

Gas export pricing in Europe: how to balance different approaches

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- **Conclusions**

Three key gas pricing mechanisms

- **Cost-plus (net-forward) pricing:**

Ricardian rent (long-term difference between costs & marginal costs) => utilized at *physical* market

- **(Net-back) replacement-value-based pricing:**

Ricardian rent

+ **Hotelling** rent (long-term difference between marginal cost & replacement value of competing fuel(s)) => utilized at *physical* market

- **Exchange (commodities) pricing (futures / options):**

Ricardian rent

+ **Hotelling** rent

+/- **Windfall** profits/losses (to cover short-term supply/demand imbalances; difference between supply/demand "equilibrium" price & replacement value) => utilized at *paper* market

Non-renewable energy pricing: economic & legal background

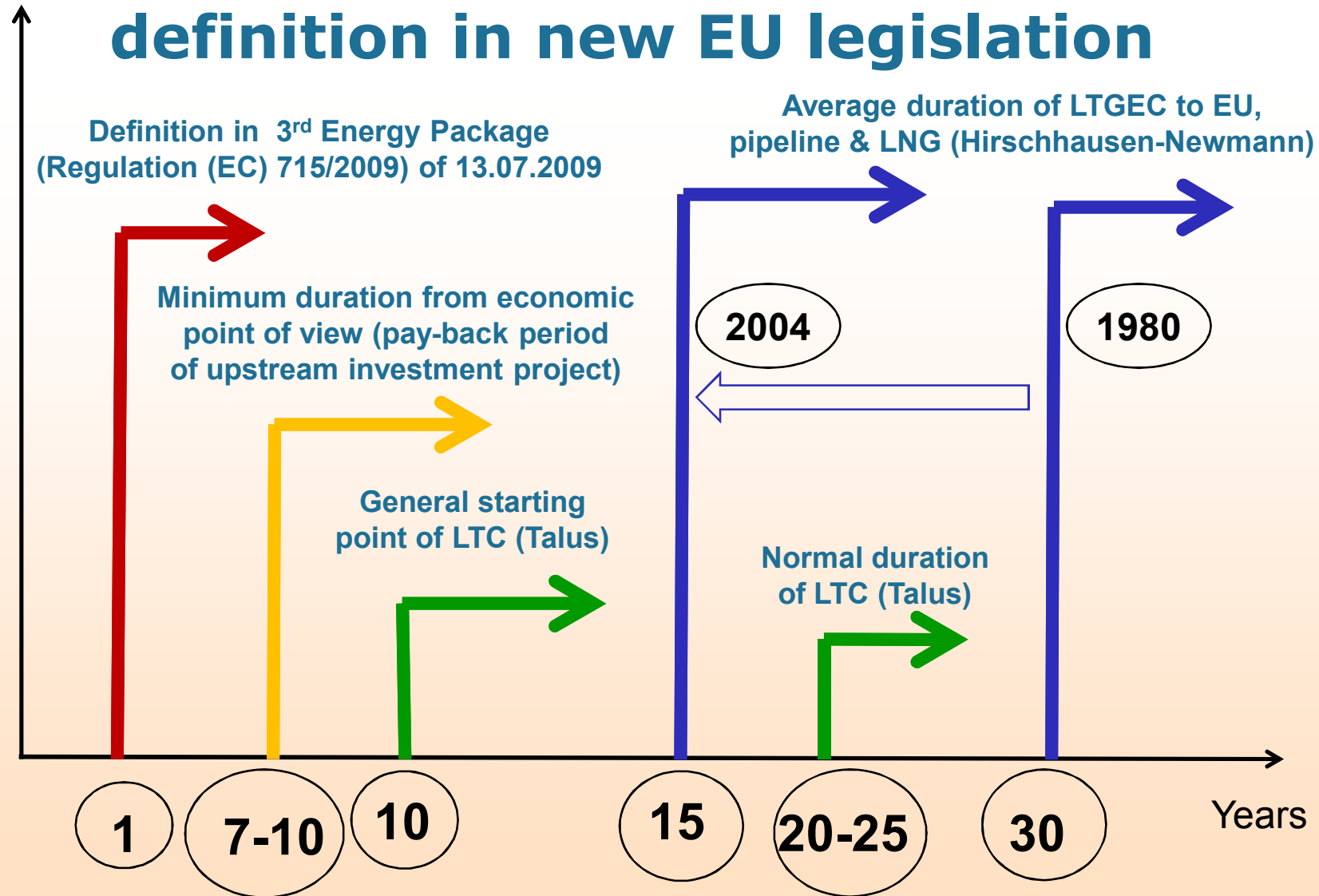
Resource owning state: to maximize long-term resource rent => Sovereign right of exporter / resource-owning state to sell gas to export market with highest replacement value (USSR/Russia => EU):

- **Economic basis:** Groningen concept of LTGEC (Netherlands, 1962) = long-term contract + pricing formula linked to gas replacement values (prices of replacing fuels within competitive energy market) + price review (+ net-back to delivery point) => to market gas within evolving market structure & competitive pricing environment to the mutual benefit of both producer & consumer
- **Legal basis:** UNGA Res.1803 (1962) + ECT Art.18 (1994/98) = (permanent) state sovereignty on natural/energy resources

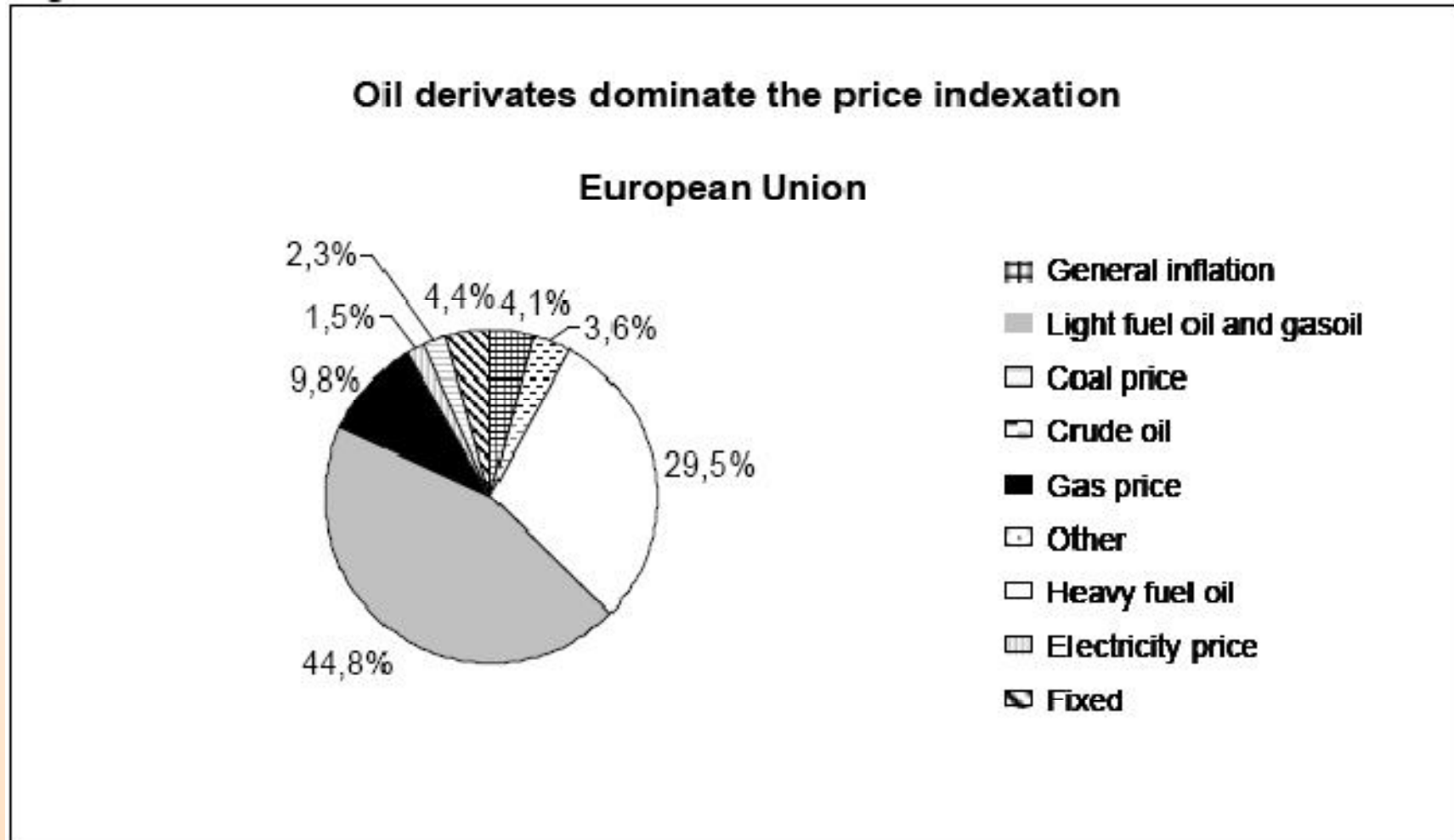
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Long-term gas (export) contracts: different duration in historical European practice & definition in new EU legislation

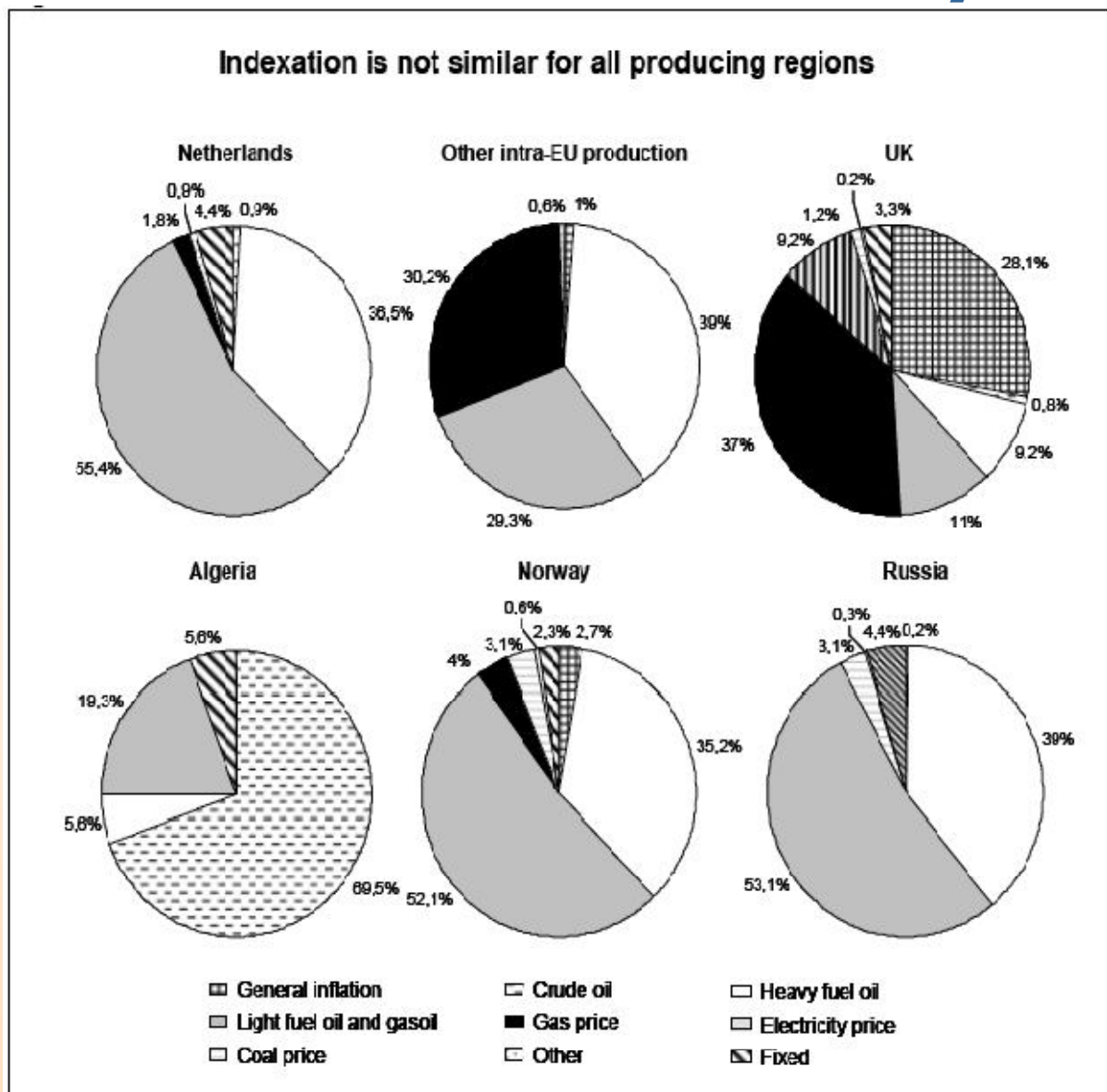


Price indexation structure in the EU



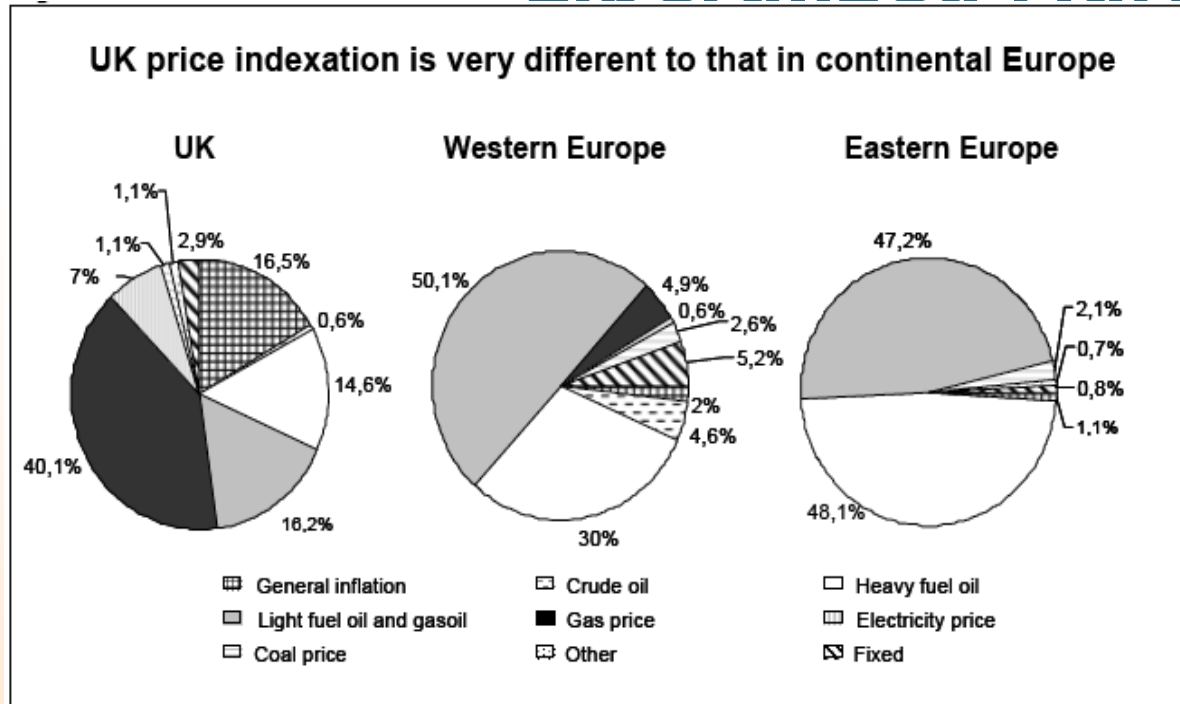
Source: *Energy Sector Inquiry 2005/2006*

LTGEC in the EU: Indexation by Producer



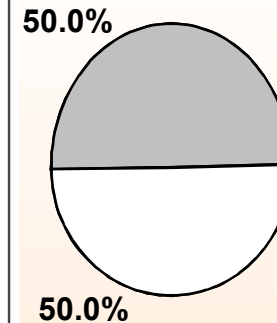
Source: Energy Sector Inquiry 2005/2006

LTGEC in Europe: Indexation by Region - Historical Evolution from Less to More Liberalized Markets

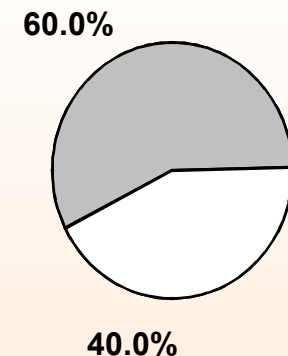


Source: Energy Sector Inquiry 2005/2006

Russia-Ukraine LTGEC (2009-2019)



Basic Groningen LTGEC model (since 1962)



Evolution of LTGEC pricing formula structure: from more simple to more complicated

Russia-Ukraine 2009 LTGEC structure rationale: more practical (understandable & sustainable) to start with less sophisticated pricing formula => similar to basic Groningen formula

Further development (most likely): towards EE-type => WE-type => UK-type price indexation

Evolution of gas export pricing in Continental Europe & FSU

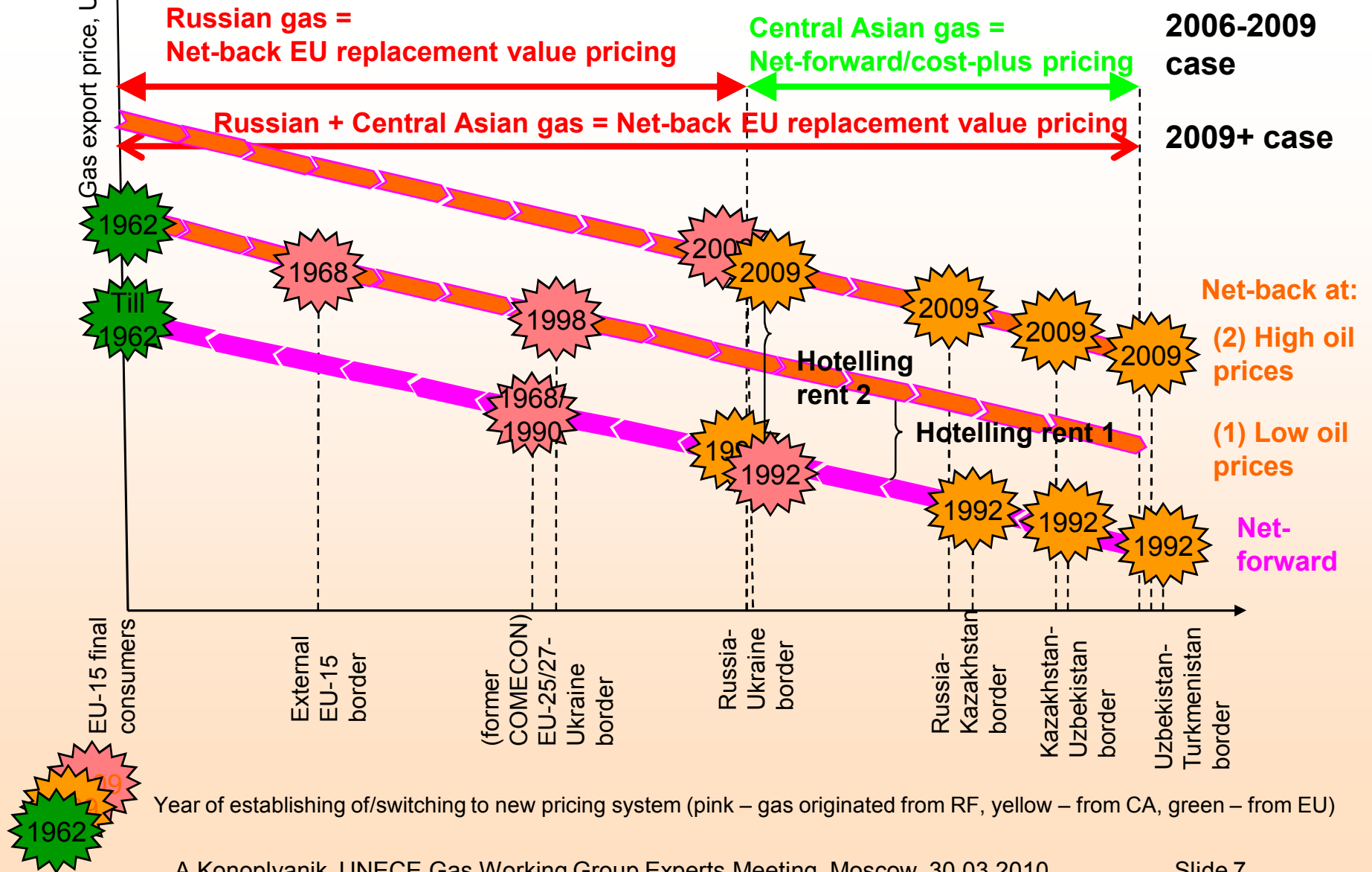
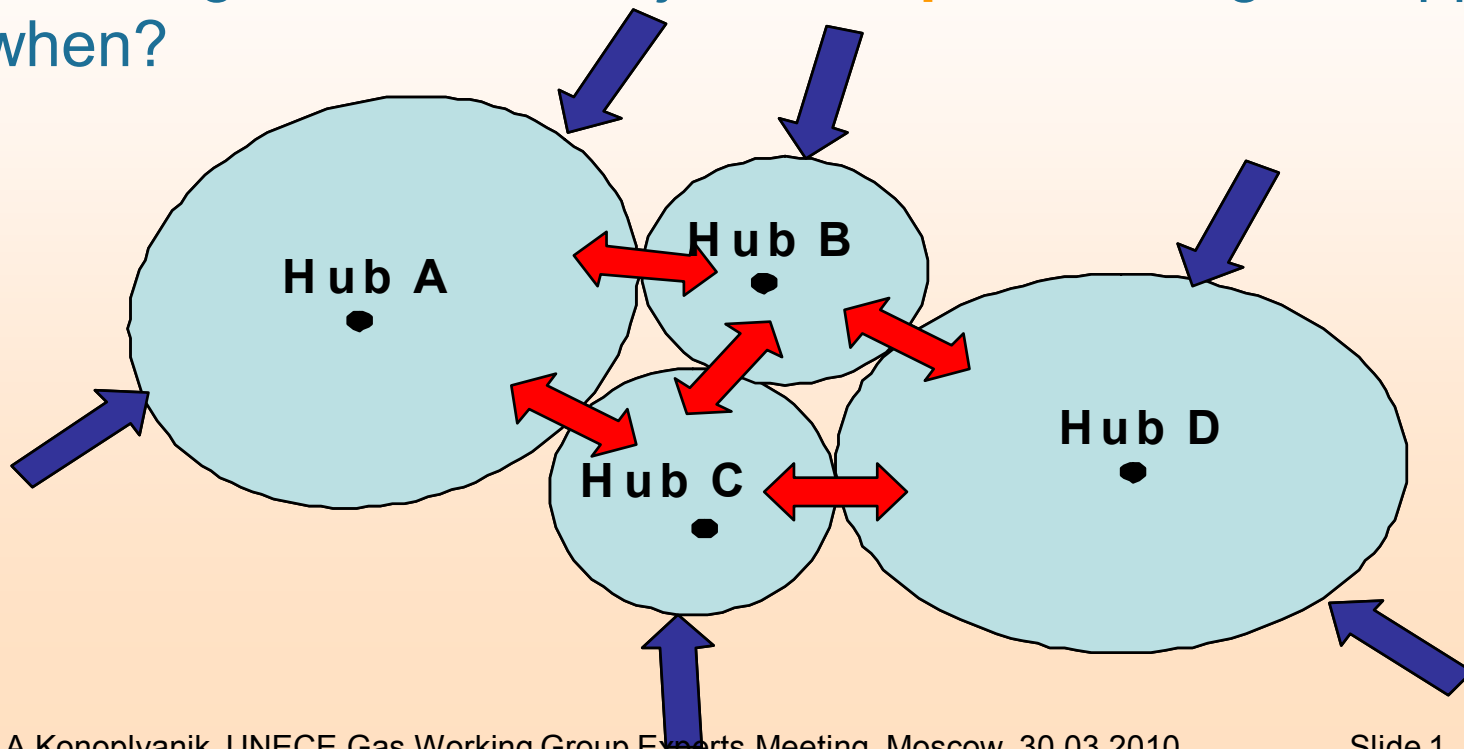


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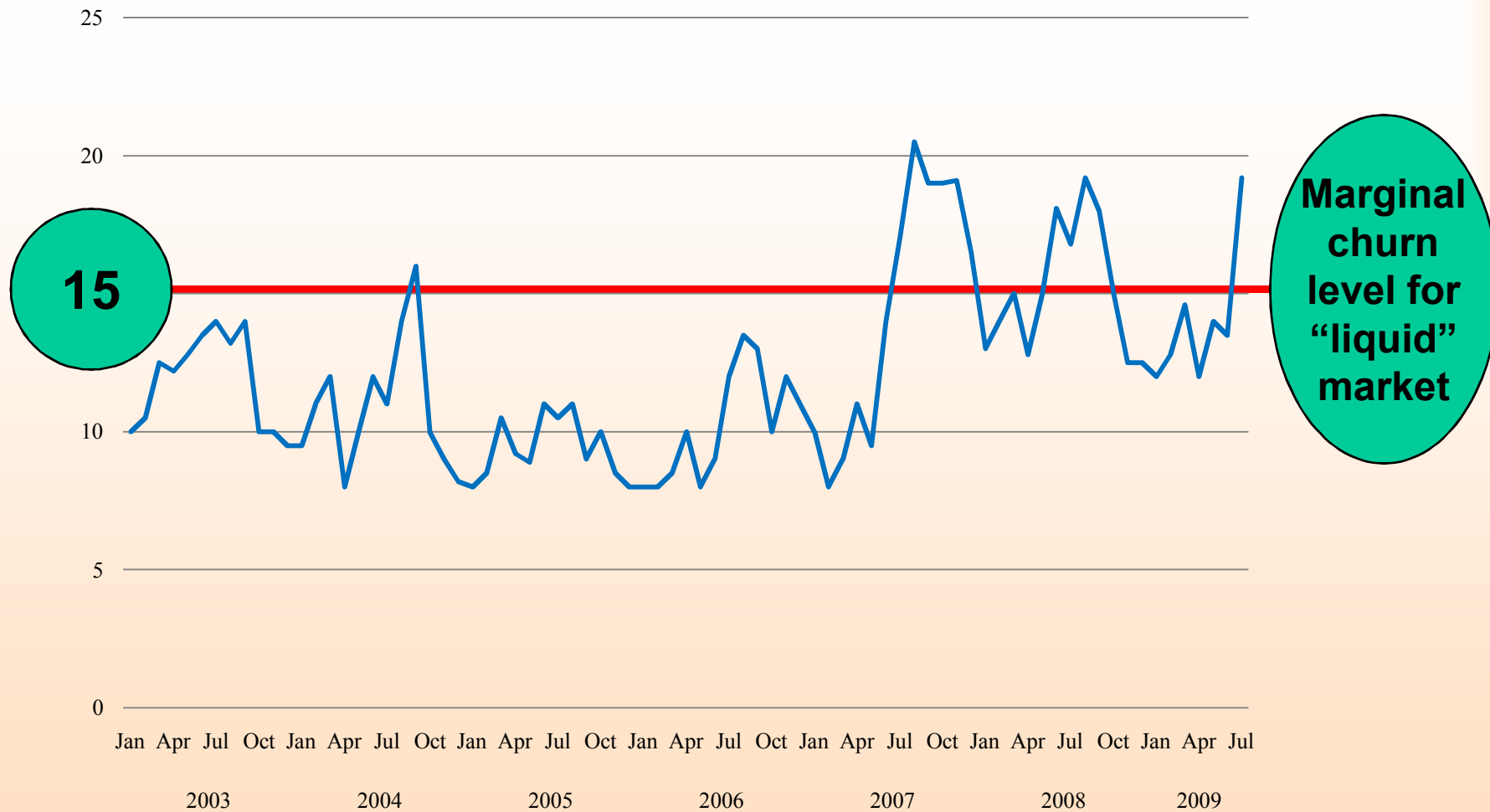
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Future organization of common internal EU gas market according to 3rd EU Energy package

All market areas to be organized as **entry–exit zones** with **virtual hubs** => Towards uniform capacity allocation mechanisms & gas pricing mechanisms => Gas pricing at the hubs: on **all** gas volumes **or** just on **a portion** of gas supplies? And when?

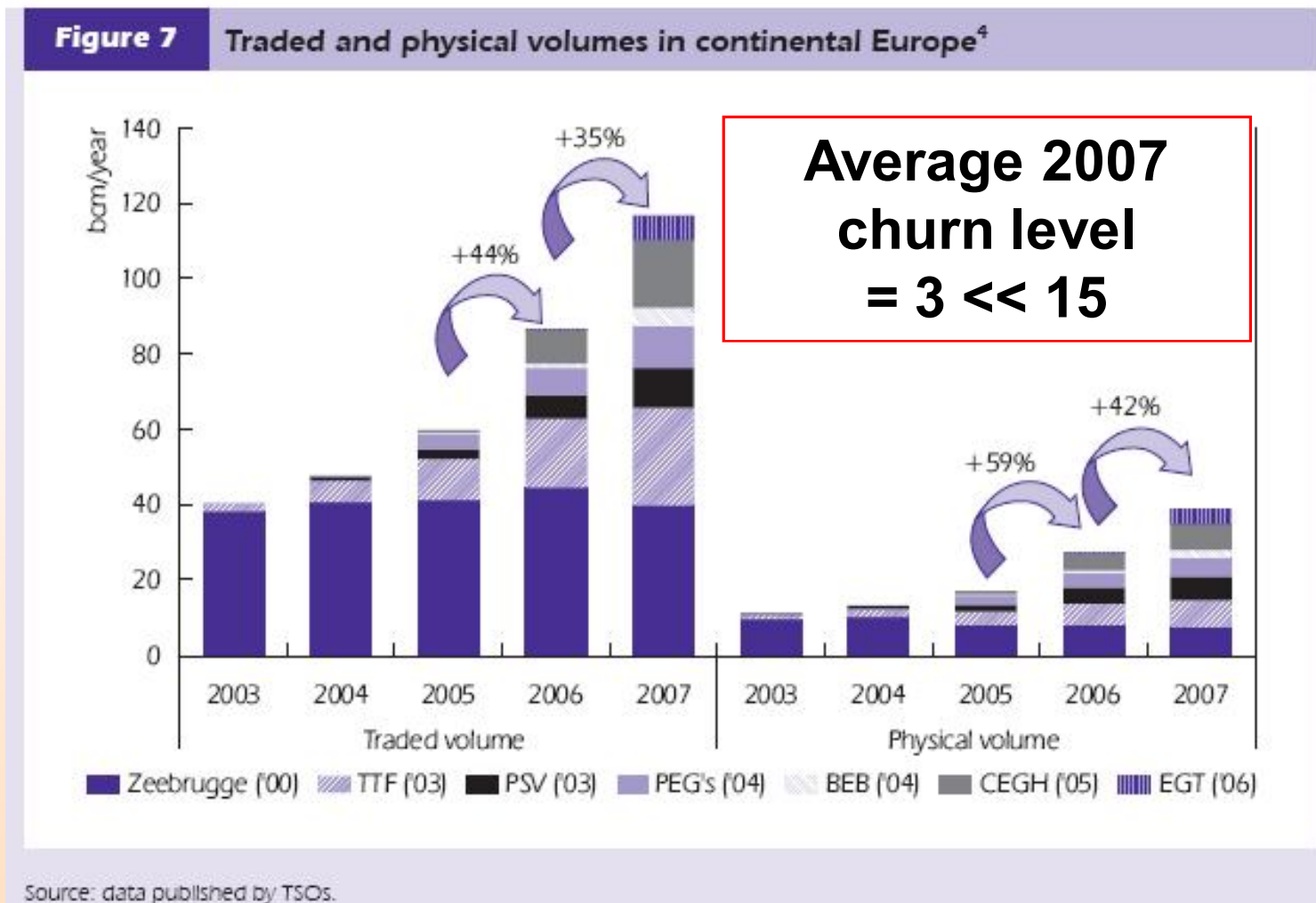


NBP churning factor, 2003-2009



Source: "Gas Matters" for corresponding years

Traded and physical gas volumes in continental Europe (w/o NBP)



Source: IEA. Natural Gas Market Review 2008, p.32

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Gas pricing: price indexation vs. spot/futures pricing – pros & contras (1)

Price indexation	Spot/futures pricing
Long-term stable non-interruptible gas supply with minimum costs & risks for both LTGEC parties => maximum marketable resource rent	Maximization of profit short-term => to earn on price fluctuations => maximum price fluctuations
Physical gas market => non-liquid, but more stable	Paper gas market => liquid, but less stable
Hedgers => mostly producers / traders of physical gas => limited & stable spectrum of participants	Speculators => mostly traders of gas contracts => inflow / outflow of financial players => open & unstable spectrum of participants

Gas pricing: price indexation vs. spot/futures pricing – pros & contras (2)

Price indexation	Spot/futures pricing
Predictable contract prices => based on stable contractual formulas	Unpredictable spot prices & forward curves since based on frequently changing perceptions of global financial market players
Transparent formula & price review mechanisms <i>though</i> actual price not available to public immediately: (i) price calculated as function of formula ingredients, (ii) LTGEC confidentiality clauses	Transparent & immediate result (price quotations) <i>but</i> non-transparent & unclear decision-making mechanism on price levels (based on perceptions of big & unstable amount of players)

Gas pricing: price indexation vs. spot/futures pricing – pros & contras (3)

Price indexation	Spot/futures pricing
Impossible to manipulate – fixed formula & contractual clauses; adaptation on bilateral basis within legally-binding procedure	Possibility to manipulate: (i) by direct price-manipulations, (ii) by influencing on expectations (perceptions) of market players
To soften price-peaks (narrow corridor of price fluctuations) => to stabilize gas market	To amplify price-peaks (expand corridor of price fluctuations) => to destabilize gas market

Evolution/adaptation of gas pricing mechanisms in Europe: two main options

- **Option 1:** to substitute gas price indexation in LTGECs by spot/futures quotations => **NO**
- **Option 2:** to adapt mostly oil-linked gas price indexation in LTGEC by pricing formulas linked to broader spectrum of parameters & non-oil gas replacement values => **YES** (long-term capacity allocation *must* be available to exclude contractual mismatch problems - supply vs. transportation):
 - **Long-term supplies (basic/base-load)** : more flexible LTGEC (n x 1 year) + “modified” gas replacement value formulas (price indexation *not* limited to oil-pegging);
 - **Short-term supplies (supplementary/peak- & semi-peak load)** : short-term (< 1 year)/spot contracts + futures quotations

Thank you for your attention

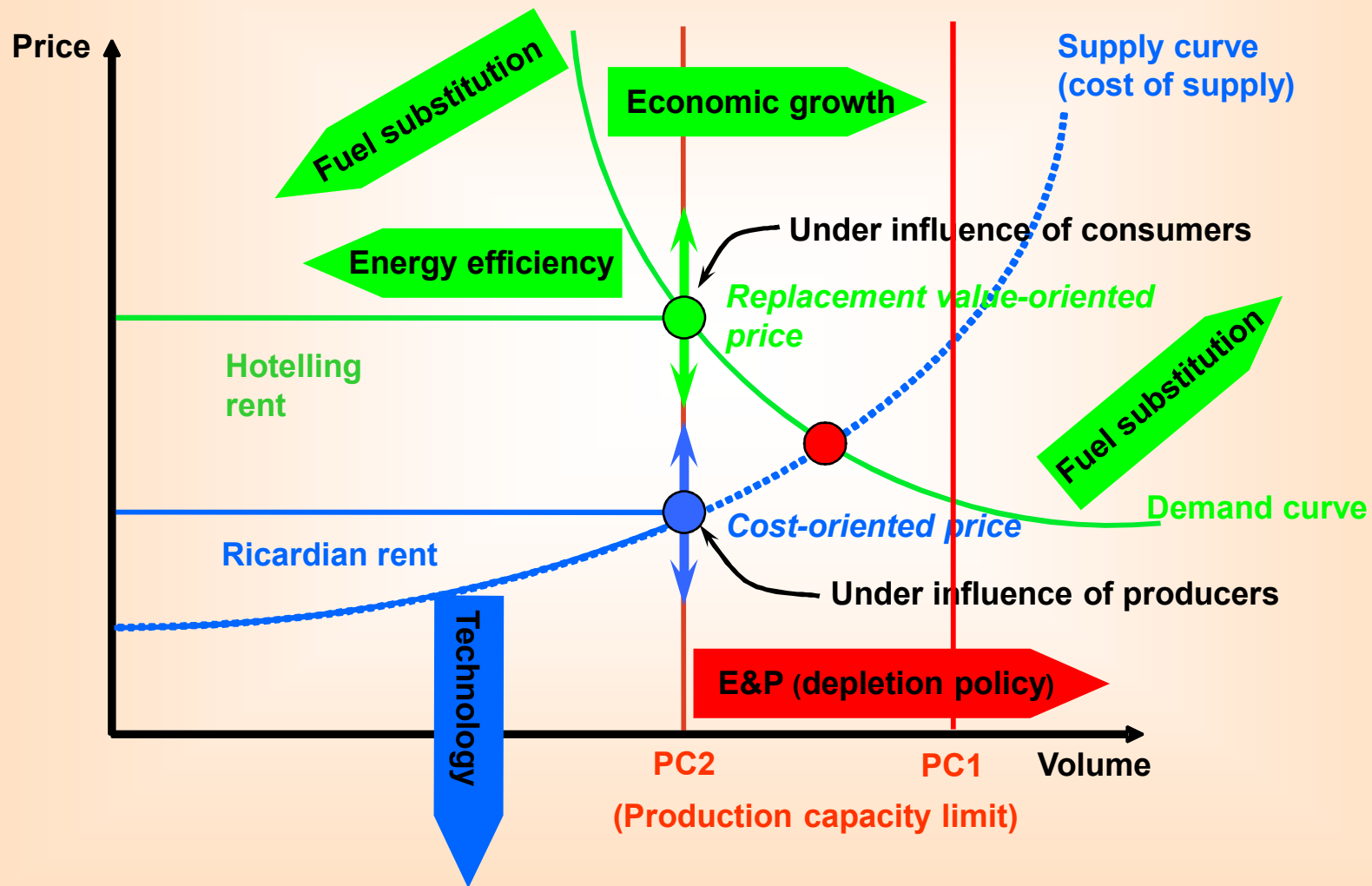
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Back-up slides

Pricing of Non-Renewable Energy Resources: Ricardian vs. Hotelling rent

$$\text{Ricardian rent} + \text{Hotelling rent} = \text{Resource rent}$$



Groningen (Dutch) & Russian/Soviet LTGEC Models: Differences & Similarities

	Groningen LTGEC model (since 1962)	Russian / Soviet LTGEC model (since 1968)	Russian / Soviet specifics (why Russian /Soviet LTGEC model differs from Groningen LTGEC model)
Contract duration	Long-term	Longer-term	Larger West Siberian fields & unit CAPEX, longer transportation distances & pay-back periods
Delivery point	Upstream to end-user	Upstream to end-user - on EU-15 border; one delivery point served for few final consumers	Historically: on political border between East & West
Pricing	Replacement value (RFO + LFO) + net-back to delivery point + regular price review + minimum pay obligation (take-and/or-pay)		West: both for export & domestic sales; East: only for export sales
Protection from price arbitrage	Destination clauses		More important since in one delivery point - few contracts with much more differing export prices destined for different markets
Role of transit	None (minimal)	Significant – especially after dissolution of COMECON & USSR & after EU expansion	New sovereign states appeared upstream to historical delivery points + new rules discriminating transit

A Typical Net Back Replacement Value Based Gas Price Formula & its Review

$$P_m = \left\{ \begin{array}{l} [P_o] \\ + \mathbf{[0.60]} \times \mathbf{[0.80]} \times \mathbf{0.0078} \times (\mathbf{LFO}_m - \mathbf{LFO}_o) \quad \{up/down\} \\ + \mathbf{[0.40]} \times \mathbf{[0.90]} \times \mathbf{0.0076} \times (\mathbf{HFO}_m - \mathbf{HFO}_o) \quad \{up/down\} \\ + [...] \quad (\text{coal}) \quad \{up/down\} \\ + [...] \quad (\text{electricity}) \quad \{up/down\} \\ + [...] \quad (\text{gas-to-gas competition}) \quad \{up/down\} \end{array} \right.$$

NB: [...] – parameters in brackets usually subject of renegotiation; elements in bold reflect historically original Groningen (Dutch)

pricing formula

Long-term evolution of price review mechanism:

- reflect its adaptation to the new state of development of energy markets,
- changing shares of existing competing fuels (LFO/HFO ratio in favour of LFO) *and* incorporation of new competing fuels *and* gas to gas competition,

but

LFO & HFO are still dominant replacement fuels in gas pricing within long-term gas export contracts