“Adaptation of European gas pricing - how to find a balance between two margins: oil-indexed LTGEC formulas (Gazprom’s preference) and spot contracts with futures pricing (Third EU Energy Package model)”

Dr. Andrey A.Konoplyanik,
Consultant to the Board, Gazprombank, and
Professor, Russian State Oil & Gas University
(Moscow, Russia)
<www.konoplyanik.ru>

Presentation at the Enlargement & Integration Workshop
“The Politics and Economics of European Energy Security”,
organised by the DG Joint Research Centre/European Commission-
Institute for Energy/Energy Security Unit,
18 and 19 November 2010, Marriott Hotel, Amsterdam, The Netherlands

Table of content

- **Three major gas pricing methodologies worldwide**
- Evolution of gas pricing in Europe and CIS: 1962-2010
- Long-term gas export contracts (LTGEC) formula pricing or spot/futures as preferred type of gas pricing in Europe:
  - LTGEC formula pricing,
  - Spot/futures pricing
- Future roles of LTGEC: adaptation in line with gas market developments
- Future architecture, contractual structures and pricing mechanisms of the European gas market

Three key gas pricing mechanisms worldwide

- **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 *plus*
  - 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 *plus*
  - Hotelling rent *plus/minus*
  - 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 (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

Table of content

- Three major gas pricing methodologies worldwide
- **Evolution of gas pricing in Europe and CIS: 1962-2010**
- Long-term gas export contracts (LTGEC) formula pricing or spot/futures as preferred type of gas pricing in Europe:
  - LTGEC formula pricing,
  - Spot/futures pricing
- Future roles of LTGEC: adaptation in line with gas market developments
- Future architecture, contractual structures and pricing mechanisms of the European gas market

Evolution of gas export pricing in Continental Europe & FSU/CIS

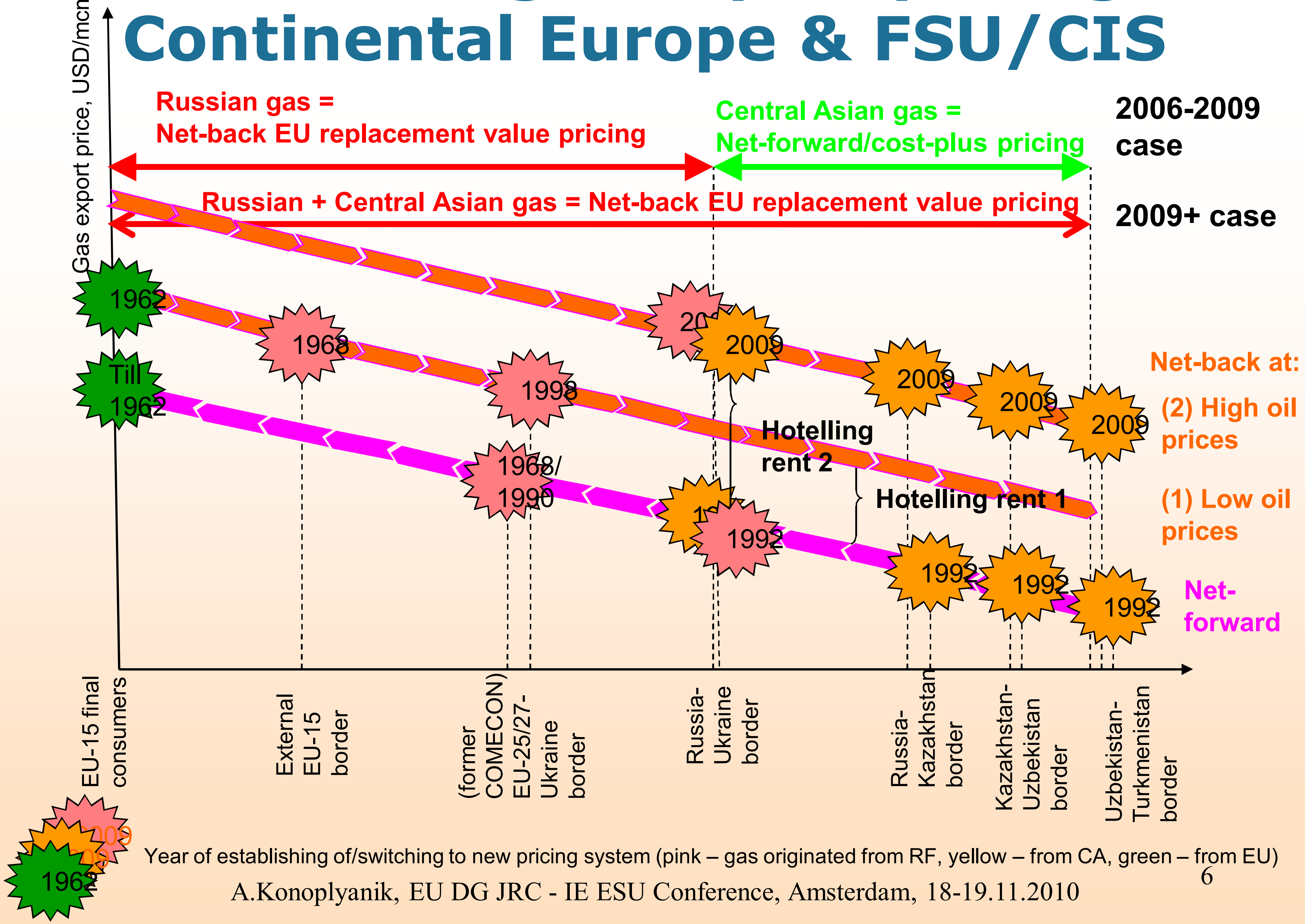
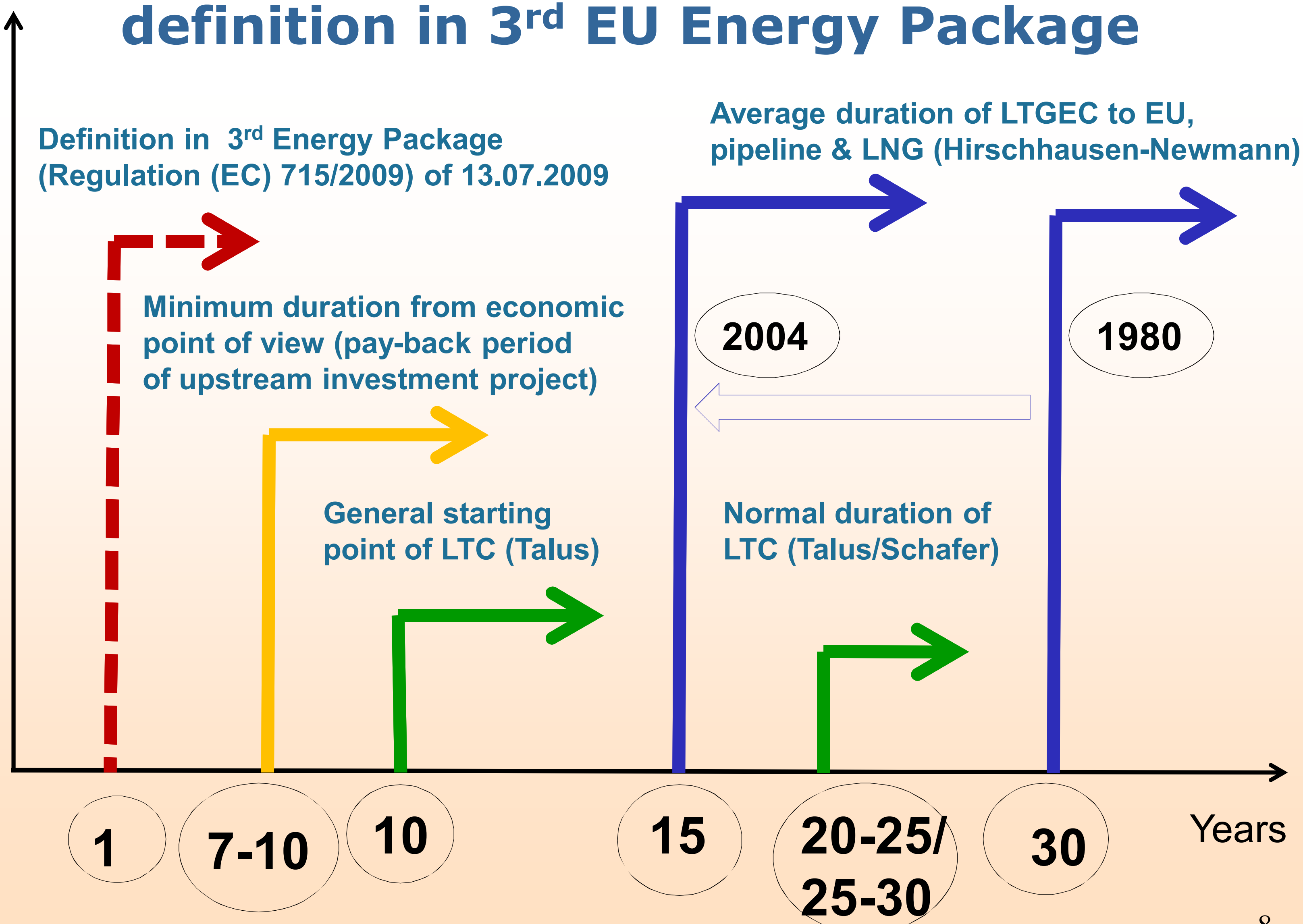


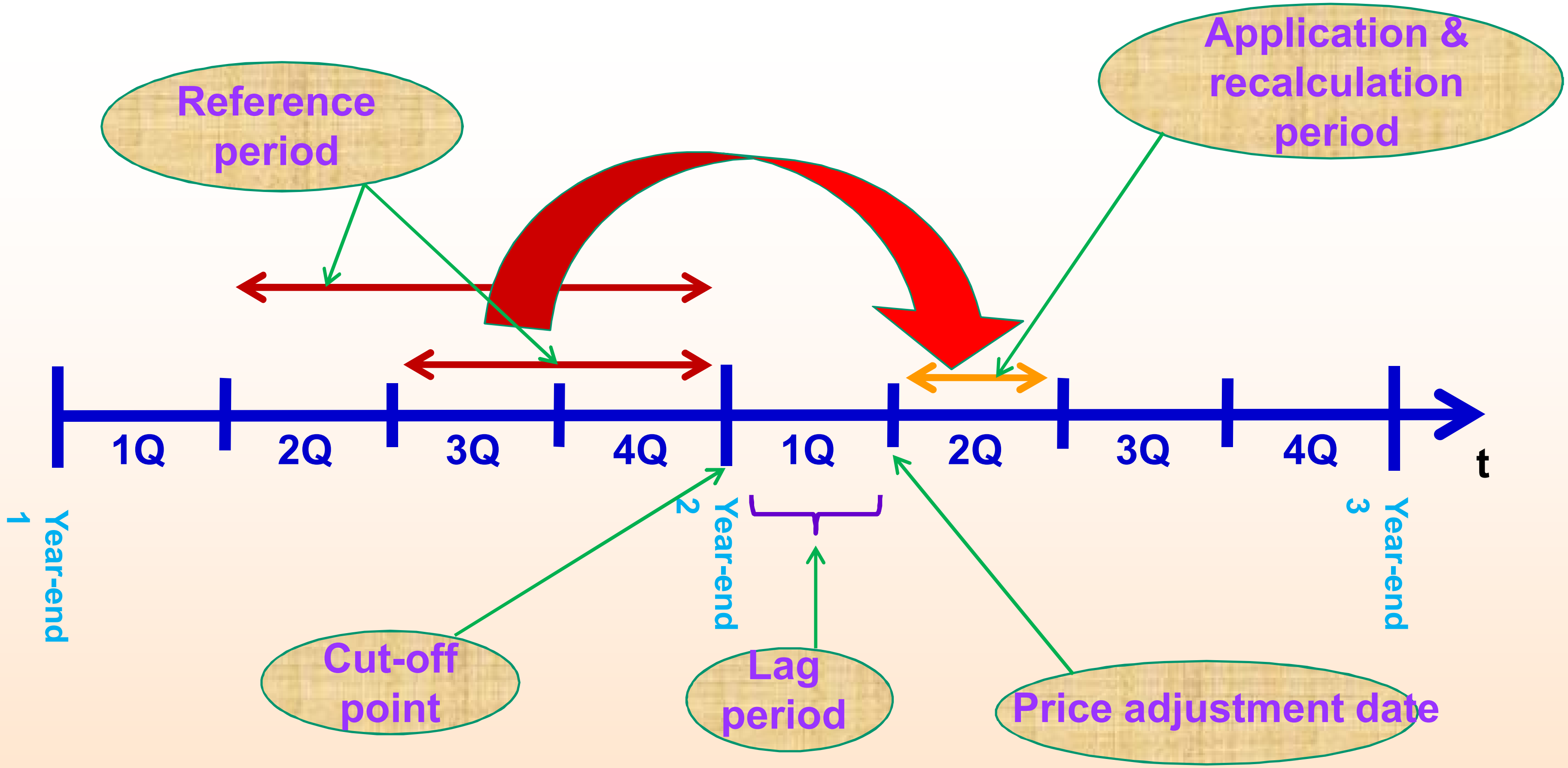
Table of content

- Three major gas pricing methodologies worldwide
- Evolution of gas pricing in Europe and CIS: 1962-2010
- **Long-term gas export contracts (LTGEC) formula pricing, or spot/futures as preferred type of gas pricing in Europe:**
  - **LTGEC formula pricing**
  - Spot/futures pricing
- Future roles of LTGEC: adaptation in line with gas market developments
- Future architecture, contractual structures and pricing mechanisms of the European gas market

"Long-term" (gas export contracts): different durations in historical European practice & its definition in 3rd EU Energy Package



LTGEC price recalculation mechanism



Reference period: 1 calendar year (3-5- years) => 6-9 months sliding scale
Application period: 1 calendar year => 3 months sliding scale
Lag period: few weeks/months => zero

Typical LTGEC pricing formulae based on net-back replacement value, and its evolution

Pm =
[Po]
+ [0.60] x [0.80] x 0.0078 x (LFOm - LFOo) {***growth***/*fall*}
+ [0.40] x [0.90] x 0.0076 x (HFOm -HFOo) {*growth*/***fall***}

+ [… (coal)] {***growth***/*fall*}
+ [… (electricity)] {***growth***/*fall*}
+ [… (gas-to-gas competition)] {***growth***/*fall*}

NB: […] – parameters in brackets – usually subject of negotiations on review; in **bold** – elements of original Groningen formulae; ***bold Italics*** in figure brackets – dominant changes of cjmpeting fuels shares in pricing formulae

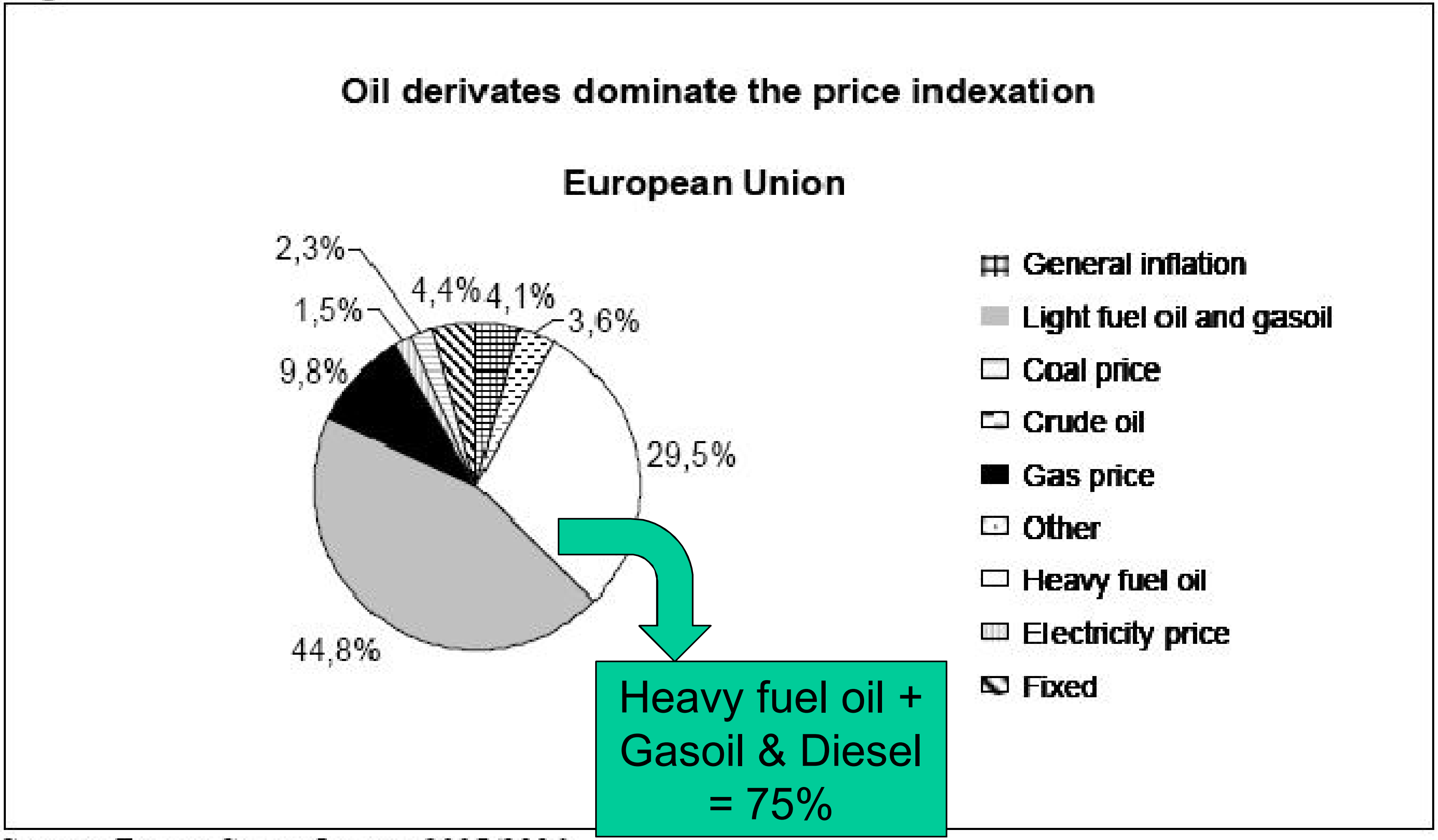
Long-term evolution of review mechanism of pricing formulae:

- Reflects adaptation of the formulae to new conditions of energy markets development,
- Takes place by competitive changes of shares of gas-competing fuels that already present in the formulae (fall RFO, growth LFO) and by inclusion in the formulae of new gas-competing fuels & gas-tj-gas competition,

but

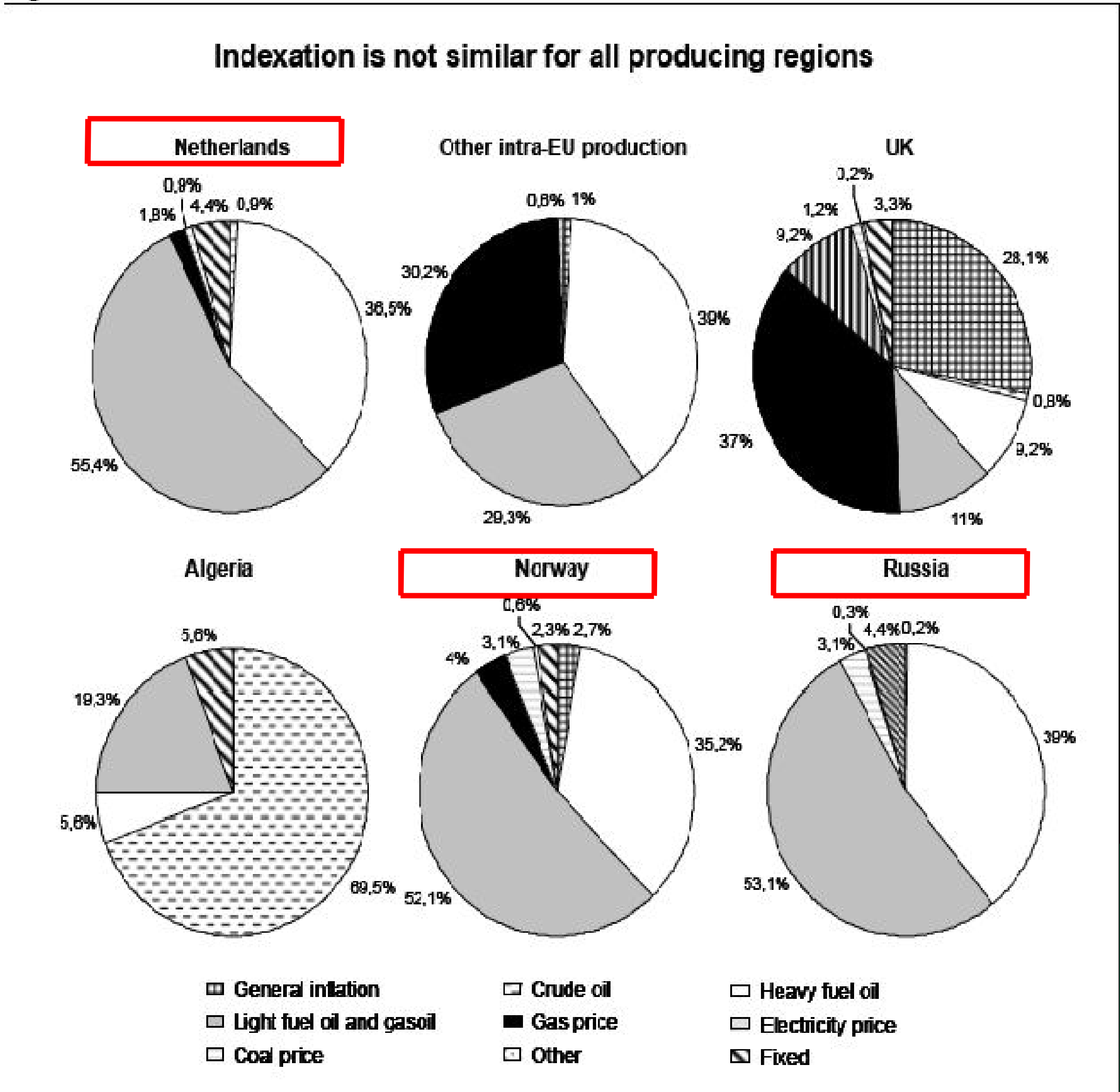
Gasoil/diesel & RFO still dominate in LTGEC pricing formulaes

Price indexation structure in the EU



Source: Energy Sector Inquiry 2005/2006

LTGEC in the EU: Indexation by Producer

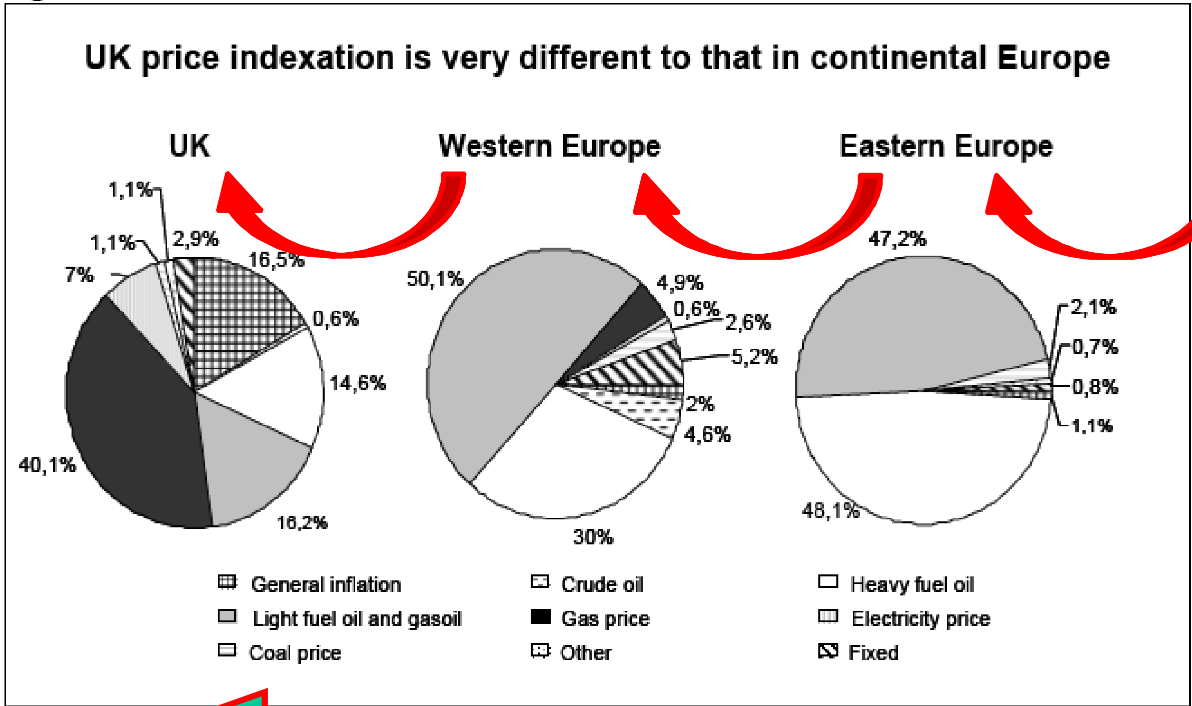


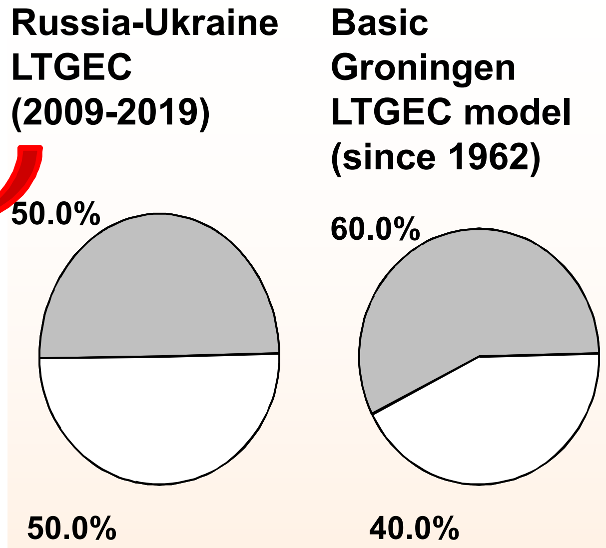
Source: Energy Sector Inquiry 2005/2006

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





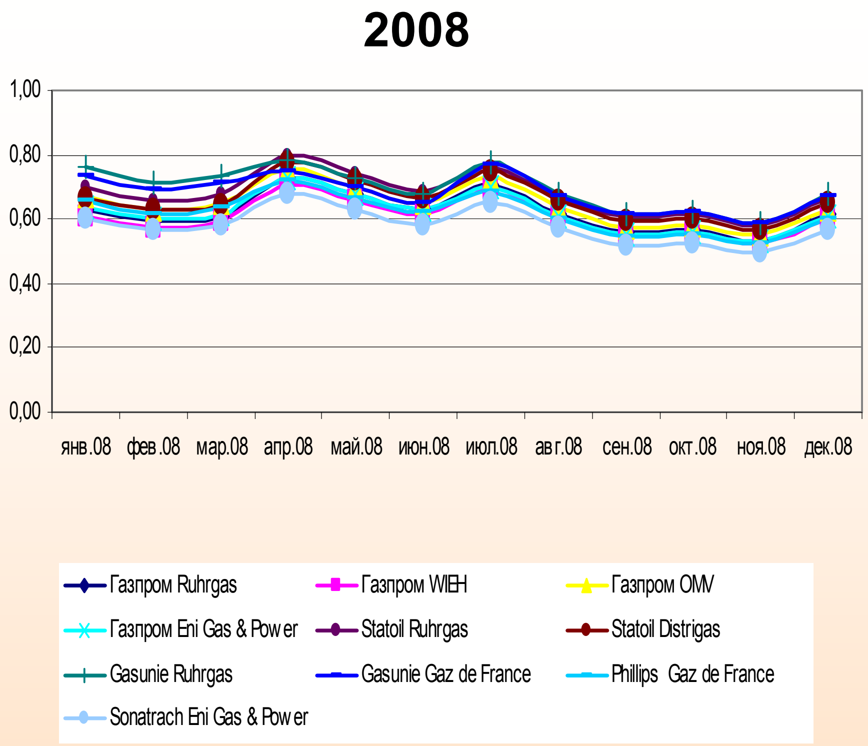
Source: Ener… Inquiry 2005/2006

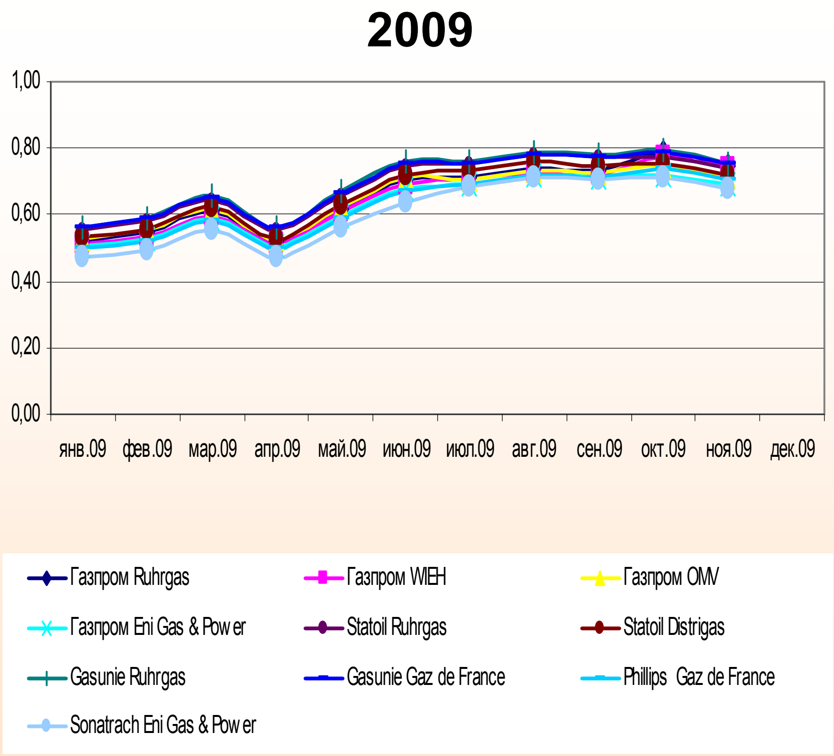
Evolution of LTGEC pricing formula structure: **from more simple to more complicated**

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?

Correlation between gas price in long-term European contracts & Brent spot price with 9 months lag, 2008-2009





Source: В.Фейгин, В.Ревенков. Природный газ в международной торговле: совершенствование традиционных методов ценообразования и новые подходы. Международном научном семинаре “Современные рынки природного газа: барьеры и стимулы развития”, Москва, РГУ нефти и газа им. И.М.Губкина, 24 ноября 2009 г.

LTGEC oil indexation formulae tendencies

- Beginning of LTGEC (early 1960-ies): gas replacement value is based on oil parity
- After 1970-ies: oil parity formulae remains in LTGECs, but gas replacement value deviates away from oil parity
- Nevertheless (???):
  - Gazprom's continuous statements in support of "oil parity" (as stabilization factor of gas prices),
  - GECF Declaration of 19.04.2010 in support of "oil parity"

Producers, Consumers & Speculators Price/Pricing Preferences

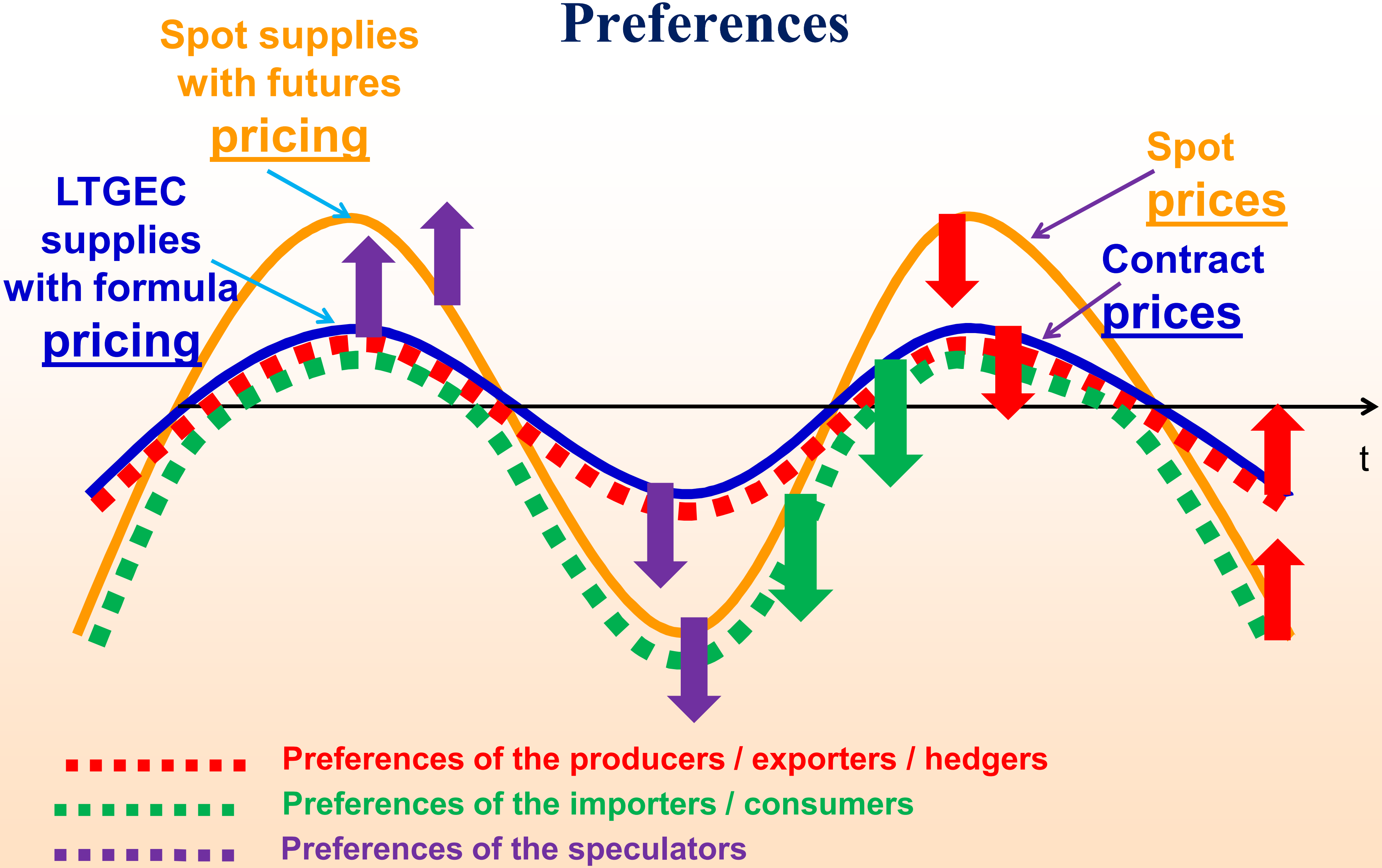


Table of content

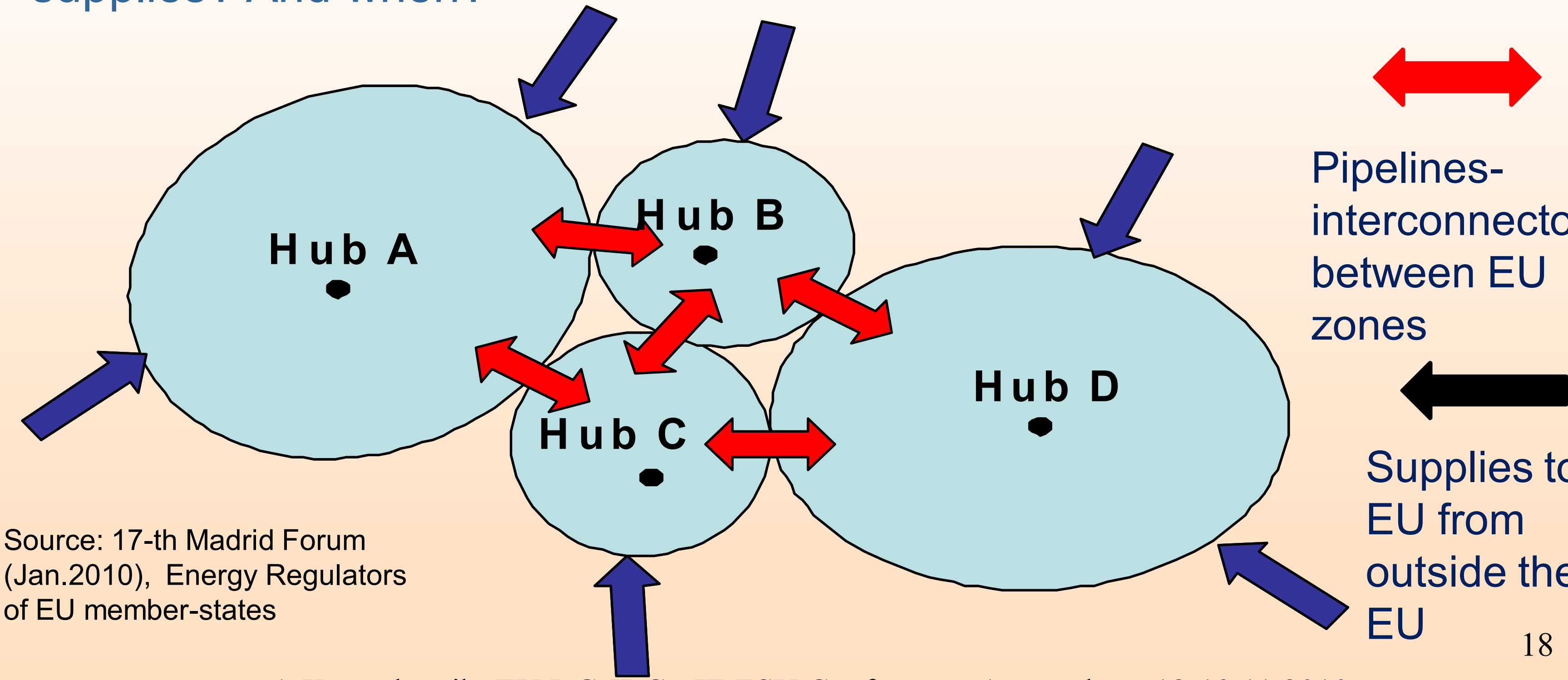
- Three major gas pricing methodologies worldwide
- Evolution of gas pricing in Europe and CIS: 1962-2010
- **Long-term gas export contracts (LTGEC) formula pricing or spot/futures as preferred type of gas pricing in Europe:**
  - LTGEC formula pricing,
  - **Spot/futures pricing**
- Future roles of LTGEC: adaptation in line with gas market developments
- Future architecture, contractual structures and pricing mechanisms of the European gas market

Future architecture of common internal EU gas market according to Third 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 & **gas pricing mechanisms**, but:

Gas pricing at the hubs: on **all** gas volumes ***or*** just on **a portion** of gas supplies? And when?



Source: 17-th Madrid Forum (Jan.2010), Energy Regulators of EU member-states

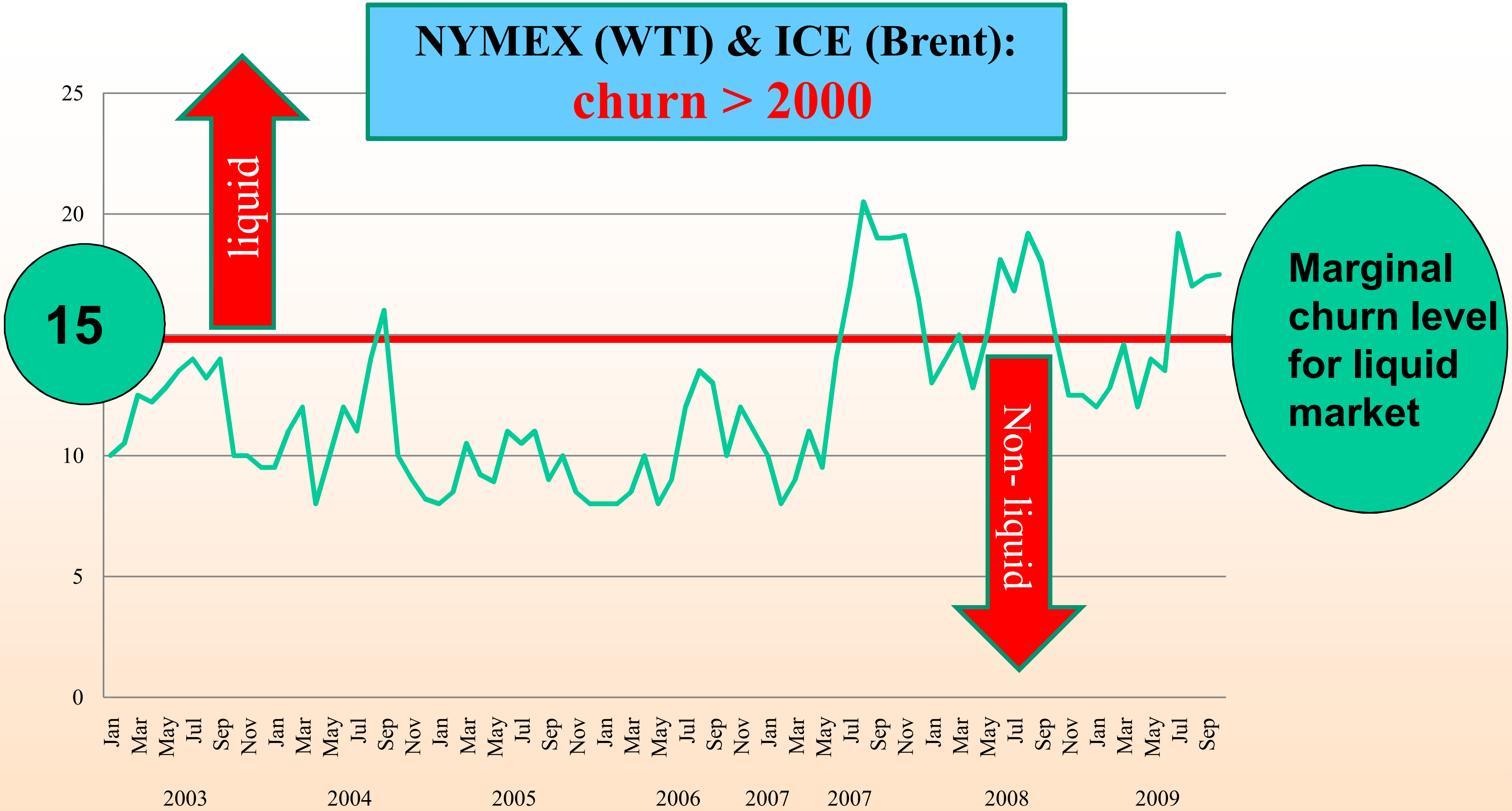
Liquidity of European gas hubs, Q4-2009

• **United Kingdom:** National Balancing Point (NBP)	**14.9**
• **Belgium:** Zeebrugge (ZEE)	**4.9**
• **Austria:** Central European Gas Hub (CEGH)	**3.2**
• **Netherlands:** Title Transfer Facility (TTF)	**3.0**
• **Italy:** Punto di Scambio Virtuale (PSV)	**1.9**
• **France:** Point d'Echange de Gaz (PEG) (av.2009)	**1.9**
• **Germany:** NetConnect Germany (NCG)	**2.4**
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 & is defined as the ratio of traded volumes to physical gas deliveries after trades

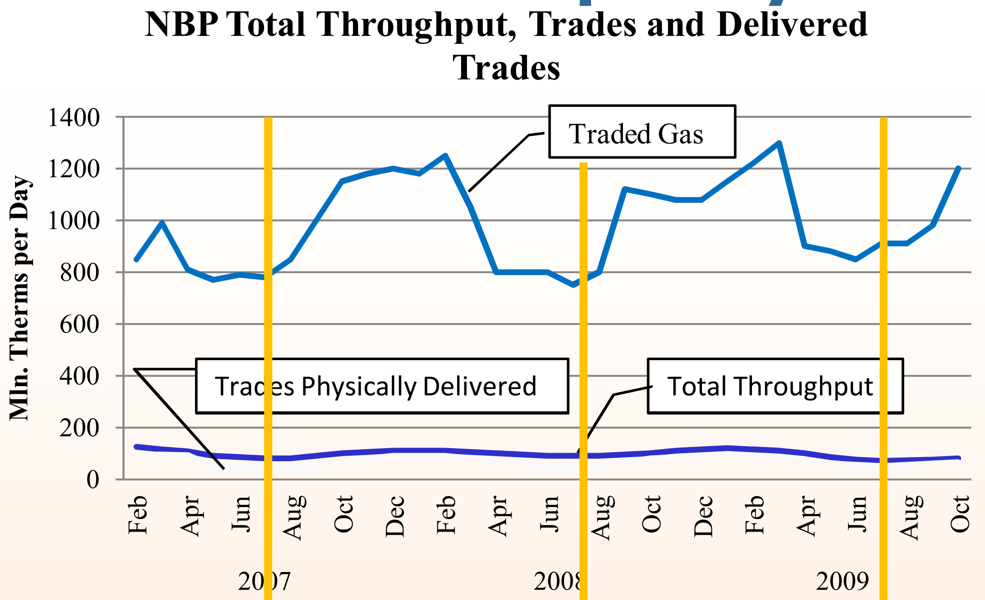
Source: “Gas Matters”, IHS-CERA, M.Kanai (ECS)

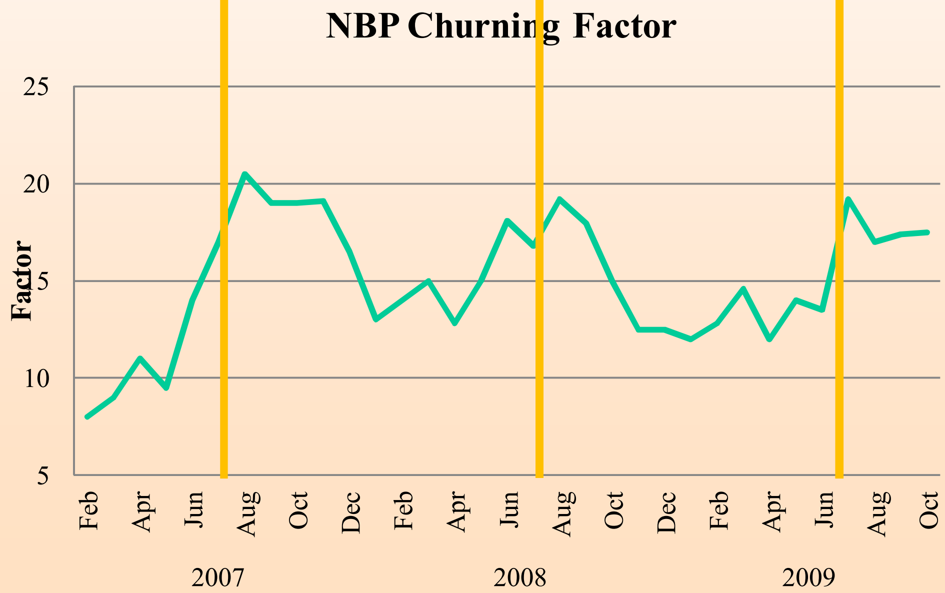
Churn ratio at UK NBP (gas) & at major petroleum exchanges



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

Churn ratio: the best available, but controversial liquidity measurement





Churn cyclical (?) trend :

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

Источник: Gas Matters

Table of content

- Three major gas pricing methodologies worldwide
- Evolution of gas pricing in Europe and CIS: 1962-2010
- Long-term gas export contracts (LTGEC) formula pricing or spot/futures as preferred type of gas pricing in Europe:
  - LTGEC formula pricing
  - Spot/futures pricing
- **Future roles of LTGEC: adaptation in line with gas market developments**
- Future architecture, contractual structures and pricing mechanisms of the European gas market

Results of J.Stern's FLAME polls on expected time of gas price decoupling from oil prices

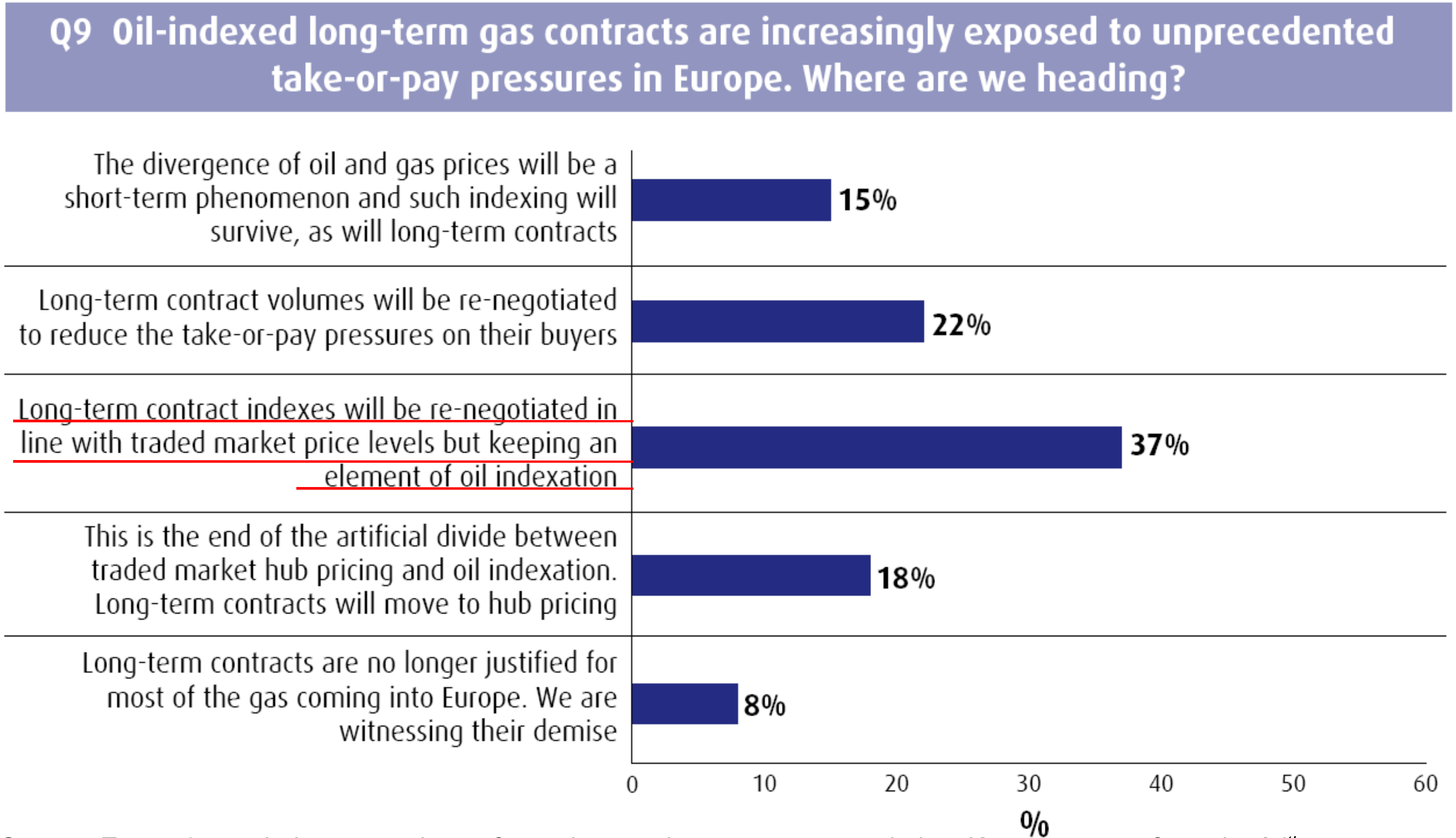
Table 1: When do you expect European long tern contract gas prices will become decoupled from oil and determined by spot and futures prices? (% of total)

YEAR OF CONFERENCE POLL:	2004	2005	2008	2009	2010
Before end 2010	24	15	8.7	3.8	4
Before end 2015	36	15	22.1	20.3	29
Later than 2015	15	39	42.5	44.3	51
Never	24	31	28.8	31.6	25

Source: FLAME Conference for respective years

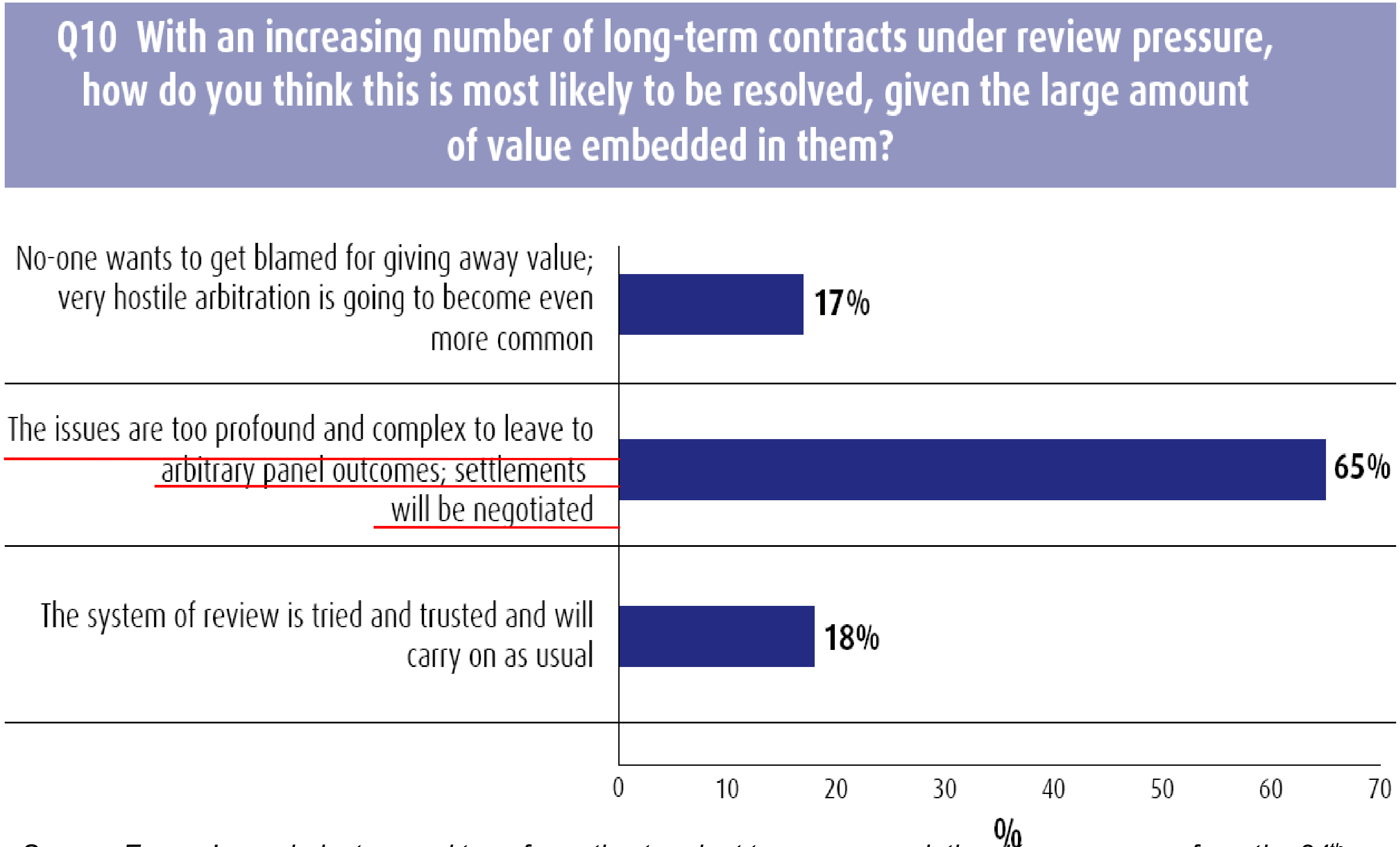
Source: J.Stern. "Continental European Long-Term Gas Contracts: is a transition away from oil product-linked pricing inevitable and imminent?", OIES, NG34, September 2009, p.5; Ibid. "Gas Price Formation in Europe: rationale and next steps", GMT, 8 October 2010.

Future of LTGEC: industry view



Source: Europe's gas industry need transformation to adapt to energy revolution. Key messages from the 24th European Autumn Gas Conference, held in Bilbao in northern Spain in November 2009", December 2009, p.14.

How to adapt LTGEC: industry view



Source: Europe's gas industry need transformation to adapt to energy revolution. Key messages from the 24th European Autumn Gas Conference, held in Bilbao in northern Spain in November 2009", December 2009, p.15.

Gazprom: Evolution of contract provisions and pricing mechanisms in Europe (based on public information)(1)

Actions	Companies
Buyers' demands for price reviews and contract adjustments following "significant market changes"	E.On, Wingas, RWE, Botas, Eni, GdF Suez, EconGas, Gasum
Downgrading minimum TOP obligations from Gazprom's average 85%	E.ON, Botas: 90% to 75%; ENI: 85% to 60% for 3 years) => Gazprom total 15 BCM for 3 years = 5/140-145 BCM (2010) = 3.5% RF gas export volume
No penalties for violation of minimum TOP obligations	Naftogaz UA, Botas; Eni, E.ON pending
Gas sales above minimum TOP obligations at current spot prices	E.ON, GdF, Eni
Adding gas-to-gas competition component into pricing formulae thus decreasing/softening oil-indexation formulae link	E.ON, GdF, Eni–Gazprom = 15% based on a basket of European gas hubs, E.ON-Statoil = 25%; Statoil average up to 30%, requests to Gazprom up to 40%

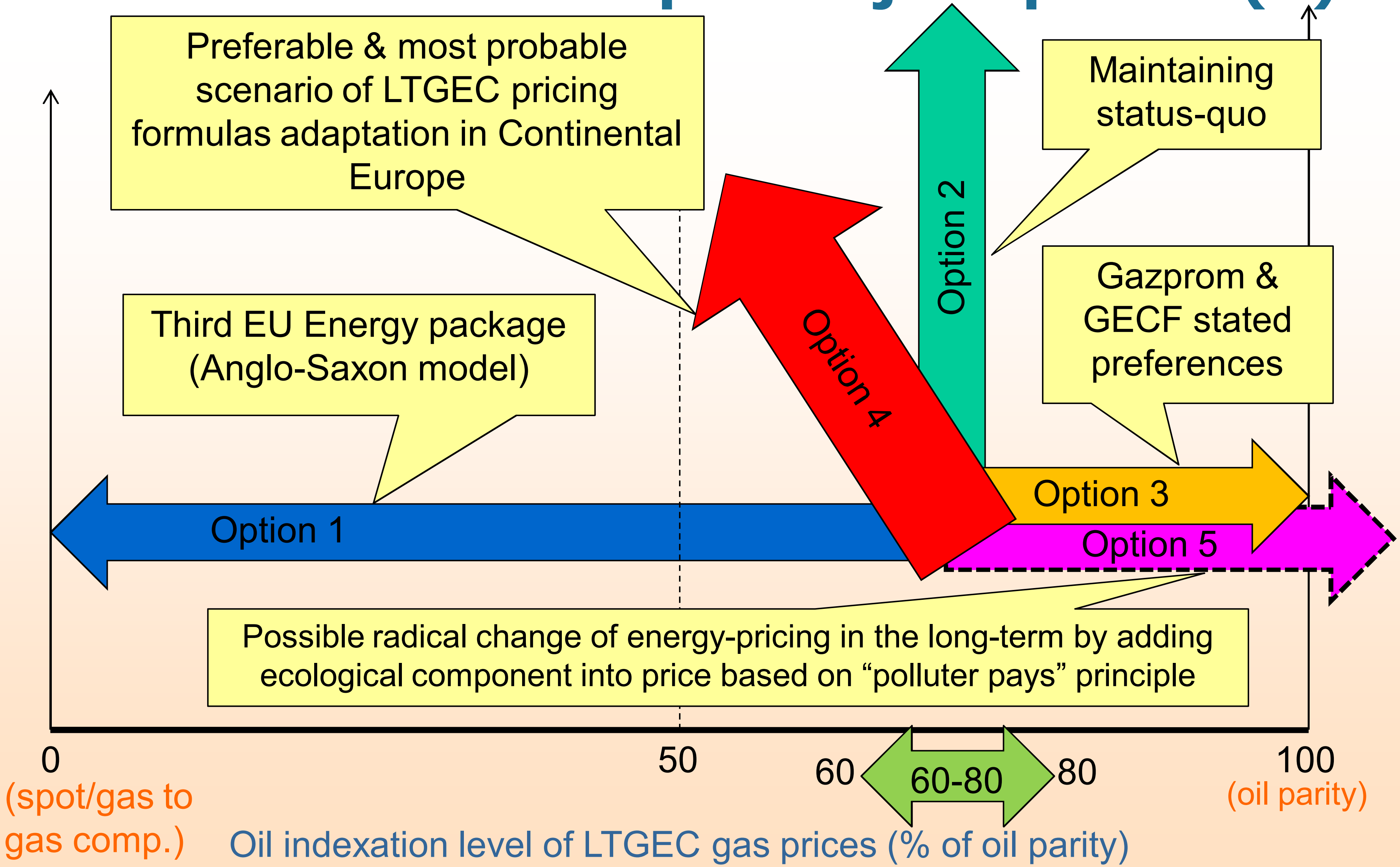
Gazprom: Evolution of contract provisions and pricing mechanisms in Europe (based on public information)(2)

Actions	Companies
Increasing flexibility of contractual provisions	Gazprom's "promotional package"
Recalculating base formulae price	Wingas
Direct price concessions	Botas (tbc)
Maneuvre by contract volumes within contractual time-frame + requests to cancel obligation to off-take contracted volumes within 5-year period	E.ON, Eni
Stimulating measures ("packages") for purchases in excess of (downgraded) minimum TOP	
Shorter contract durations	Sonatrach
Shortening of recalculation period/interval	possible
Shortening of reference period	possible

Table of content

- Three major gas pricing methodologies worldwide
- Evolution of gas pricing in Europe and CIS: 1962-2010
- Long-term gas export contracts (LTGEC) formula pricing or spot/futures as preferred type of gas pricing in Europe:
  - LTGEC formula pricing,
  - Spot/futures pricing
- Future roles of LTGEC: adaptation in line with gas market developments
- **Future architecture, contractual structures and pricing mechanisms of the European gas market**

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 (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

Views expressed in this presentation do not necessarily reflect (may/should reflect) and/or coincide (may/should be consistent) with official position of JSC Gazprombank, its stockholders and/or its/their affiliated persons, and are within full responsibility of the author of this presentation.

<www.konoplyanik.ru>

<andrey.konoplyanik@gpb-ngs.ru>