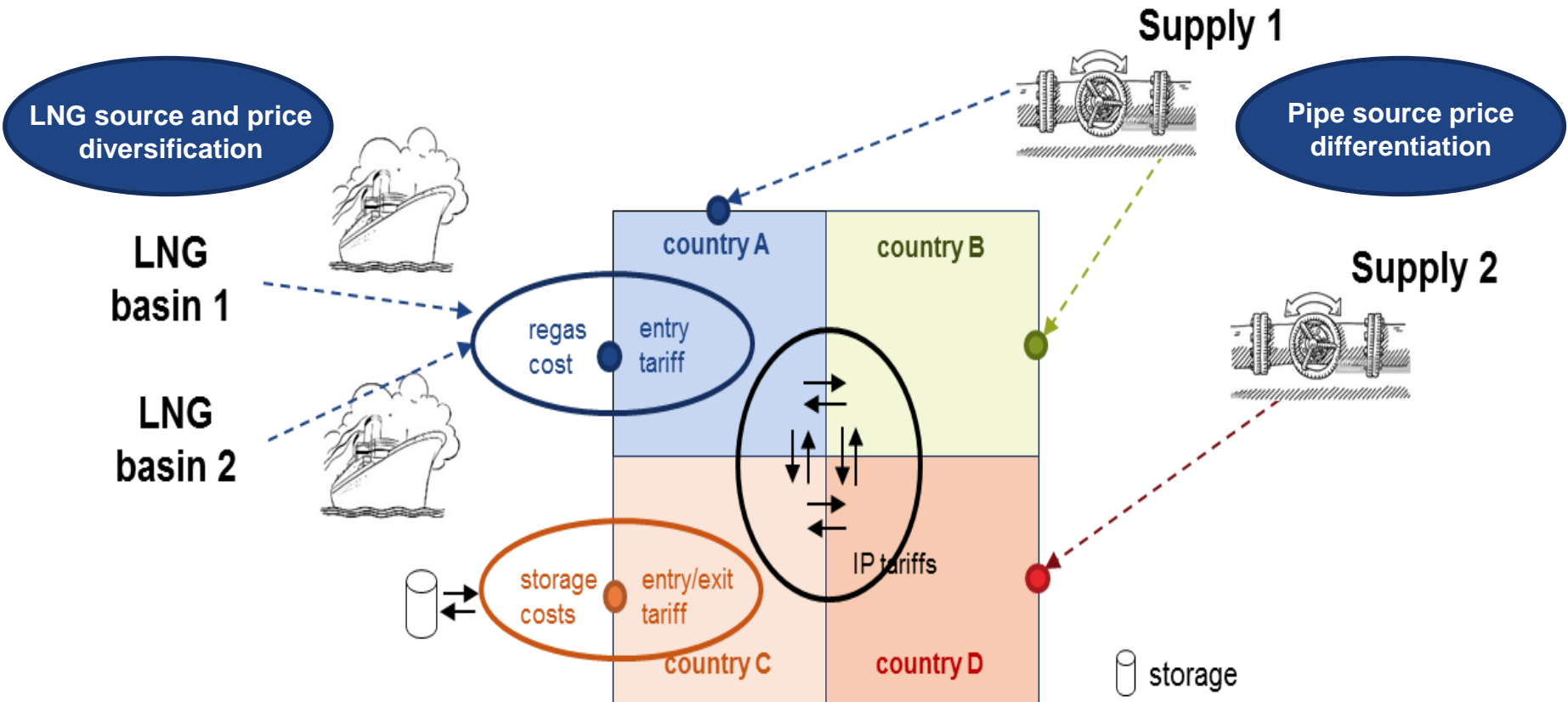


Infrastructure costs

What? Why? How?



More comprehensive approach



A refined supply assessment complemented by inclusion of infrastructure costs (incl. LNG and UGS costs)

A green L-shaped graphic in the top-left corner.

The stakeholder expectation: Improved market modelling incl. infra costs

From whom?

- > A broad range of stakeholders recommend to include infrastructure costs to improve market modelling

Why?

- > To ensure a « more realistic » modelling of flows, ie infrastructure use
- > To ensure « more realistic » supply mixes



Concept: the fundamental question

Do we think IP costs will have a role in driving gas flows in the future?



**Conceptually, it make sense to consider
infra costs in the TYNDP modelling**

Under investigation based on

- Expectations expressed by institutions and stakeholders
- Foreseen move towards short-term capacity bookings

Note: flows will remain primarily driven by demand coverage. Infra costs will play as an arbitrage between possible routes



Pre-requisites



A meaningful market modelling overall requires...

Supply costs component

- > To make realistic assumptions on **supply prices**
 - ENTSOG proposal detailed in “supply assumptions” presentation

Infrastructure costs component

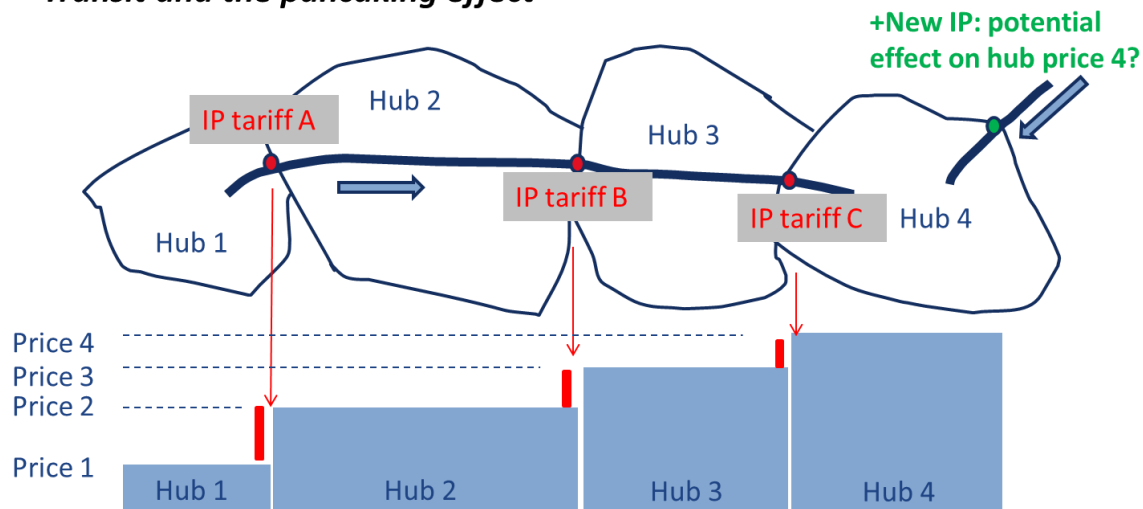
- > To account for infrastructure costs for the **existing gas system**
 - **Transmission grid**
 - **UGS and LNG terminals**
- > To account for infrastructure costs also for **infrastructure projects**
- > To translate **infra tariffs** into **costs per unit of flow** (commoditisation)
 - Accounting for capacity and commodity charges
 - Requiring an assumption on the profile for capacity subscription and use (load factor)



Market modelling: what it does...

- > A refined approach to supplies prices and mixes
- > Market-oriented flow patterns
- > Market prices taking into account infrastructure costs

Transit and the pancaking effect





Some limitations



- > No long-term visibility on infrastructure costs (e.g. tariffs)
 - Most acceptable approach is to maintain today's tariff over time

- > Capacity bookings on short-term and long-term (several years) may have different impact on infrastructure use

- > Infrastructure costs will induce more « binary » flow patterns compared to the previous approach
 - Consideration of LT capacity booking already identified as solution

- > Long-term commodity contract will not be directly considered in TYNDP 2018
 - Minimum supply potential as a proxy to LTC Take-or-pay...
 - ...plus thoughts currently given to consideration of LT capacity bookings

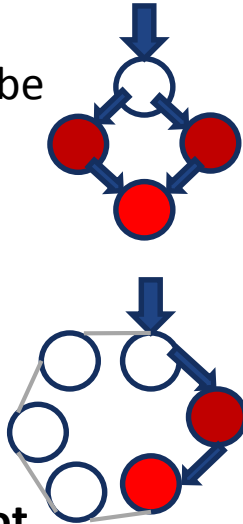


Inclusion of infrastructure costs

Until now

> Infinitesimal “Mathematical costs” on arcs, increasing with use

- 2 equivalent routes would be used in a balanced way
- Between 2 routes, the optimisation choses the “shortest one”



> Actual infrastructure costs not taken into account

With inclusion of infra costs

> Arcs will have different costs

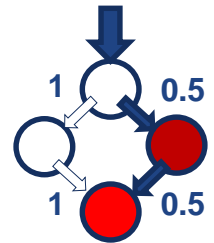
> Methodology to “commoditise” infra costs

- the model uses commodity tariffs

> The cheapest routes will be used

- risk of binary flows

> Flows driven by tariffs





Thank You for Your Attention

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