«How market hubs and traded gas in European gas market dynamics will influence European gas prices and pricing»

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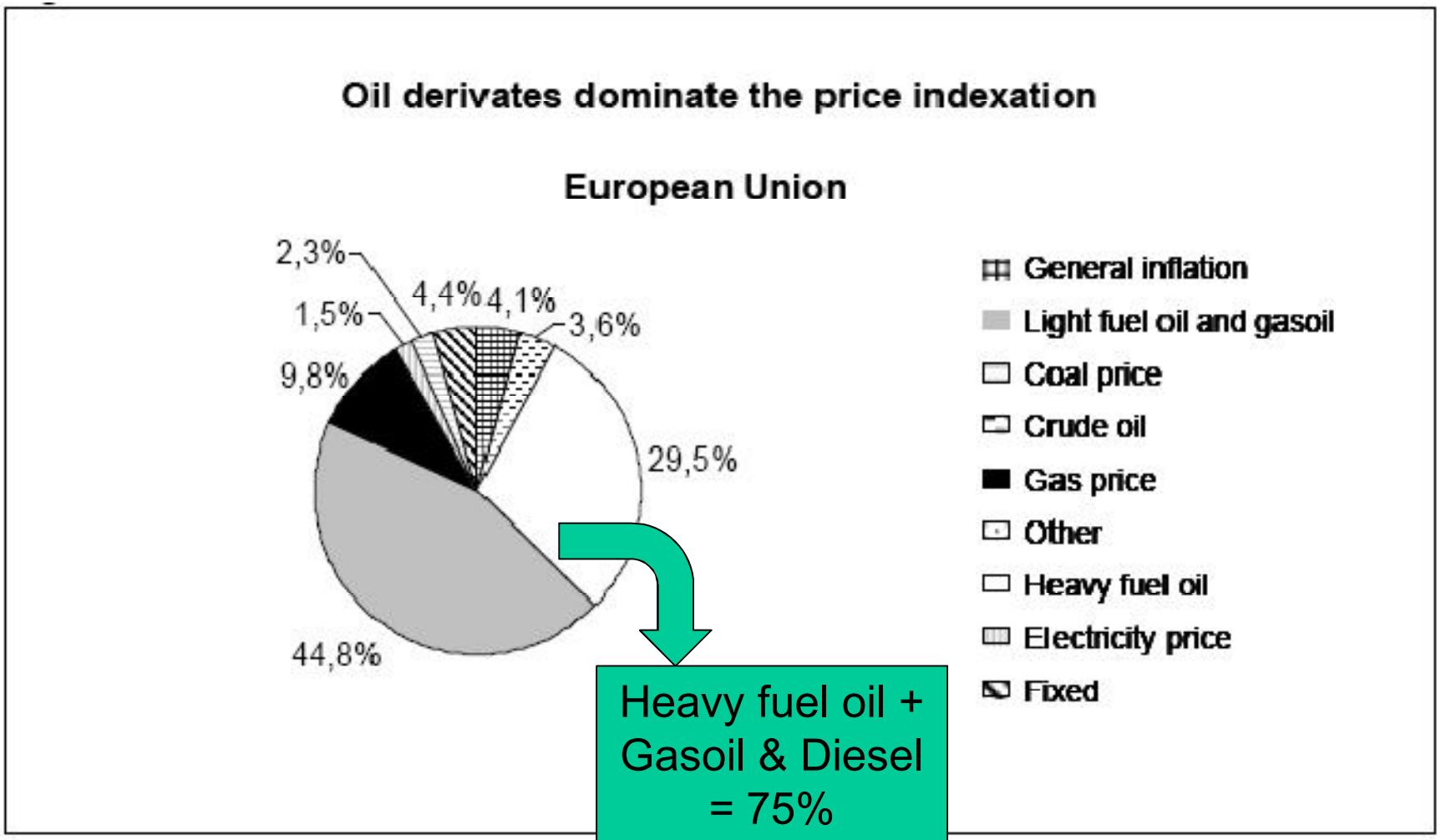
- How can we expect prices in Europe to develop – what are the drivers?

Gas pricing (Europe)

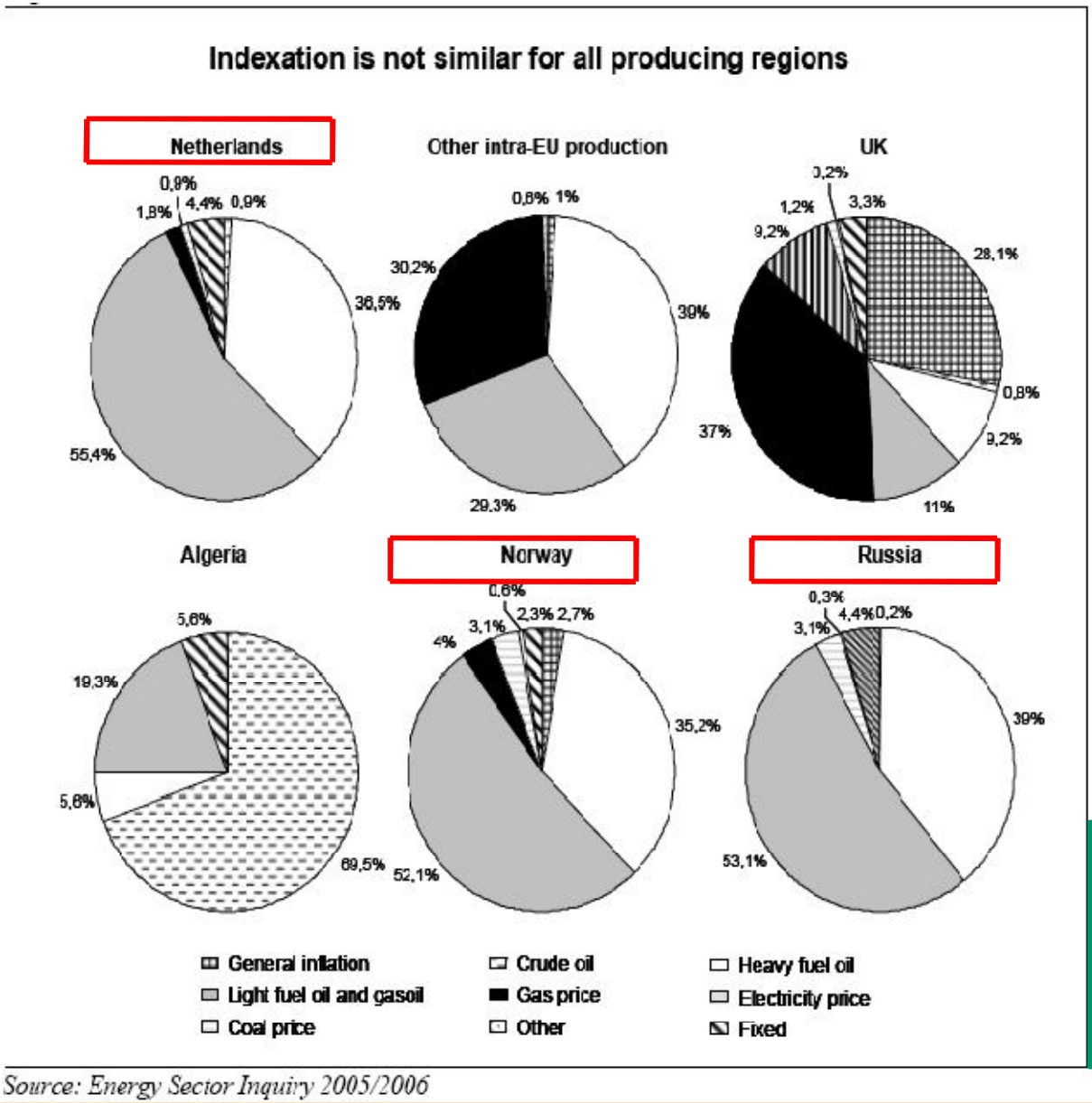
- **Prior to 1960-ies:** cost-plus
- **1962:** net-back replacement value (to maximize long-term resource rent – Netherlands, "Nota de Pous")
- **1962-2009/10:** spread-over of Groningen-type LTGEC with mostly oil-indexation through broader energy Europe
- **Why "Oil-Indexation"?:** *"Indexation"* = mechanism of softening price fluctuations; *"oil"* = key replacement fuel
- **Oil-indexation in the1960-ies:**
  - RFO (electricity generation) & LFO (households) are really key replacement fuels to gas,
  - Oil price is low and stable, so RFO & LFO,
  - Oil-indexation is a mechanism of softening *potential* price volatility of key replacement fuels => fully corresponds to replacement value philosophy at that time => easy to implement & rare adjustments
- **Oil-indexation nowadays:**
  - RFO & LFO are not the key replacement fuels anymore,
  - Oil price is high & volatile, does not reflect (since mid-2000's) "physical oil" fundamentals
  - Oil-indexation is softening fluctuations of oil prices, but the nature of volatile oil prices (commoditization of oil market) still in place => the gap between "oil-indexation"(contract formula) and "replacement value" (economic philosophy of formula-based gas pricing) is widening, BUT oil-indexation still easy to implement, though regular adjustments
- **Counter processes in gas market development (to increase vs. diminish price risk & volatility):**
  - Commoditization (Anglo-Saxon model, following oil market) increases risks & volatility => this stipulates
  - Development of financial instruments to mitigate these growing risks immanent to chosen EU gas target model ("designed market") => illogical vicious circle: first to increase risks, then try to diminish them

Price indexation structure in the EU



Source: Energy Sector Inquiry 2005/2006

LTGEC in the EU: Indexation by Producer

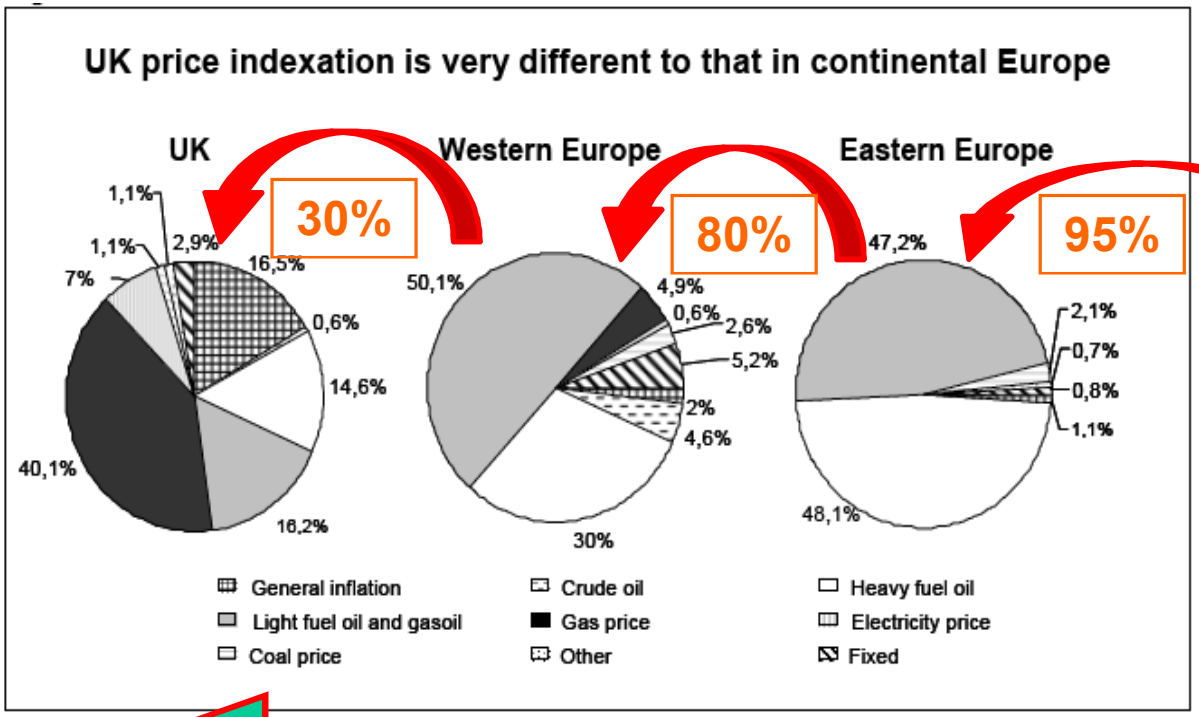


Source: Energy Sector Inquiry 2005/2006

Netherlands, Norway, Russia: HFO = 35-39%; diesel & gasoil = 52-55%; Sum-total HFO+ Diesel & Gasoil: Netherlands = 92%, Norway = 87%, Russia = 92%

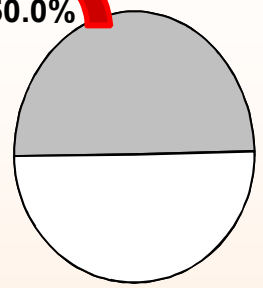
Major gas exporters to the EU: mostly oil indexation

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

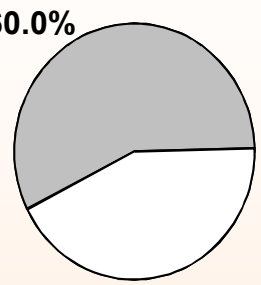


Source: Energy Inquiry 2005/2006

Russia-Ukraine LTGEC (2009-2019)



Basic Groningen LTGEC model (since 1962)



Oil indexation = 100%

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

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

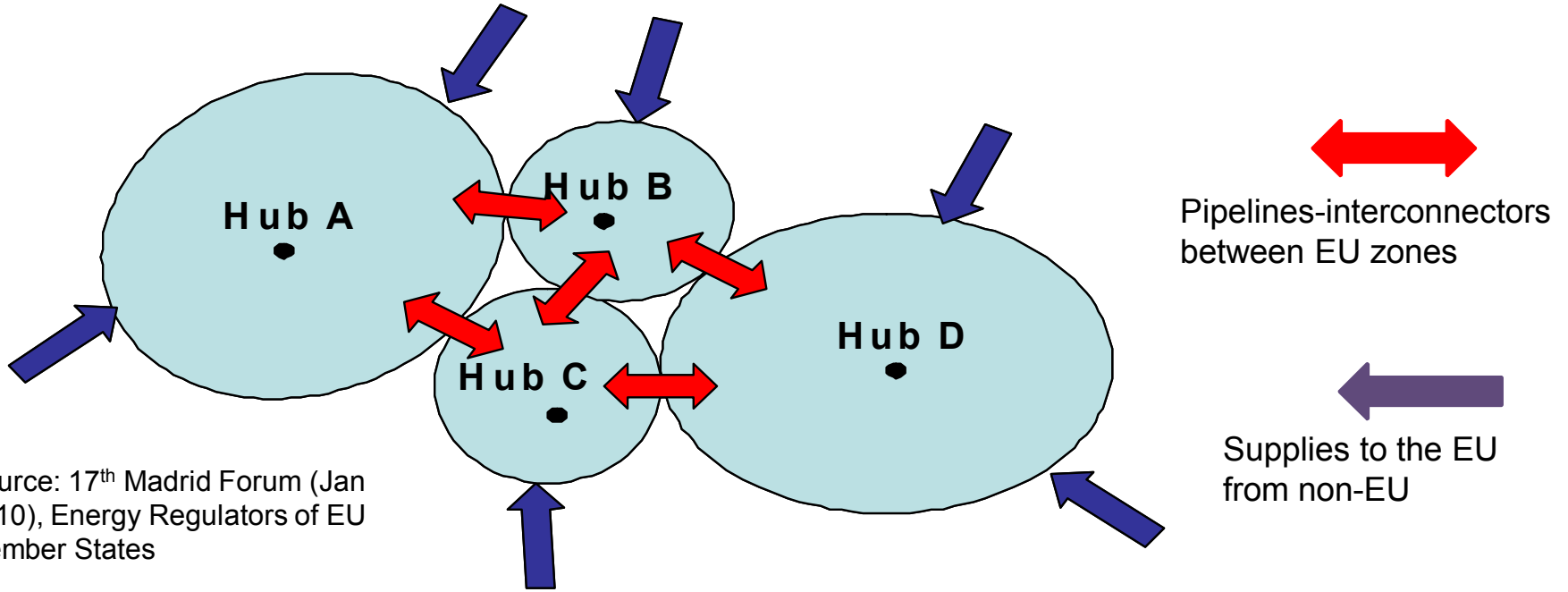
Further development (most likely): towards EE-type => WE-type => UK-type price indexation => away from oil parity?

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

- No single (homogenous) internal EU gas market in the near future even as an economic model
- All market areas to be organized as **entry–exit zones** with **virtual hubs** => Towards uniform capacity allocation mechanisms ("**bundled products**") & gas pricing mechanisms ("**liquid hubs**"), but:

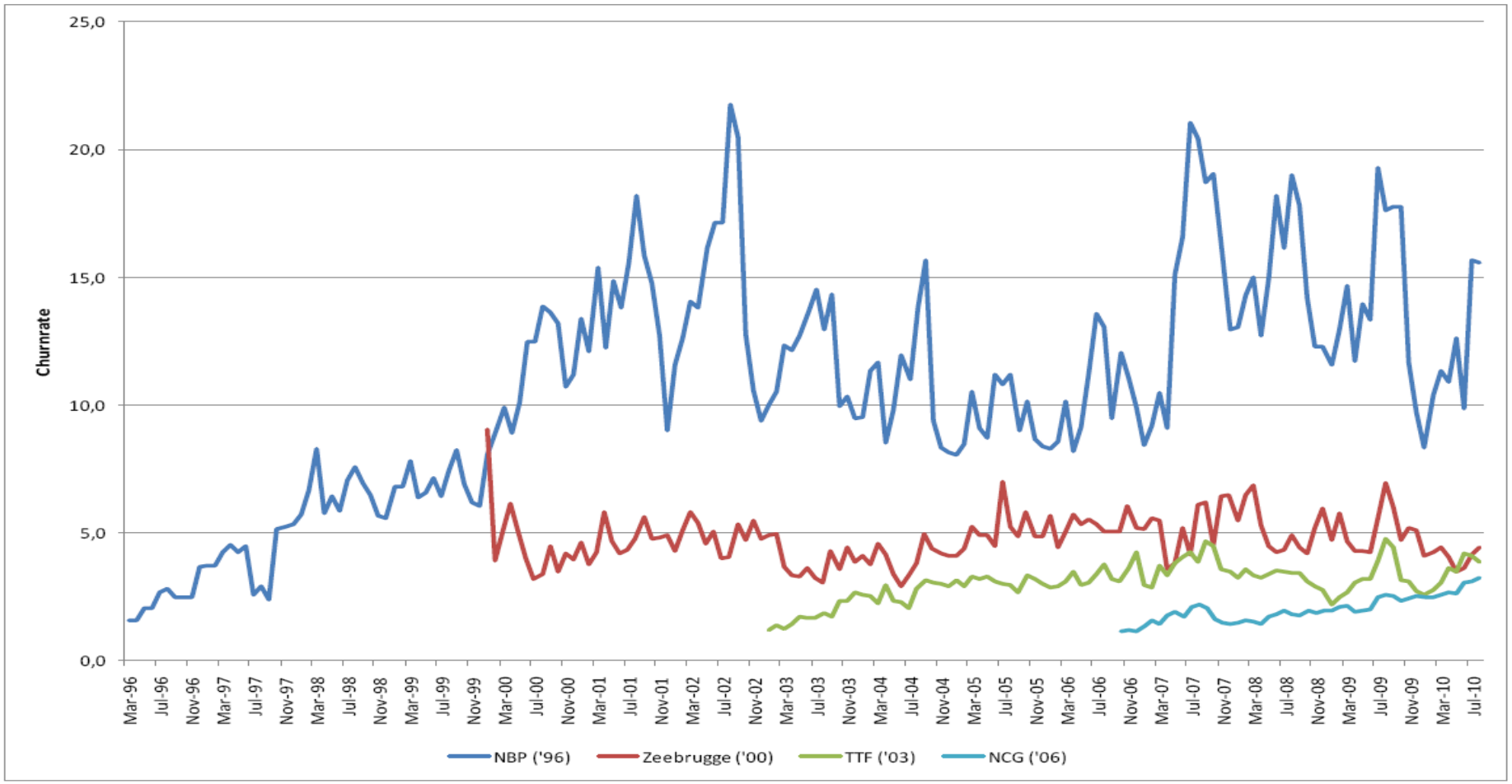
(1) Capacity allocation: **short**-term vs. **long**-term? At zone borders? At hubs? Bundled products – only on volumes (of throughput capacity) or on duration of access as well? How to overcome inconveniences of the 3rd Package ? (f.i.: long-term = (1 year+) => "contractual mismatch" problem) => to be further debated within gas target model workshops, etc.

(2) Gas pricing at hubs: on **all** gas volumes *or* just on a **portion** of gas supplies? When hubs would become really liquid? All or only few of them? Which ones?



Source: 17th Madrid Forum (Jan 2010), Energy Regulators of EU Member States

Churn rates of gas hubs in the UK (NBP), Belgium (Zeebrugge), The Netherlands (TTF) and Germany (NCG), 1996-2010



Churn rate is the volume of gas traded on the hub compared to the total trade volume of the market. (Sources: Huberator (BE), Gas Transport Services (NL), National Grid (UK), Platts). Cited from: *Rudolph Harmsen and Catrinus Jepma* . North West European gas market: integrated already. http://www.europeanenergyreview.eu/index.php?id=2695

Liquidity of European gas hubs (churn ratio)

	2007	2008	2009
United Kingdom: National Balancing Point (**NBP**)	13.5	14.4	14.5
Belgium: Zeebrugge (**ZEE**)	5.1	5.0	5.0
Austria: Central European Gas Hub (**CEGH**)	2.6	2.9	3.0
Netherlands: Title Transfer Facility (**TTF**)	3.7	3.2	3.0
Italy: Punto di Scambio Virtuale (**PSV**)	1.7	2.0	2.1
Germany: NetConnect Germany (**NCG**, EGT prior 2009)	1.6	1.8	2.1
Germany: GASPOOL (**BEB**)	-	-	2.2
France: Point d'Echange de Gaz (**PEG**)	-	-	1.2

For comparison:

USA (oil): NYMEX (WTI) (Feb.2010) **1680-2240**

UK (oil): ICE (Brent) (Feb.2010) **2014**

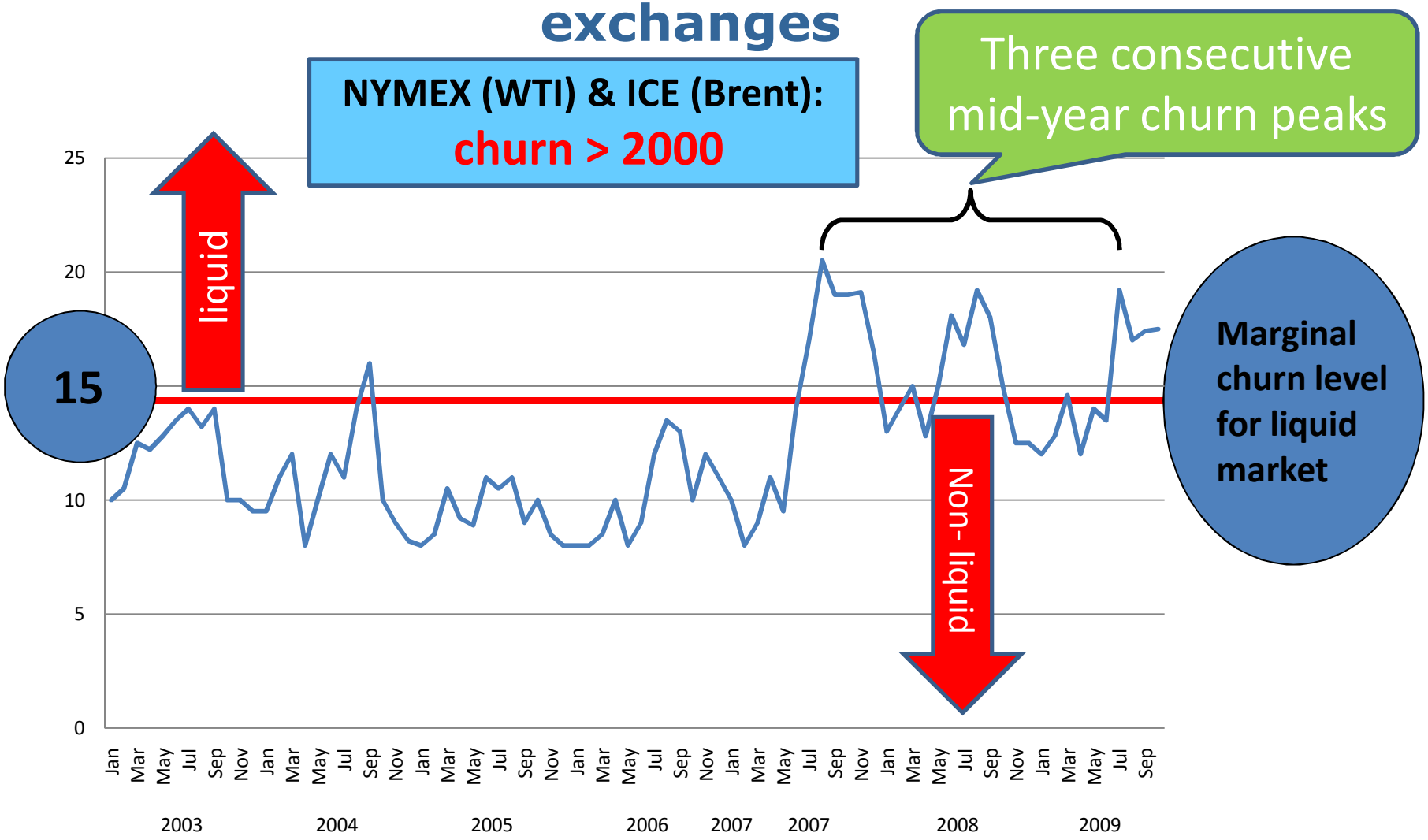
USA (gas): NYMEX Henry Hub (av.2009) **377**

Break-even churn level for liquid marketplace **15**

Churn is the commonly used parameter for measuring liquidity level of marketplaces; defined as the ratio of traded volumes to physical gas deliveries from the marketplace after trades

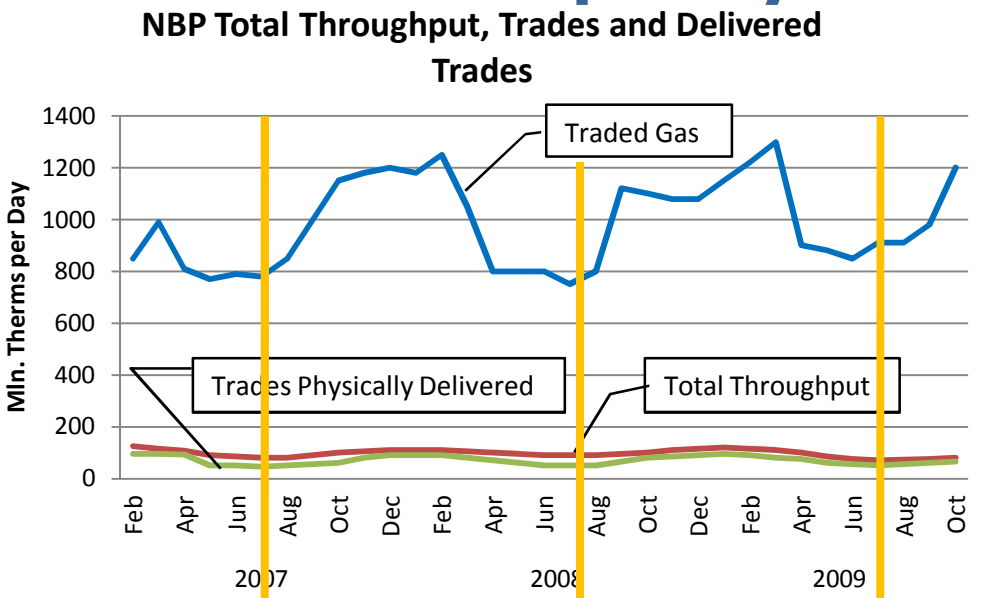
Source: "Gas Matters", IHS-CERA, IEA, M.Kanai (ECS)

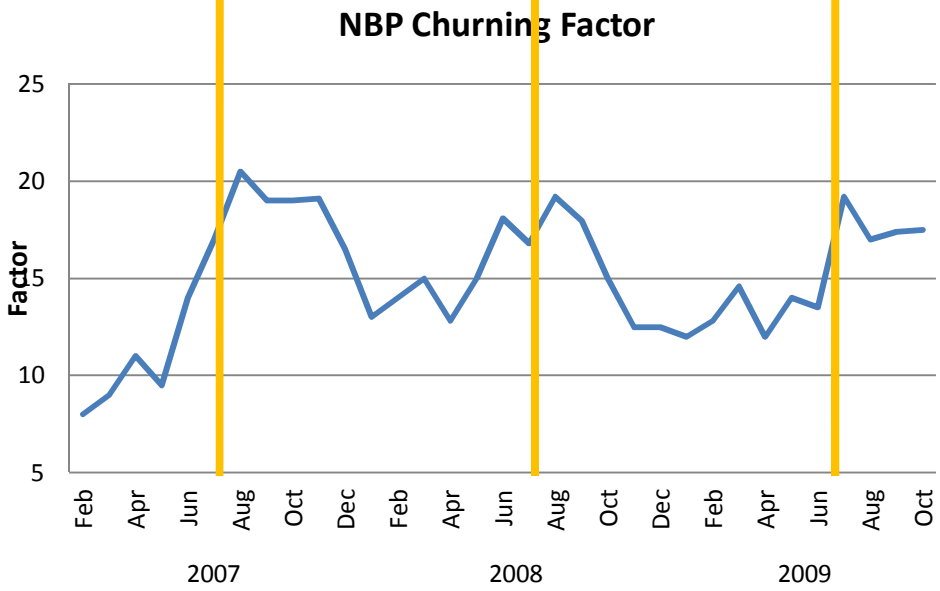
Churn ratio at UK NBP (gas) & at major petroleum exchanges



Source: "Gas Matters" for corresponding years, WTI/ICE – M.Kanai estimate (ECS)

Churn ratio: the best available, but controversial liquidity measurement



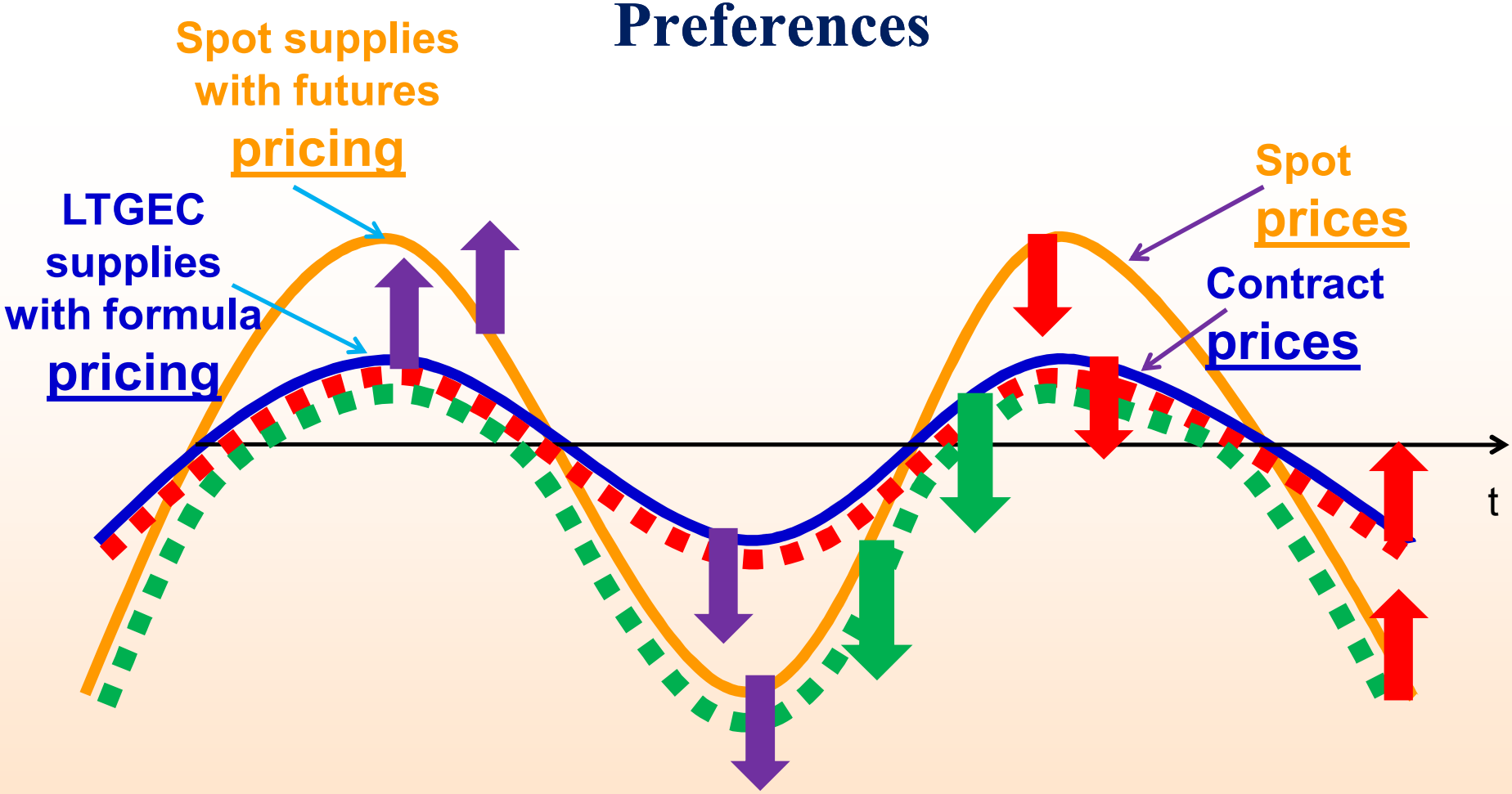


Источник: Gas Matters

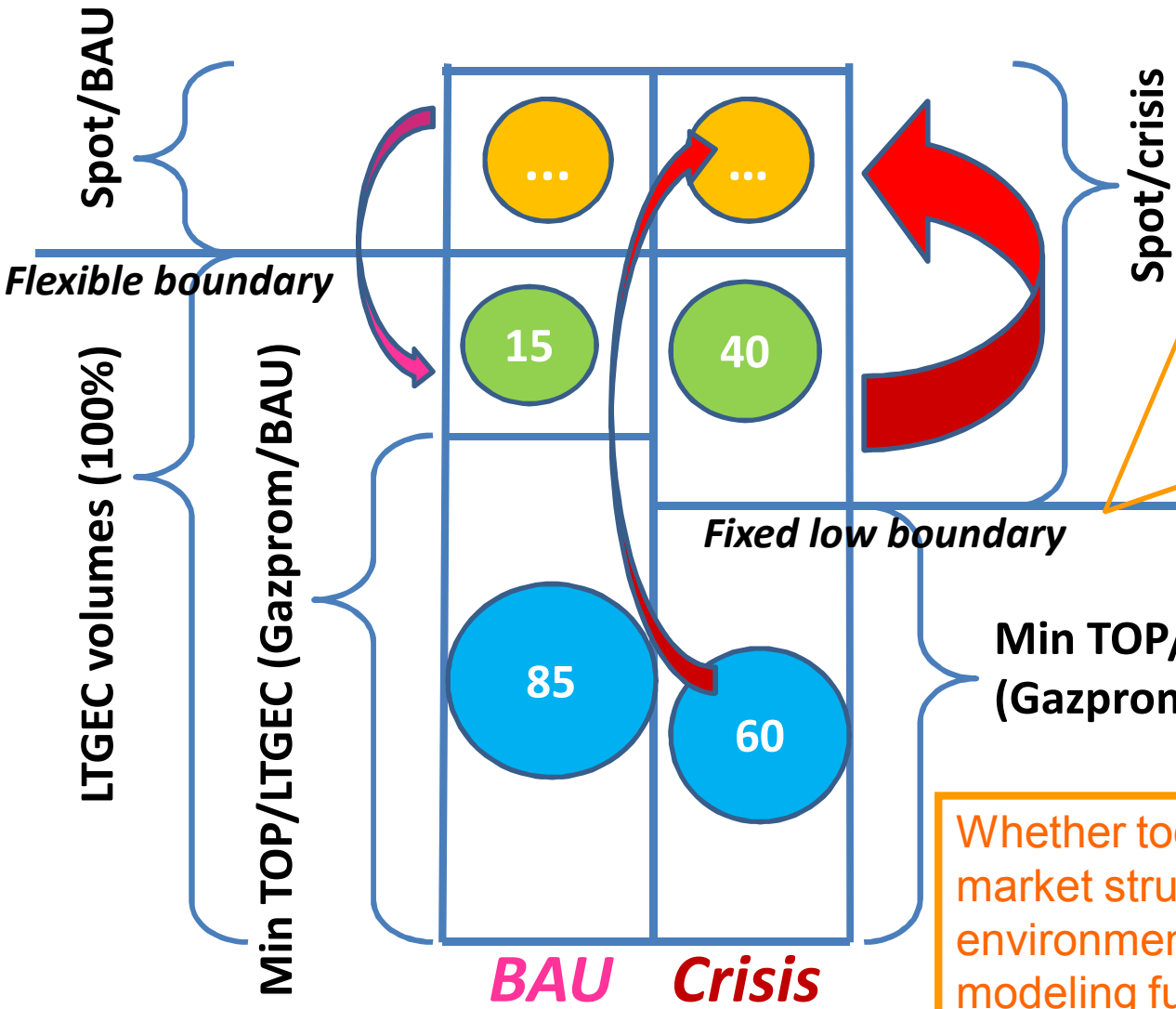
Churn cyclical (?) trend :

- ***highest churn*** ratios (within its cycle?) refer to ***lowest volumes*** of physical & traded volumes within seasonal trade/supply cycle,
- ***summer low*** traded/physical supplies ***volumes*** corresponds to ***highest churn*** ratios =>
- this ***contradicts to theoretical concepts of liquid markets (?)*** which consider that the higher is the trade turn-over, the higher is the liquidity level of this marketplace & the higher churn ratio is to be =>
- whether **churn ratio** could be an easy-to-manipulate, but **not necessarily a true measurement of liquidity level?**

Producers, Consumers & Speculators Price/Pricing Preferences



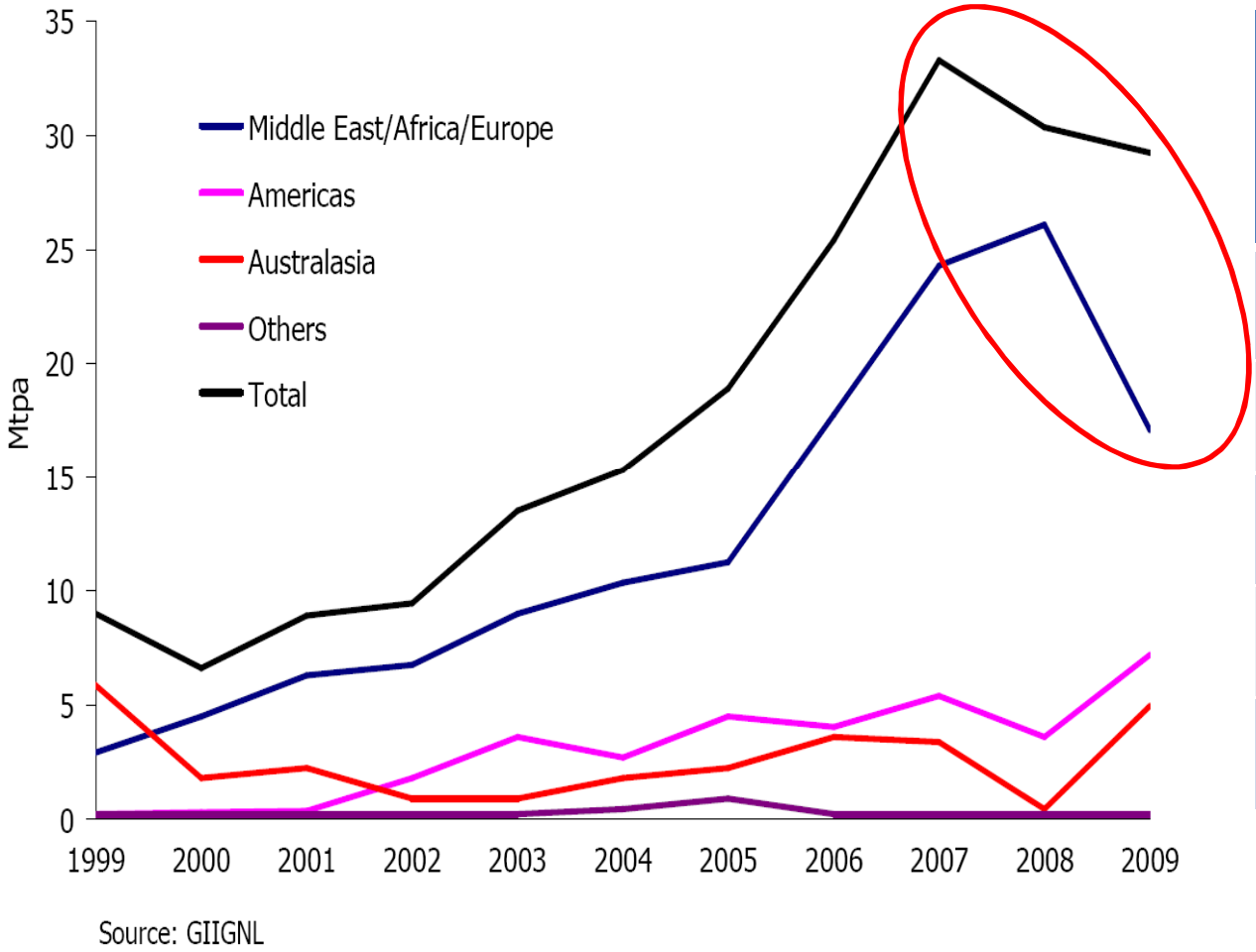
Evolution of spot/LTC gas trade under BAU/crises



%-age of spot increases to extreme high during crises due to: (1) decrease of 'Min TOP' in LTGECs & buyers' switch from LTGEC to spot purchases + (2) spot compensates delays in contracted supplies (postponed start-ups) from new projects; spot back decreases from extreme high during BAU dev'ts

Whether today's contractual gas market structure reflecting crisis environment can be used as a basis for modeling future BAU developments ?

Spot & Short-Term LNG Exports (flexible sales)

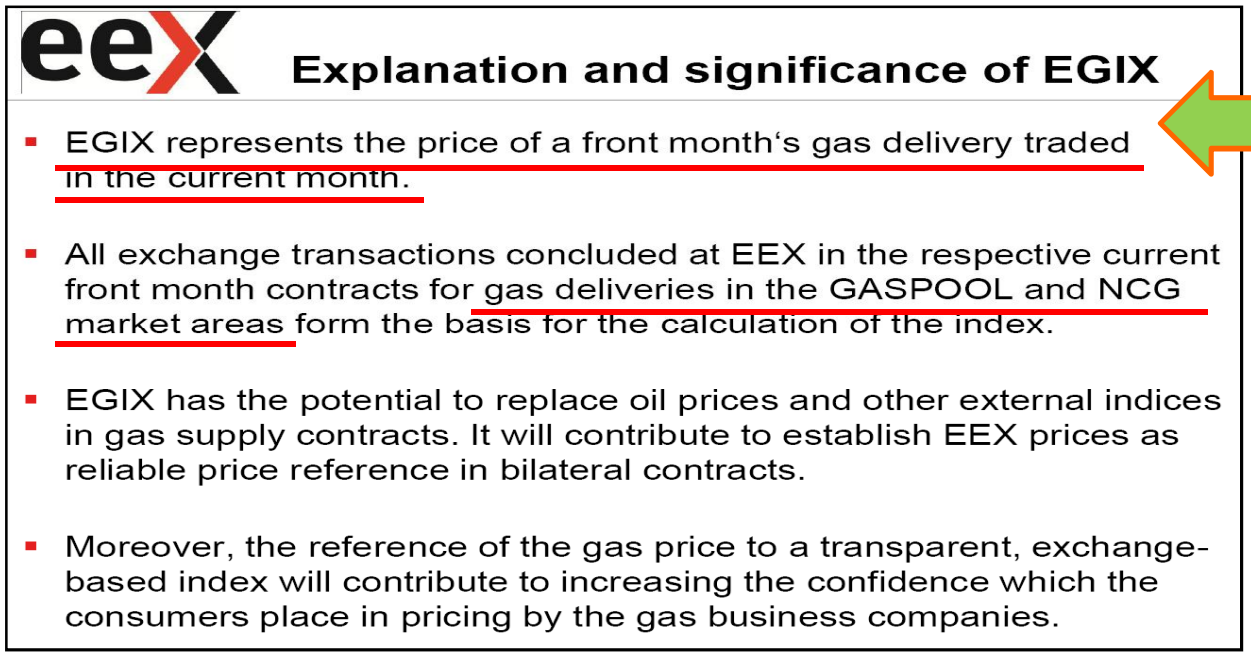


Flexible sales as percentage of total LNG exports	
2005	15%
2006	17%
2007	21%
2008	19%
2009	16%

Source: Morten Frisch. "Gas market dynamics and the future pricing of spot LNG". Presentation at GASEX 2010 Conference, Taipei, Taiwan, 24 November 2010, p.8

Note: Spot & short-term LNG exports or flexible sales are understood to be sales of duration of **up to 4 years** (Ibid., p.8)

Concerns about gas indexes (EGIX example)

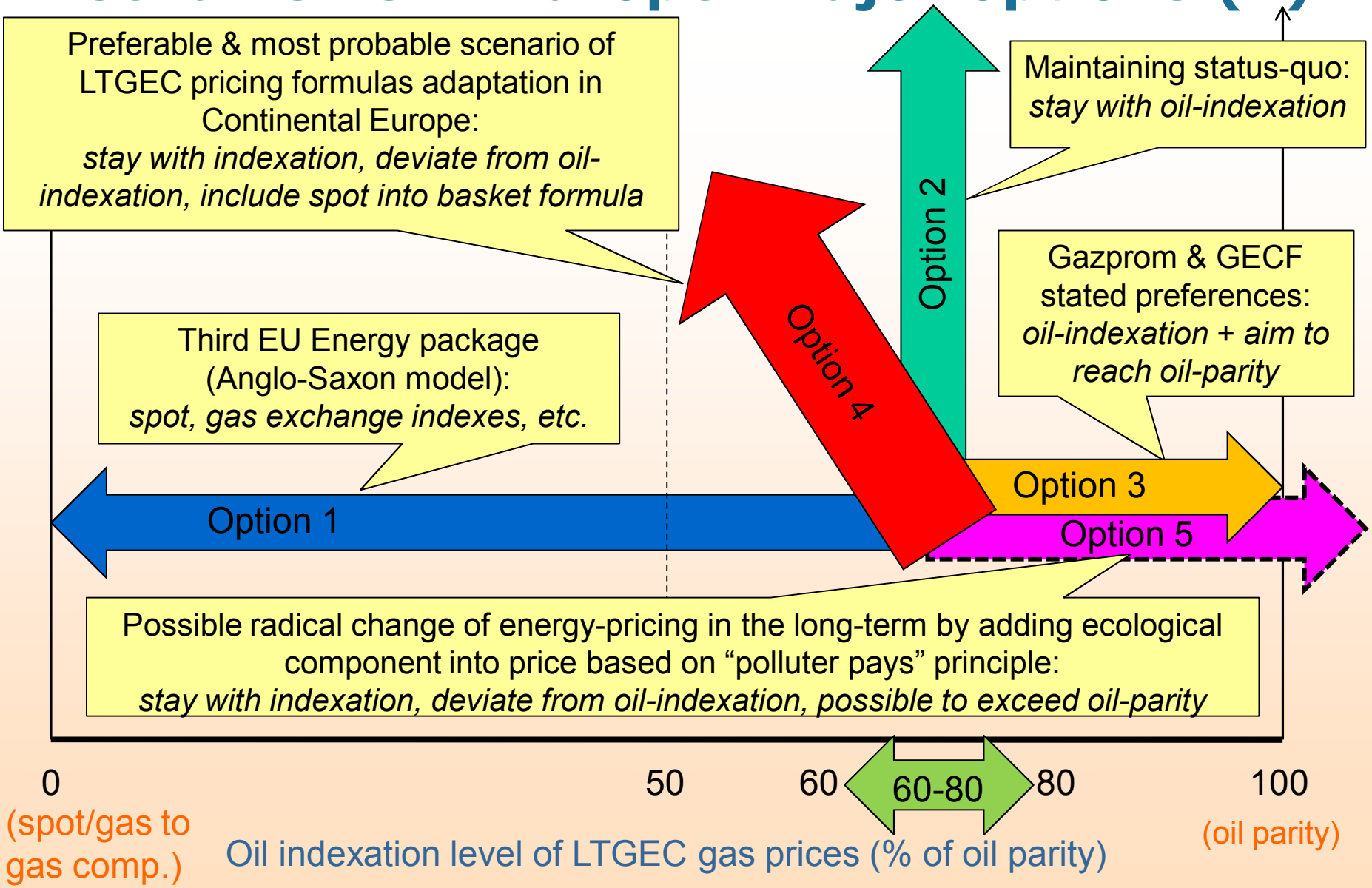


…to refer to true market-based NG prices…

Source: **Dr.Hanz-Bernd Menzel,** CEO European Energy Exchange AG (EEX). The European Gas Index (EGIX) – challenging existing gas pricing mechanisms. – Presentation at the European Gas Conference, Vienna, 27 January 2011.

- Aim – to replace oil-indexation by more appropriate pricing instrument => **agree**
- ***But:*** underlying concept is based on pure belief that at any given point of time, even 10-15+ years ahead, any front-month's gas delivery price will reflect justified (equilibrium) market price, would be a reliable & transparent price non-dependent of the state of gas market developments => **concerns,** since creation of paper gas market (exchanges) based on Anglo-Saxon model similar to oil:
  - does **not** exclude price manipulation (proven by US investigations re 2008 oil price developments),
  - does **not** reflect supply-demand balance is **physical** gas (physical gas market equilibrium), but
  - (***if follows oil***) will reflect supply-demand balance in **gas-linked financial derivatives** (paper gas market) and will thus significantly deviate from physical gas market fundamentals => **whether this will provide justified pricing (investment) signals for gas supply project financiers?**

Evolution/adaptation of gas pricing mechanisms in Europe: major options (1)



Evolution/adaptation of gas pricing & contractual mechanisms in Europe: major options (2)

- **Option 1:** to substitute gas price indexation in LTGECs by spot/futures quotations => **NO**
- **Option 2:** to maintain status-quo (LTGEC with dominant oil indexation) => **NO**
- **Option 3:** to maintain oil-indexation within LTGEC and to move to oil parity => **NO**
- **Option 4:** 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 (+ access to pipeline adequate to LTGEC volume / duration: 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
- **Option 5:** to develop new pricing concepts leading to exceeding oil parity by gas prices (LTGEC + new indexation ingredients, like comparative ecological (dis)advantages of different fuels, etc.) => **NOT NOW**

Thank you for your attention

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