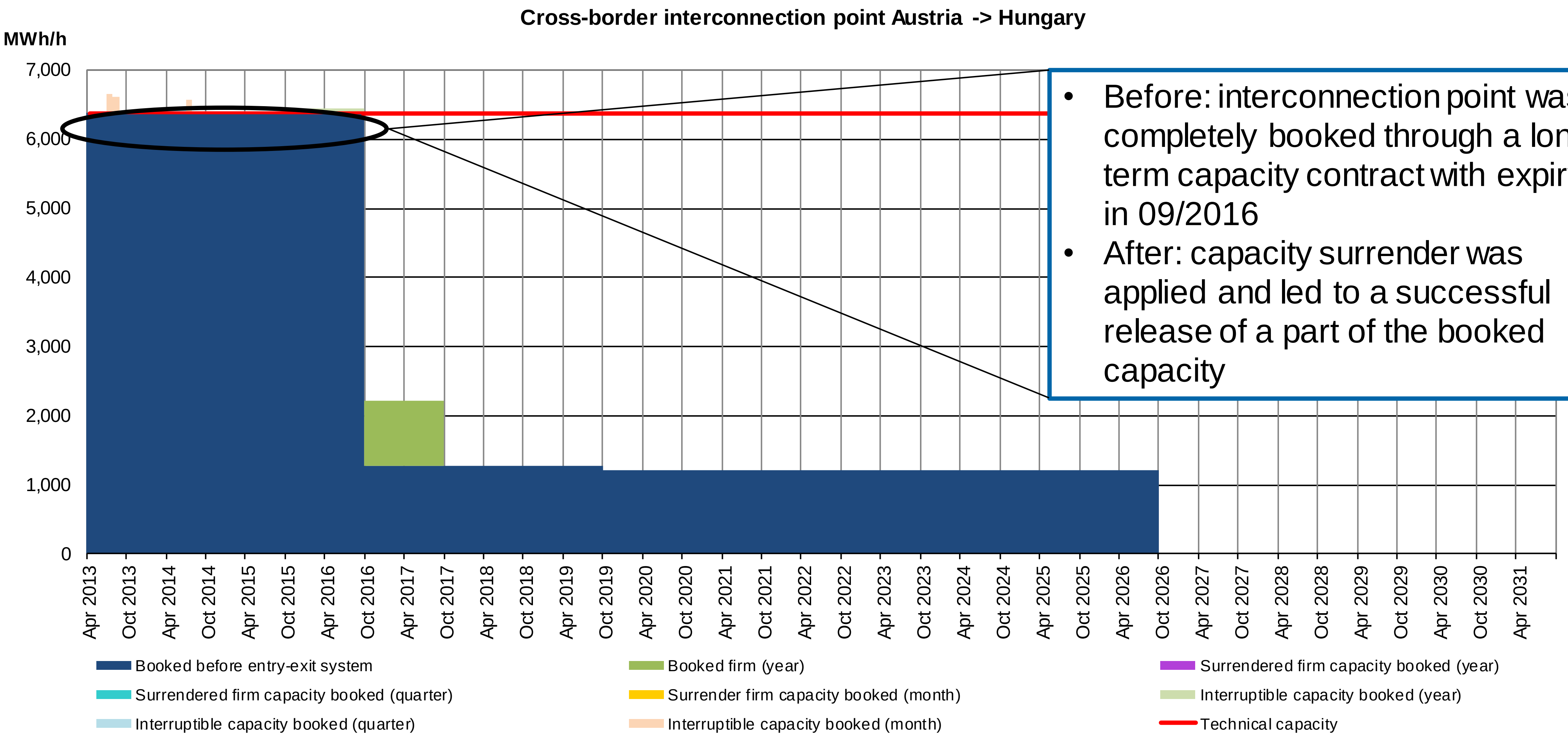
- Capacity surrender is used in many European countries



	NL	UK	CZ	SE	AT	FR	DE	ES	PT	PL	BG
UIOLIShortTerm				75.42	59.69		8.89				
UIOLILongTerm			8.58								
Oversubscription	125.71	103.78				26.60	0.00	12.68	8.10		0.13
Surrender	12.96	28.71	79.84		6.51		6.43			0.19	

Source: ACER 2018 Implementation Monitoring Report on Contractual Congestion at Interconnection Points (https://acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/Congestion%20Report%205th%20ed.pdf)

Capacity surrender – concrete case



- Before: interconnection point was completely booked through a long-term capacity contract with expiry in 09/2016
- After: capacity surrender was applied and led to a successful release of a part of the booked capacity

Balancing options

Key to market design, not just technical rules

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- Physical balancing – based on Petrobras' access to flexibility
  - Petrobras could temporarily act as balancing shipper
- Commercial balancing: as simple as possible to allow for market entry
  - Introduce balancing portfolios that allow for grouping of a network user's inputs and offtakes
  - Nomination and renomination rules (nominated = allocated)
  - Daily balancing with daily cash out
  - Main challenge: identification of a balancing price
    - Are prices (e.g. import prices) published that could be used as a proxy in the beginning?
    - Definition of a price basket (index) – e.g. Germany
- Smaller balancing portfolios could be provided with higher tolerances in the balancing regime
  - That could be a potential way to balance the competitive position of Petrobras due to its large portfolio effect

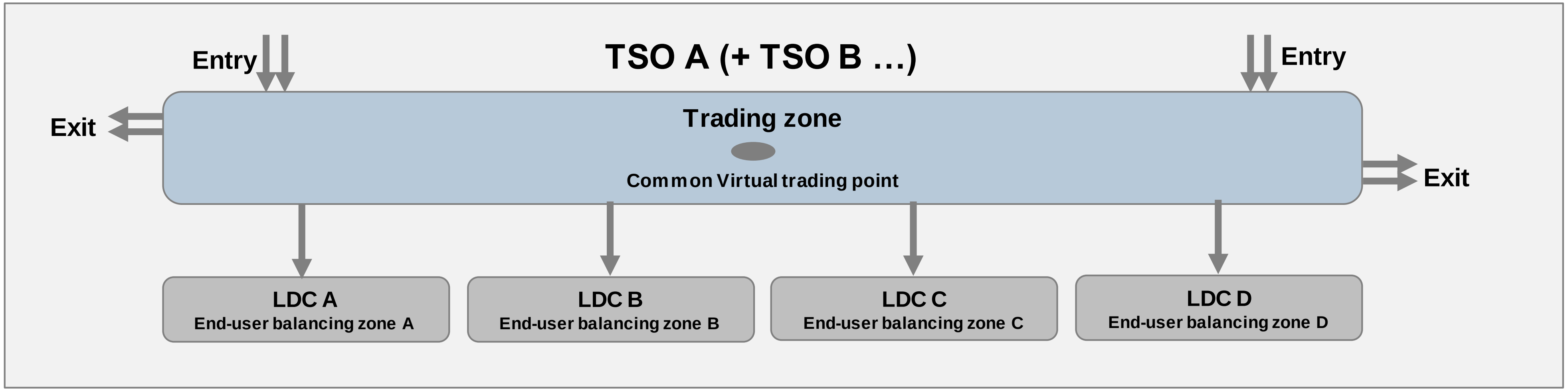
Market maker – European experience

- Building up liquidity at virtual trading point(s) through market maker obligation on Petrobras (on a transitional basis)
- Market maker:
  - Fosters liquidity and continuous trading and the development of a reliable reference price (e.g. to be subsequently used as balancing price)
- Market making can be considered as a form of gas release program
  - Market making obligations usually oblige a company to place quotes (bid and ask) for each (hour of a) trading day with a certain maximum bid-ask spread (e.g. 0.30 EUR/MWh) and with a minimum order size (e.g. 100 MWh/h)
- In many EU countries, market makers arrangements have been established in order to develop liquidity in organized/transparent gas markets, e.g. Austria, Baltics, Poland, Germany

Trading Region focuses on transmission

Could be a suitable model for Brazil

- Trading region focuses on transmission level – ANP competence to set rules
  - Full market area would require the inclusion and cooperation of the DSOs/LDCs e.g. regarding balancing
  - The trading zone includes all entries of gas into and all exits of gas out of the gas transmission systems as well as a (single) virtual point
  - The balancing of end user loads in the different states is kept separate in ‘end user balancing zones’ corresponding to the LDCs’ grids in the different states
  - City gates exits in the different states could be combined into virtual “state gates”



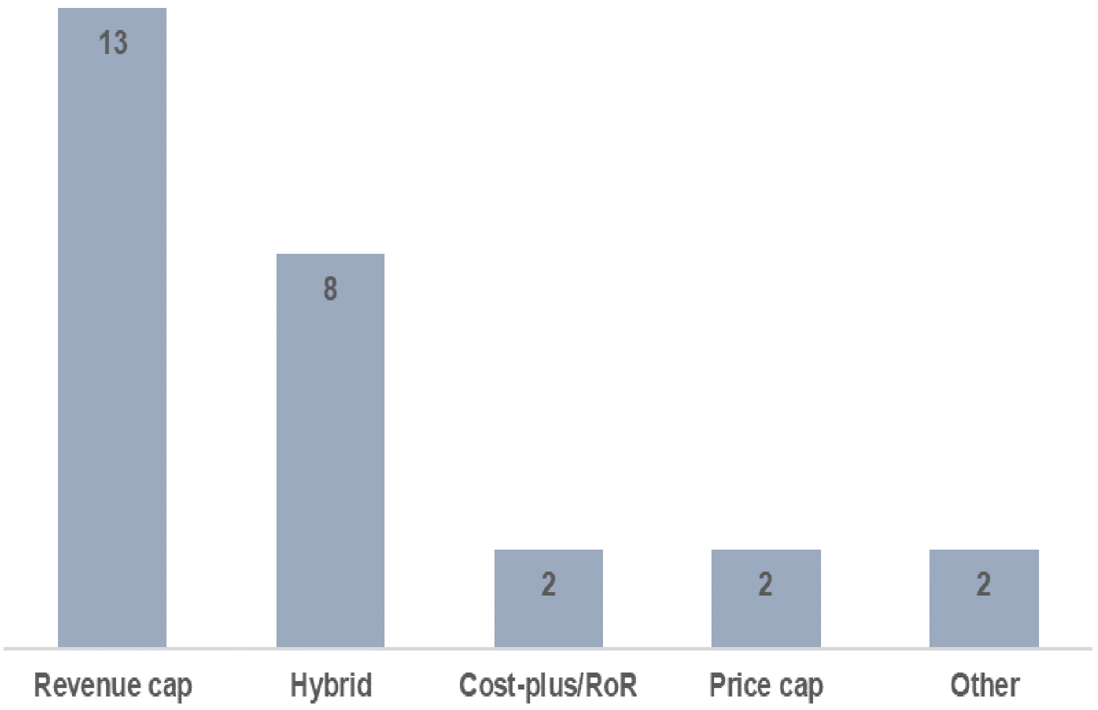
Type of regulation

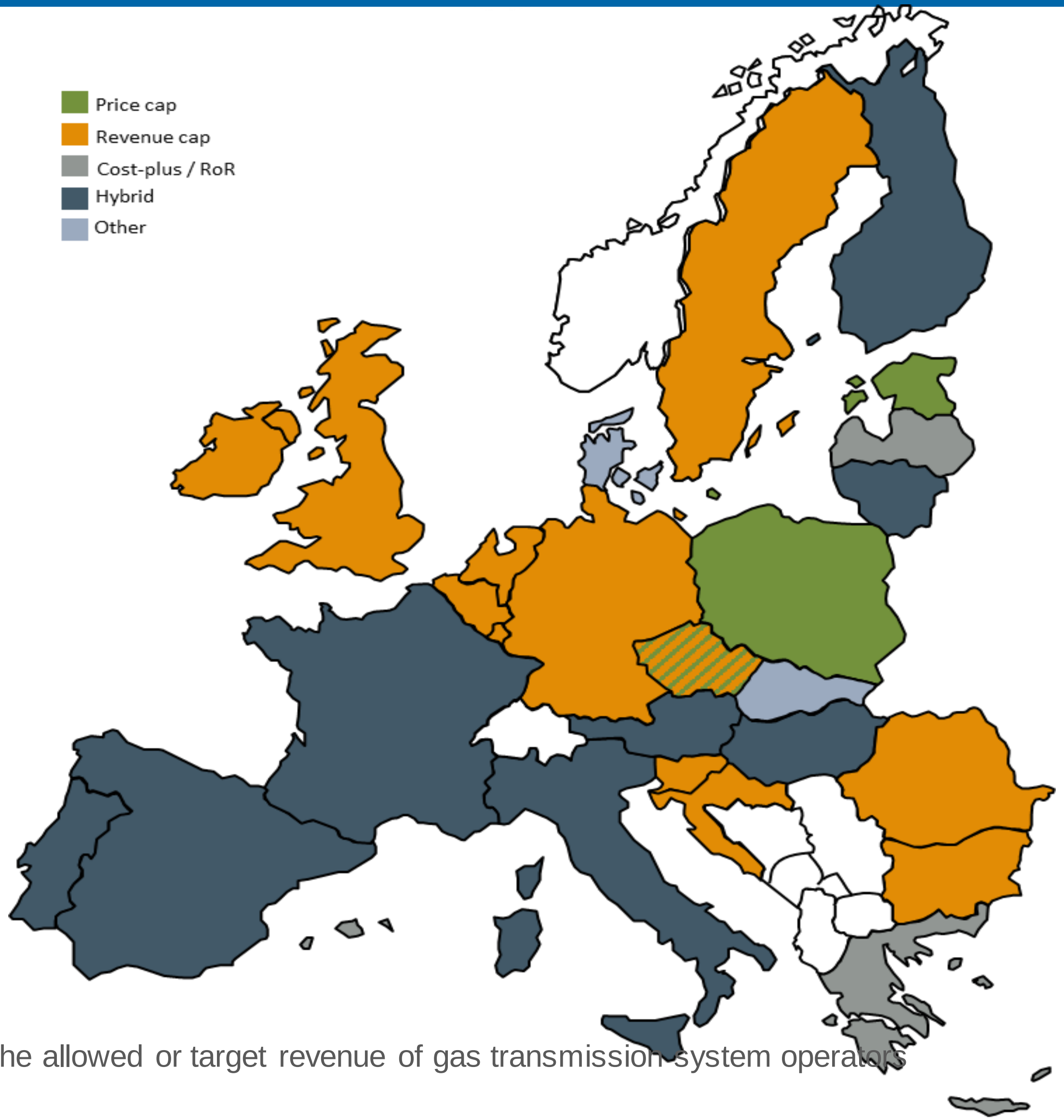
Which revenue control mechanism is the right one?

- Choice between revenue control mechanisms is not unambiguous
  - Depends on the circumstances and also the weighting placed on different objectives by the NRA and other stakeholders
- Incentives on TSOs to minimize cost
  - Incentive-based regimes (revenue and price caps) theoretically provide much stronger incentives than cost-plus/rate-of-return regimes and place the risk of any cost deviations on the TSO rather than network users
- Is demand expected to grow, i.e. are incentives to meet and expand demand necessary?
  - Cost-plus/rate-of-return and price cap regimes more suited than revenue cap regimes
- Who should bear the volume risk?
  - From an efficiency perspective, this risk should be placed on the party that is better placed to manage it
  - The costs of the gas networks vary only slightly with demand (as most costs are fixed in the short term). This suggests that the risk exposure should be passed to network users (as it is under a revenue cap), since TSOs have limited ability to manage the risk and the risk is diversified by spreading it across a wider group

Type of regulation in Europe

A mixed picture





Source: ACER 2018, Report on Methodologies and parameters used to determine the allowed or target revenue of gas transmission system operators

Options for pricing incremental capacity

Main question: who should pay costs for incremental capacity?

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- Pros and cons that have been discussed in Europe in the process of developing a framework for incremental capacity

	Pros	**Cons**
Increasing tariffs for all capacity users	• Simplicity of the approach	• Unexpected tariff increase for users having booked long-term capacity before an investment was triggered
Increasing tariff except for users who booked capacity before the investment decision	• "Existing" users protected from unexpected tariff increase	• Complexity linked to the coexistence of two tariffs
Potentially introducing a minimum premium for users participating to the incremental process	• "Existing" users protected from unexpected tariff increase • Simplicity as there is a single tariff	• Reduces the incentives to commit long-term since the tariff for future bookings will be lower than the incremental tariff

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Main regulatory models for setting and adjusting allowed revenues

Cost-plus	• Revenue is set equal to **historical** costs • Revenues are **adjusted frequently** (eg annually) to equal actual costs
Rate of return	• Revenue is set equal to **historical** costs • Revenues are **reset at irregular intervals**, as required, to maintain a reasonable allowed return
Price / revenue caps (incentive based)	• Revenue is set equal to ***forecast*** costs • Revenues are **reset at regular multi-year intervals**