

Russian and Central Asian gas in the FSU and continental Europe: evolution of contractual structures and pricing mechanisms

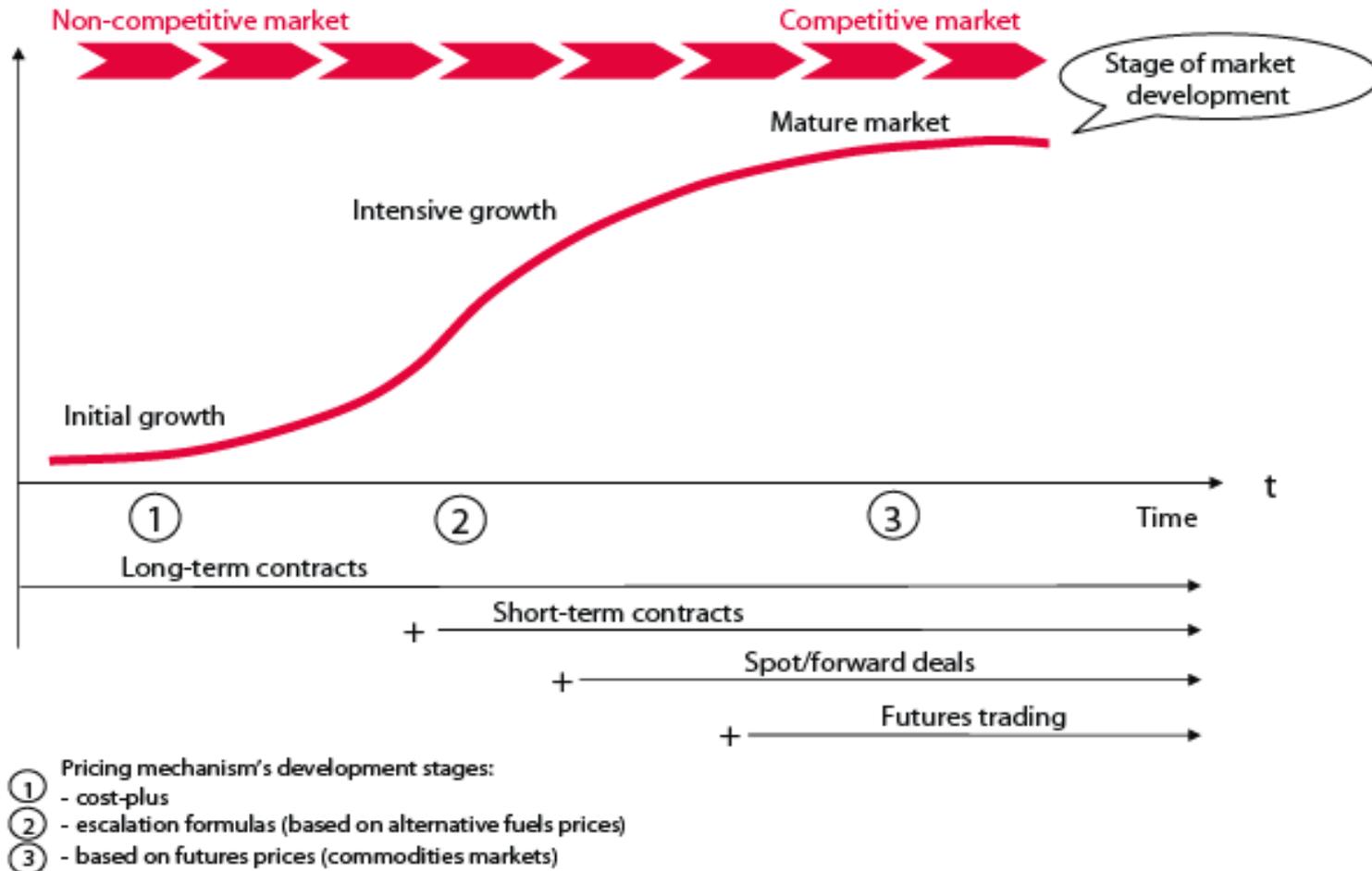
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EVOLUTION OF GAS MARKETS: CORRELATION OF DEVELOPMENT STAGES, CONTRACTUAL STRUCTURES & PRICING MECHANISMS



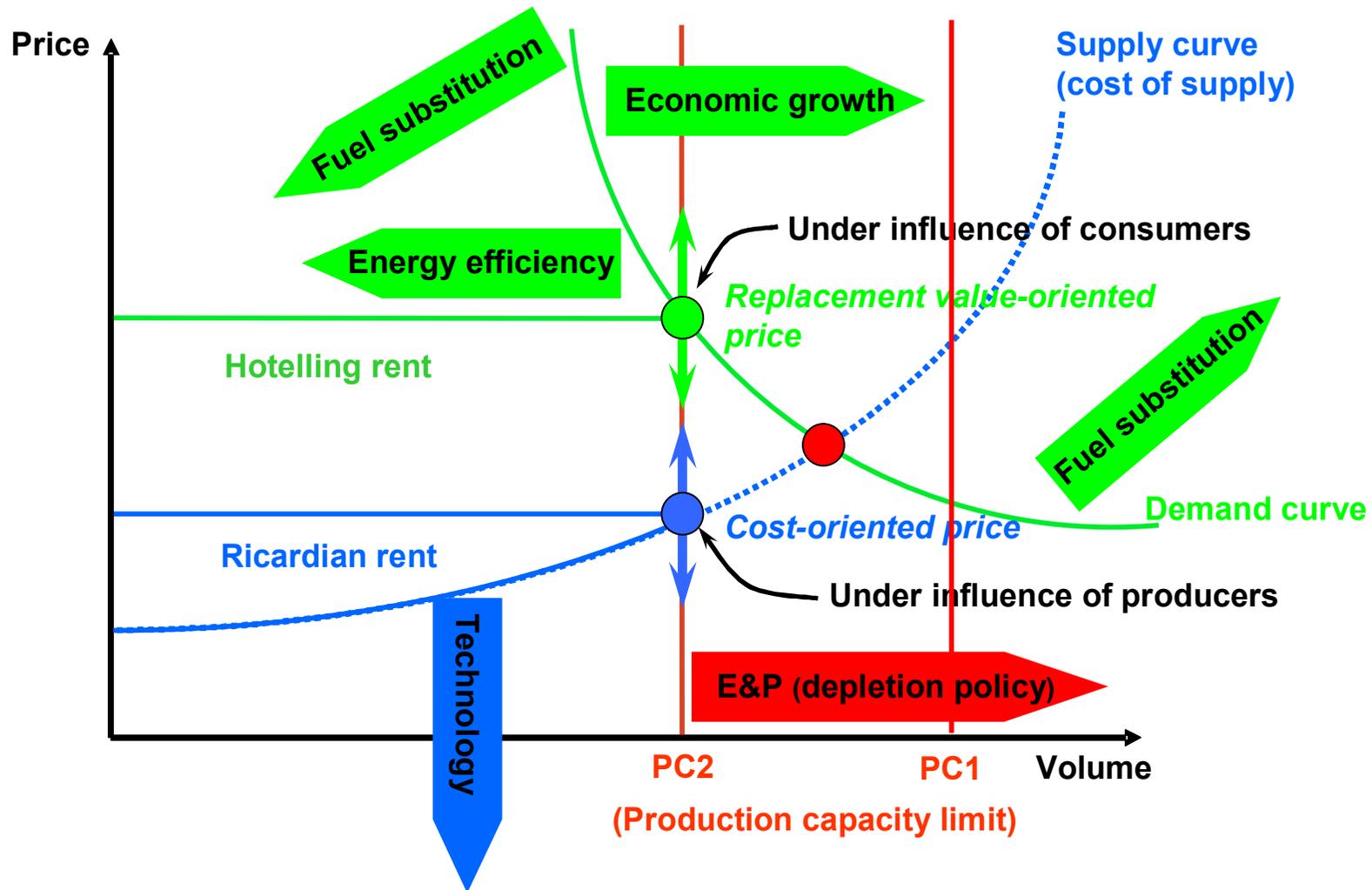
Source: (A.Konoplyanik) "Putting a Price on Energy: International Pricing Mechanisms for Oil & Gas", Energy Charter Secretariat, 2007

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Pricing of Non-Renewable Energy Resources: RICARDIAN VS. HOTELLING RENT

Ricardian rent + Hotelling rent = Resource rent



Gas Export Pricing & Prices

- Resource price and resource rent for non-renewable energy:
 - Ricardian rent: internal demand is *below* domestic production capacity limitations
 - Hotelling rent: internal demand is *above* domestic production capacity limitations
- Pricing principles:
 - Cost-plus (net forward) => pricing at internal domestic market of producer *or* subsidized export pricing (Hotelling rent is shared with your own nation *or* with foreign nation)
 - Replacement value (costs of alternative energies) => in case when domestic production capacities are below internal demand for gas => to receive maximum marketable price/resource rent
 - Net-back replacement value = Replacement value netted back to an upstream delivery point in delivery chain => Dutch (Groningen) model of long-term export contract (since 1962)/Nota de Pouse

Key elements of Groningen LTGEC concept

Groningen concept of long-term gas export contract (LTGEC) =

- = long-term contract,
- + gas price linked to its replacement value (to end-use cost of its alternative fuels - at the burner-tip),
- + regular price review within contractual price formula & possibility for regular adaptation of the formula itself,
- + minimum payment obligation (take and/or pay),
- + net-back to delivery point (gas replacement value in end-use less transportation cost from delivery point to end-use point),
- + destination clauses.

Economic & legal background of Groningen LTGEC concept

- *Economic* background: maximisation of Hotelling rent for resource-owning state
- *Legal* background: 1962 UN GA Resolution N° 1803
- More than 300 Bcm/y are imported in Continental Europe within contractual structures on the basis of Groningen LTGEC concept.

Soviet/Russian LTGEC organized on the basis of Groningen LTGEC concept

- Soviet/Russian gas export contracts to the:
 - EU (historically – since 1968),
 - Former COMECON (after dissolution of the USSR),
 - CIS (since recently)
- are based on (modified towards) Groningen (Dutch) concept of long-term gas export contract (LTGEC)
- Pricing = gas replacement value within “old-EU” domestic market + net-back to delivery points at:
 - For “old-EU” members – at Eastern then “EU-15” border,
 - For “new-EU” members and CIS states – at external border of corresponding state

A Typical Net Back Gas Price Formula & its Review

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

NB: [...] – parameters in brackets usually subject of renegotiation

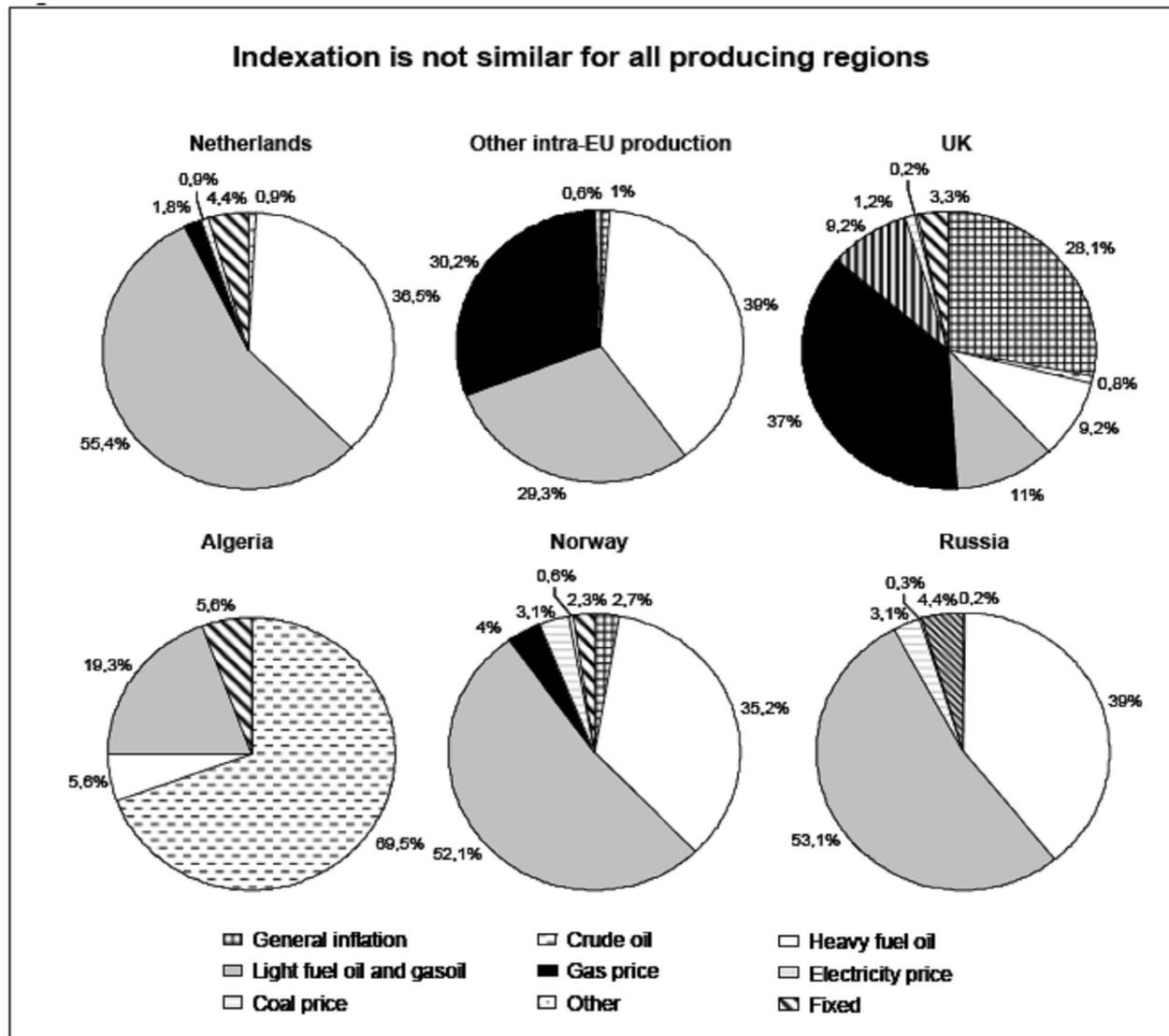
Long-term evolution of price review mechanism:

- 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

LTGEC: Indexation by Producer



Source: Energy Sector Inquiry 2005/2006

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Soviet/Russian Gas Supplies to COMECON/CIS: ***Prior to* Dissolution of the USSR**

- **Political (friendship) pricing => :**
 - subsidized (notional) export prices
 - transfer of Hotelling rent from producer-state to consumer-state through cost-plus (net forward) pricing
 - portion of resource rent is left to importer in exchange on his political concessions to exporter
 - sharing USSR resources (which today are mostly Russian resources) within USSR and with COMECON countries
 - Legal background: state sovereignty on natural resources (UNGA 1962 Res.1803; ECT Art.18)
- **Barter & quasi-barter deals**
- **Transportation system - but not designed as transit system within USSR/COMECON**
- **No transit within USSR**
- **Export & transit supplies are not contractually separated within COMECON**

Soviet/Russian Gas Supplies to COMECON/CIS: *After* Dissolution of the USSR

- Long & painful transition to :
 - Contractual separation of transit & export supplies
 - Formation of domestic transport vs. transit legislation
 - From barter to cash payments
 - From politically-subsidized - to market-based pricing & prices:
 - Transit tariffs methodologies (2005)
 - Market-oriented export pricing & prices (2006)
 - UGS tariffs methodologies (2008)

Energy Charter role:

ECT Art.7 "Transit" + draft Transit Protocol + gas/transit-related activities: e.g. Transit tariffs study (Jan'06), Pricing study (March'07), Transparency Initiative (Sept'06), etc.

Gas problems in post-Soviet area = result & long-term economic consequences of dissolution of USSR/COMECON political system = objective long-term economic problems of transition period

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Ukraine: Export and Transit of Russian Gas

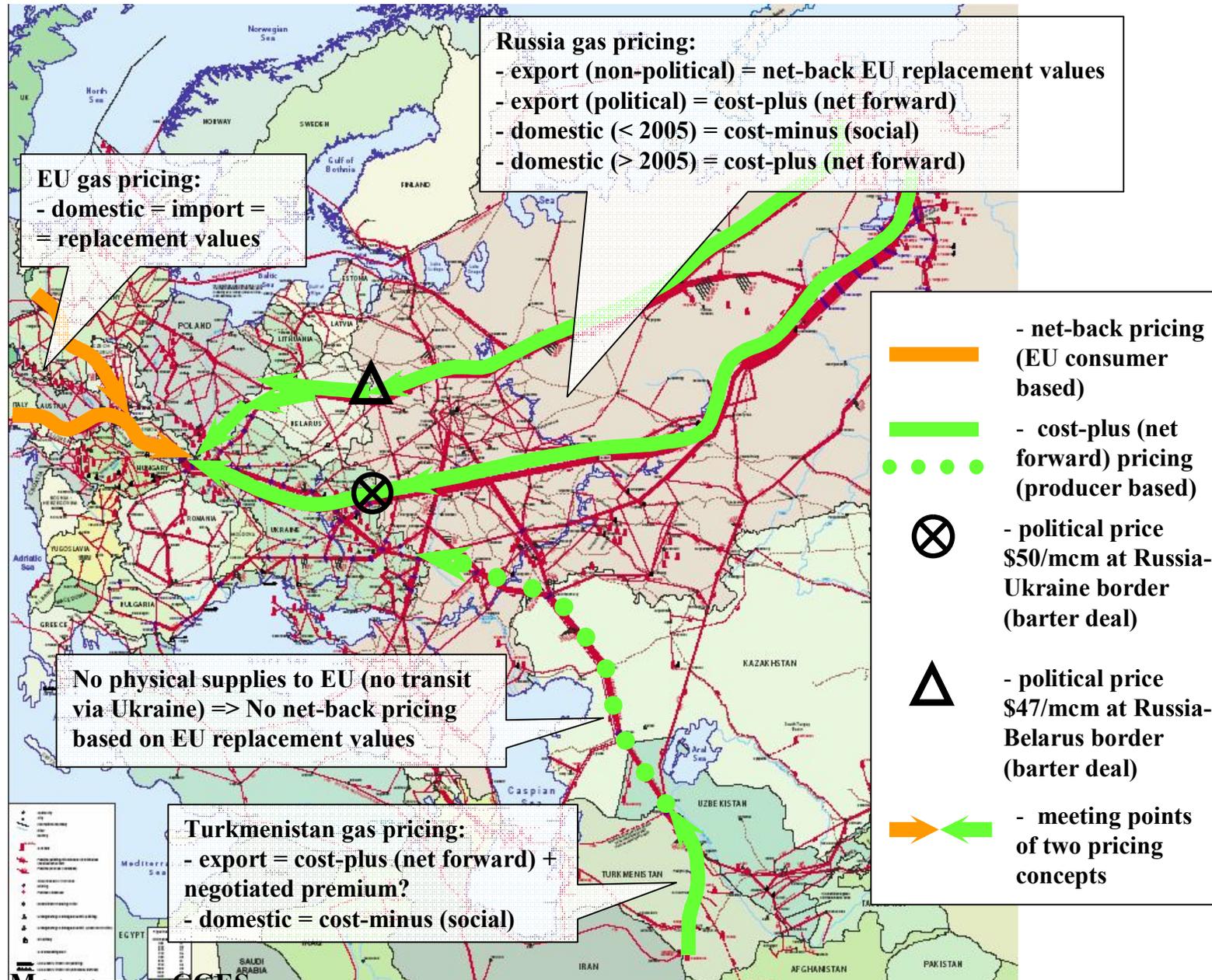
Prior to 4 January 2006

- Export & transit are not contractually separated
- Quasi-barter deals
- Notional export prices & transit tariffs – to balance gas supplies to Ukraine
- Export pricing:
 - “cost-plus (net forward)” – on the basis of the marginal costs (supply curve) for Russia
- Who receive the resource rent (Ricardian & Hotelling rents):
 - Ricardian rent – producer/exporting state (Russia),
 - (at least part of) Hotelling rent – consumer/importing state (Ukraine) => 1962 UN GA Res.1803 + 1994 ECT Art.18

Ukraine: Export and Transit of Gas from Russia *After 4 January 2006 [and prior to 1(19) Jan. 2009]*

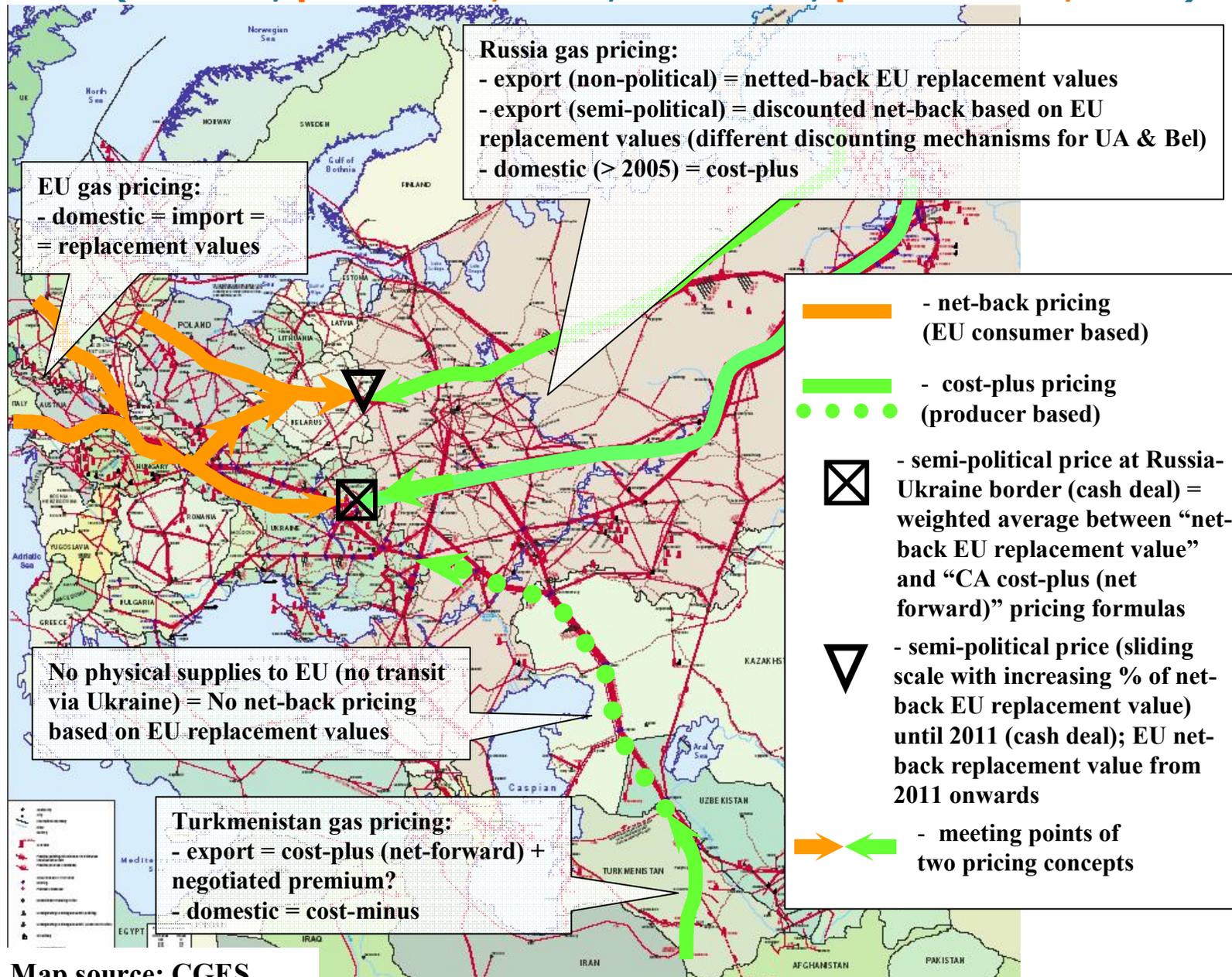
- Transit and export are contractually separated
- Cash payments
- Export price => average based on cocktail from two sources: Russia and Central Asia (CA)
- Export pricing for gas originated from:
 - Russia - by net-back calculation => based on *demand-curve* => replacement value within EU netted-back (less transportation costs) to Russia-Ukraine border
 - Central Asia - by cost-plus (net forward) calculation => based on *supply curve* => negotiated price at external border of exporting CA country (above its cost-plus level ?) plus transportation costs to Russia-Ukraine border
- Who receive resource rent (Ricardian & Hotelling rents) for gas originated from:
 - Russia – both rents go to producing/exporting-state (Russia)
 - Central Asia – *Ricardian* rent goes to CA producing / exporting states; *Hotelling* rent shared between Ukraine & CA producers / exporters => 1962 UN GA Res.1803 + 1994 ECT Art.18

Russian Gas to Europe prior to January 4, 2006: "Political" and "Non-Political" Pricing Zones



Map source: CGES

Russian Gas to Europe: "Political" and "Non-Political" Pricing Zones 2006-2009 (Ukraine, post-Jan.4, 2006, & Belarus, post-Dec.30, 2006)

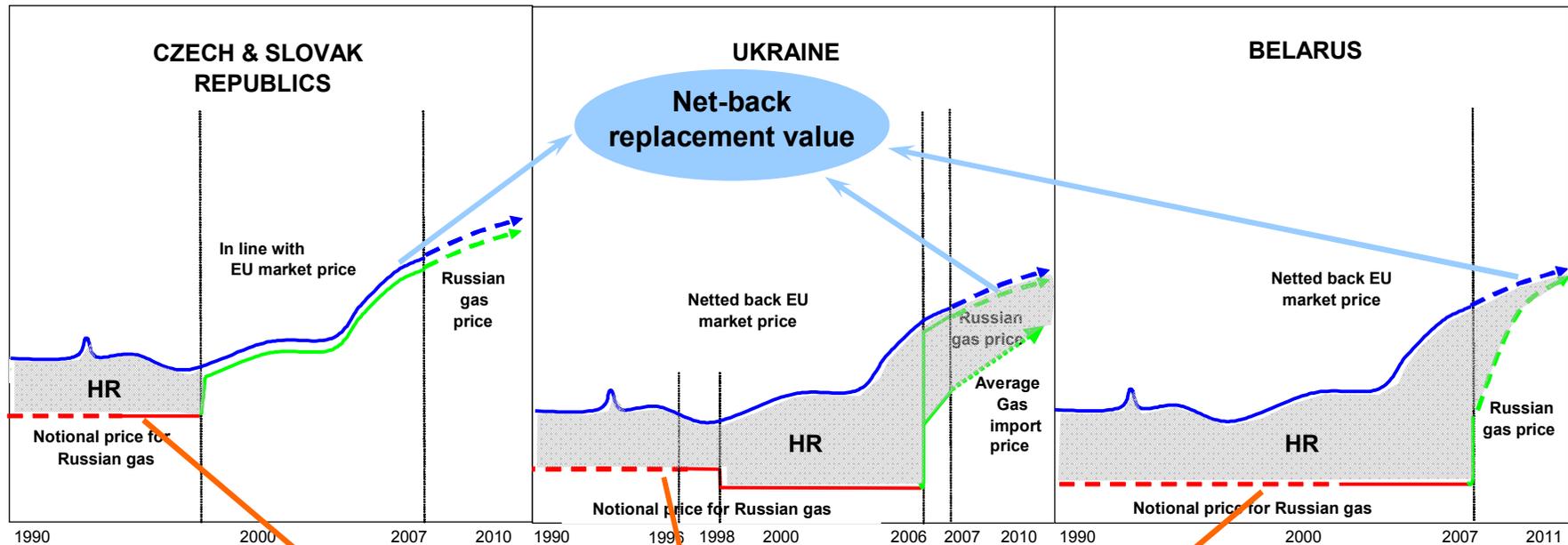


Map source: CGES

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Russian Gas Prices to the EU and Countries along the Pipe



- Remarks:**
- 1- The figures are entirely for illustration purposes and, therefore, may not fully reflect the actual price levels and movements
 - 2- The illustration for "Netted back EU market prices" are based on the IEA's World Energy Outlook, 2006
 - 3- Estimates for future gas price movements beyond 2007 are entirely illustrative.
 - 4- Recent actual price figures for Ukraine and Belarus, based on information from public sources, are as follows:
 For Ukraine - Russian gas price: 230 \$/mcm (2006) ; Average gas price (for a mixture of Russian / Central Asian gas): 65 and 135 \$/mcm (2006 and 2007, respectively)
 For Belarus - Russian gas price: 100 \$/mcm (2007) It will reach market price level by 2011 in agreed upon steps (67, 80, 90 and 100% from 2008 to 2011)
 - 5- Notinal prices for Russian gas were used to determine volumes of gas as compensation for transit services.
 For Ukraine: 80 \$/mcm until 1998; 50 \$/mcm from 1998 to 2006
 For Belarus: 47 \$/mcm most recently until 2007

■ Hotelling Rent

○ Cost-plus?
(Net forward)

Based on: "Putting a Price on Energy: International Pricing Mechanisms for Oil and Gas". Energy Charter Secretariat, 2007.

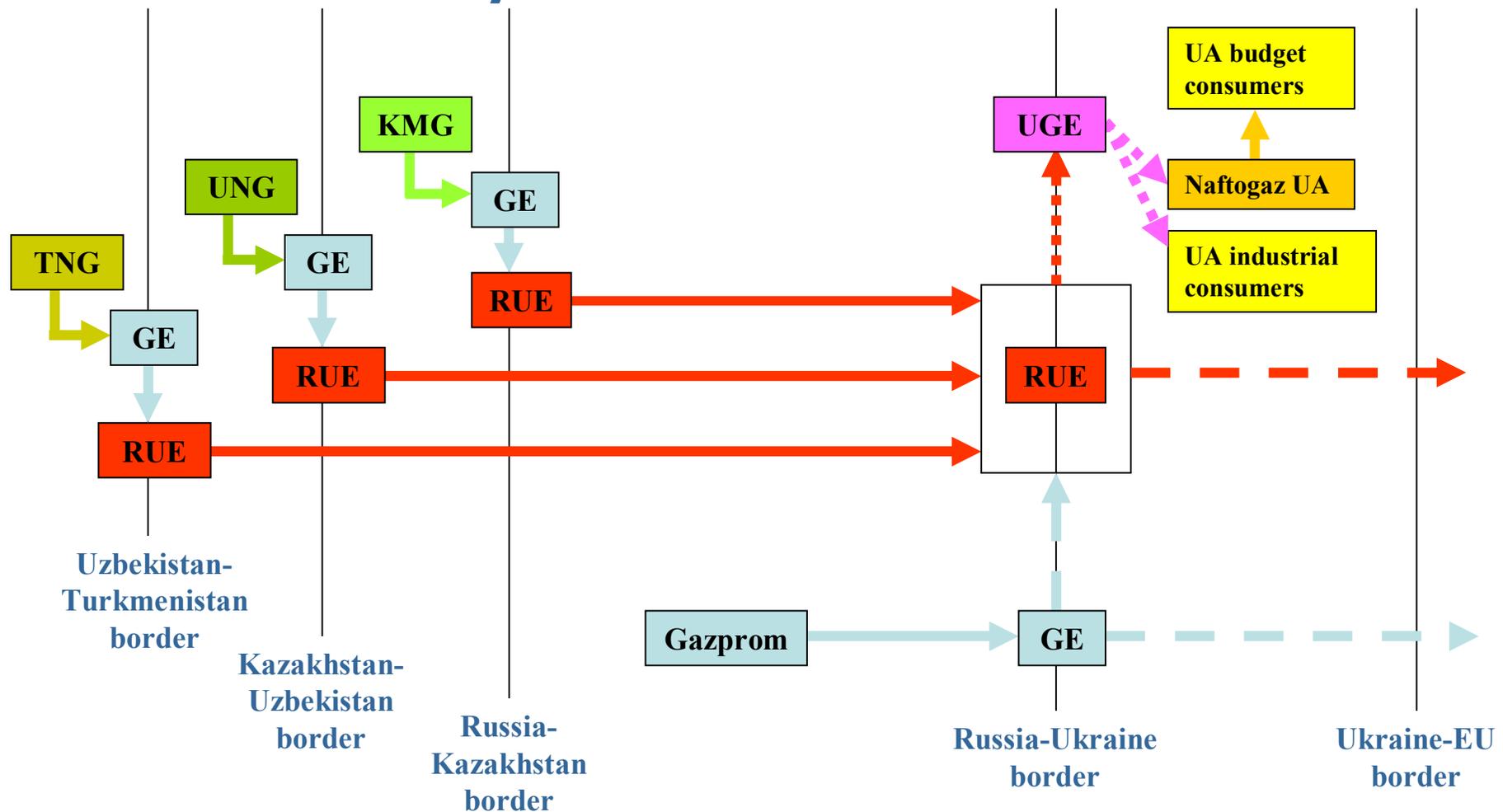
Russia & Former COMECON/USSR states: Different Sensitivity of Transition to Market-based Gas Pricing/Prices

| | Czech & Slovak Republics | Ukraine | Belarus |
|---|-------------------------------|--------------------------------|---------------------------------|
| Internal motivation vs. external political obligations to move to market pricing / prices | (No?) / Yes (accession to EU) | No / No | No / No |
| Price gap (market vs. political price): value (USD/mcm) & trend prior to transition | 10- (1998); diminishing | 15 (1998), 160 (2005); growing | 25 (1998), 170+ (2006); growing |
| Relative economic value / political sensitivity | Low | High | Highest (Union state) |

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Organisation of Russia-Ukraine Gas Trade After 4 January 2006: the Role of Intermediaries



- ▶** Cost-plus (net forward) pricing
- - - - -▶** Net-back replacement value pricing
-▶** Weighted average price based on two formulas' calculations

Economic rationale for **RUE & UGE** to appear in gas supply chain to Ukraine

- **RUE**: To exclude price competition in Europe of gas originated from Russia and from Central Asia
- **RUE**: To exclude transit (in legal/contractual meaning of the term) of Central Asian gas to Europe via Russia (strong continuous Russia-EU debate on transit within Energy Charter – still open questions)
- **But also RUE**: to provide soft transition for UA to EU-based gas pricing & prices (inevitable future result of UA intention to enter the EU) by providing supplies to UA of gas:
 - received from GE & Gazprom,
 - originated from Russia & Central Asia,
 - based on mixing the gas flows & weighting pricing principles
- **UGE**: To exclude threat of re-export by Ukraine (if Naftogas is importer) of cheap Central Asian gas (cost-plus import pricing) to Europe at high re-export prices (net-back replacement value)

Organisation of gas supplies to Ukraine – before and after 1st January 2009

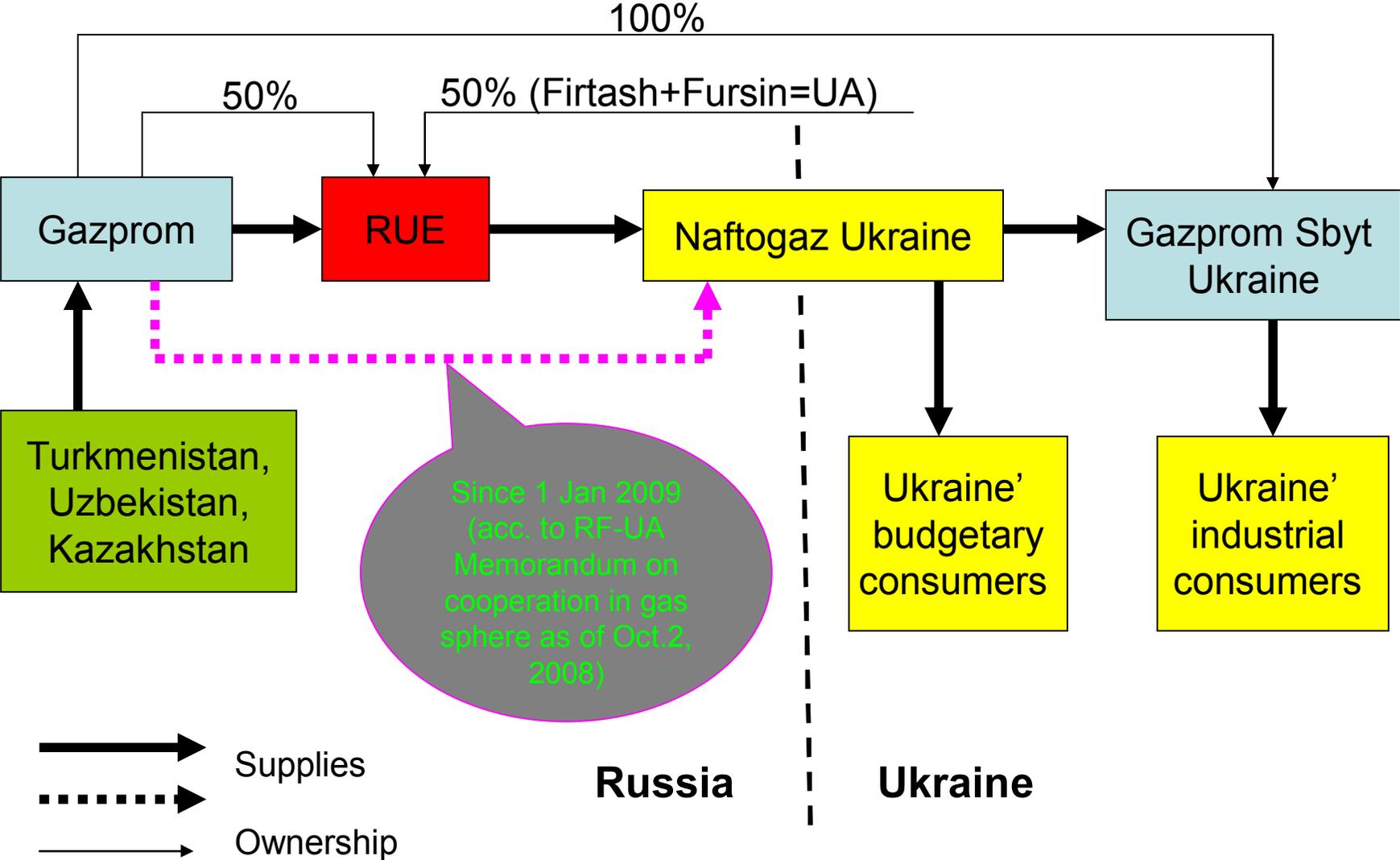


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Ukraine: Expected Export and Transit of Gas from Russia

After 1 January 2009 (as was agreed in Russia-Ukraine Memorandum on cooperation in gas sphere of 2 October 2008)

- Transit and export are contractually separated
- Cash payments
- Export **pricing**: same pricing mechanisms for gas originating from Russia and Central Asia - by net-back calculation based on *demand*-curve => replacement value within EU netted-back (less transportation costs) to:
 - Russia-Ukraine border – for gas originating from Russia,
 - Turkmen-Uzbek (Kazakh-Uzbek, Russia-Kazakh) border – for gas originating from Central Asia
 - All CA gas supplied to Ukraine is bought by Gazprom/GE at corresponding external CA border => no transit through Russia (on-border trade)
- Export **price** at Russia-Ukraine border: transition to “market price” for Ukraine within 3 years (2009-2011), *but* no pricing formula & discounting ratios
- Who receive **resource rent** (Ricardian & Hotelling rents):
 - **Ricardian rent**: to producing/exporting-state – for gas originating both from Russia and from Central Asia,
 - **Hotelling rent**:
 - for gas originating from Central Asia - to producing/exporting state,
 - *For gas originating from Russia - shared between producing/exporting state (Russia) and importing state (Ukraine) in proportions to provide discounted import price on ALL Ukrainian import gas volumes => 1962 UN GA Res.1803 + 1994 ECT Art.18*

Russia-Ukraine gas crisis January 2009 (pre-history)

- Debated price & debt figures for Feb'08 incremental supplies to UA (result of two pricing systems): 179 or 320 USD/mcm => penalties 614 mln USD disputed
- Oct 2, 2008 Memorandum: new pricing since 2009, incl. 3-year transition period, only if debt is repaid before new supply contract is signed
- Debt (core part) repaid 31 December, penalties (disputed) not paid. No supply contract for 2009 on 1 January. Export supplies to Ukraine stopped at 10-00.

Russia-Ukraine gas crisis January 2009

- Issue of compressor gas (21 Mcm/d):
 - Ukraine took it from transit volumes,
 - Russia diminished transit flow by same figure
- Reverse of gas flows in Ukraine
- Jan 7: full stop of transit
- To resume the system - issue of line-pack gas
=> proposal for international consortium
- Jan 19: new supply contract signed. Transit & export resumed.
- Result: New contract differs from Oct 2, 2008, Memorandum – one not three year-long transition period of lower prices

Ukraine: Export and Transit of Gas from Russia ***After 1 January 2009 (as settled in Gasprom - Naftogas supply contract for 2009-2019 as of 19 Jan 2009) (1)***

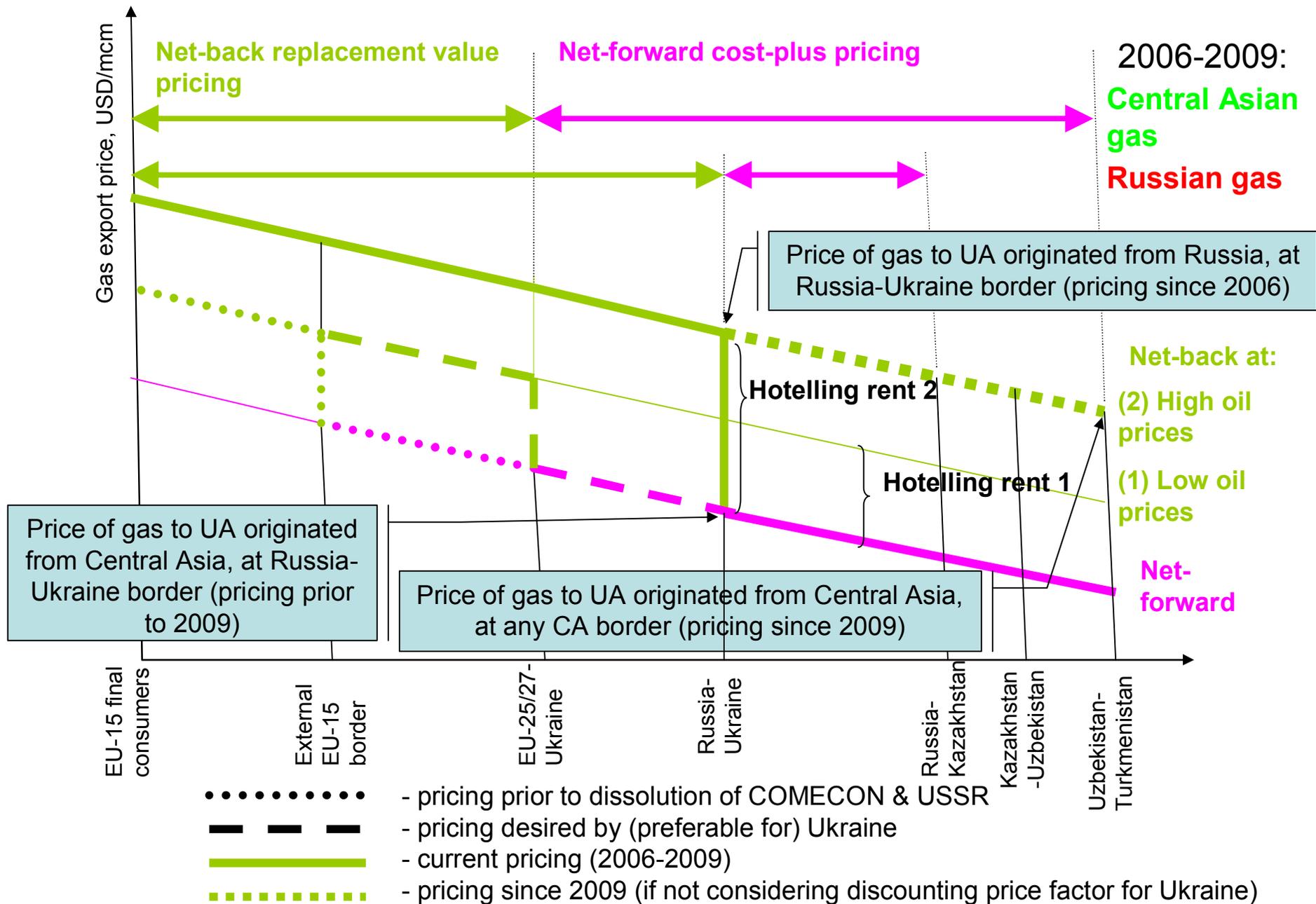
- Transit & export contractually separated & both long-term (10 years)
- Export to UA: Russian, Turkmen, Uzbek, Kazakh gas
- Supply volumes (BCM):
 - 2009: $5.0+10.5+12.0+12.5=40$
 - 2010-2019: $16.2+10.8+10.0+15.0=52$
 - Advanced changes of future supply volumes possible:
 - To notify not less than 6 months in advance
 - Not more than +/-20% of annual volume
- No re-export (gas only for UA domestic market)
- TOP = not less 80% annual volume
- Monthly fluctuations (takings/supplies) from contracted volumes: not more +/-6%

Ukraine: Export and Transit of Gas from Russia

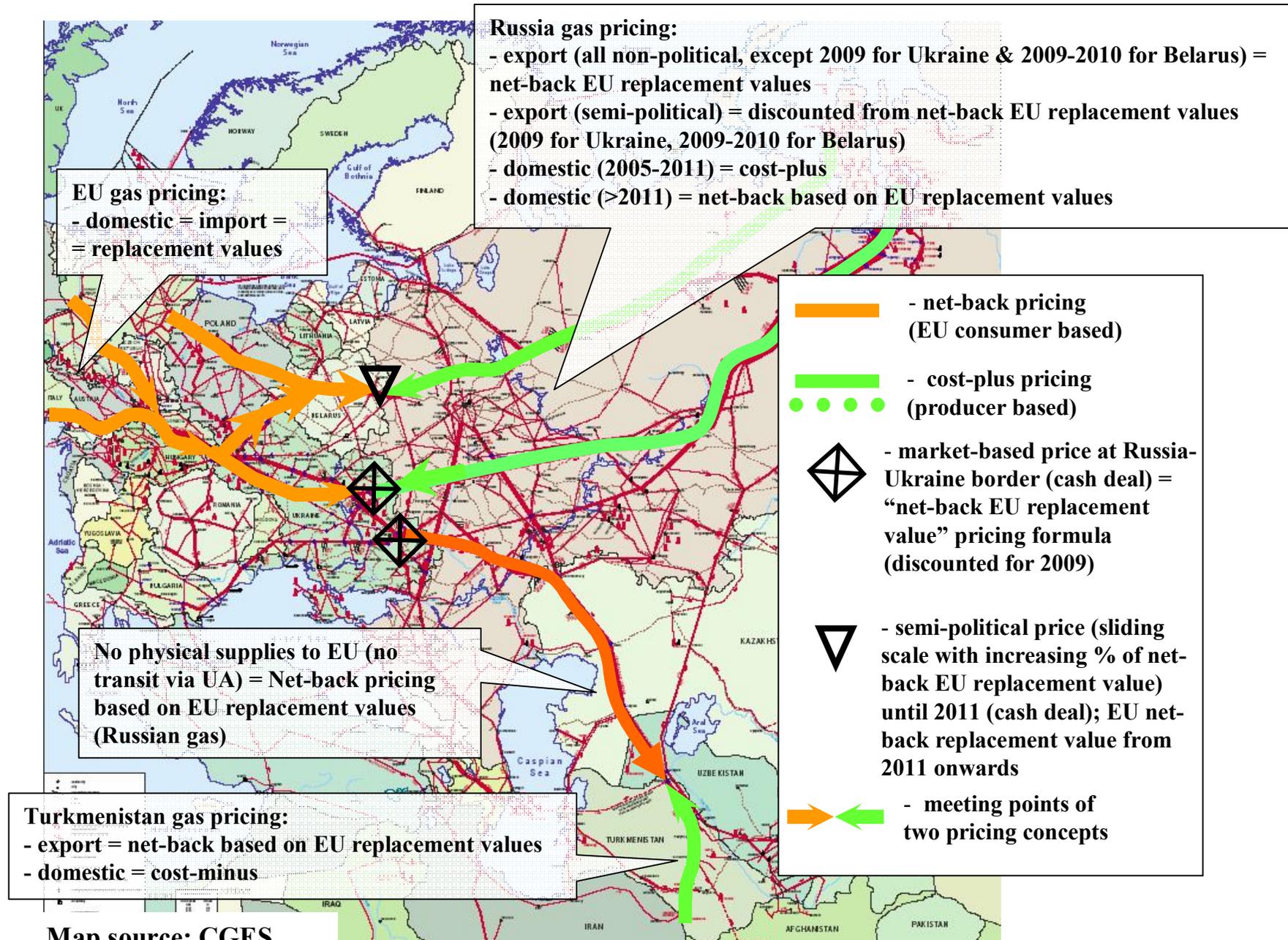
After 1 January 2009 (as settled in Gasprom - Naftogas supply contract for 2009-2019 as of 19 Jan 2009) (2)

- Cash payments; for gas export:
 - Monthly basis (not later 7th next month) => 7 March '09 problem
 - At first non-payment:
 - transfer to pre-payments till end-contract
 - Supplier can limit/stop supplies
- Formula pricing:
 - Based on 50/50 HFO (1%S)/LFO
 - HFO/LFO prices: FOB Med. Basis Italy, Platt's Oilgram Price Report - "European Monthly Averages"
 - Quarterly price calculations: 1 Jan, 1 Apr, 1 July, 1 Oct
 - Reference period 9 months
 - 2009 = 80% from formula price, since 2010 – 100% formula price
 - Price 1Q-2009 = 360 USD/mcm
- Price review procedure
- Penalties for unauthorised takings/undersupplies (exceeding +/-6% over-takings/under-supplies):
 - April-Sept: 150% of Basic price
 - Oct-March: 300% of Basic Price
 - Basic price = 450 USD/mcm

Evolution of gas export pricing within FSU area



Russian Gas Export to Europe: Pricing Zones since Jan 1, 2009



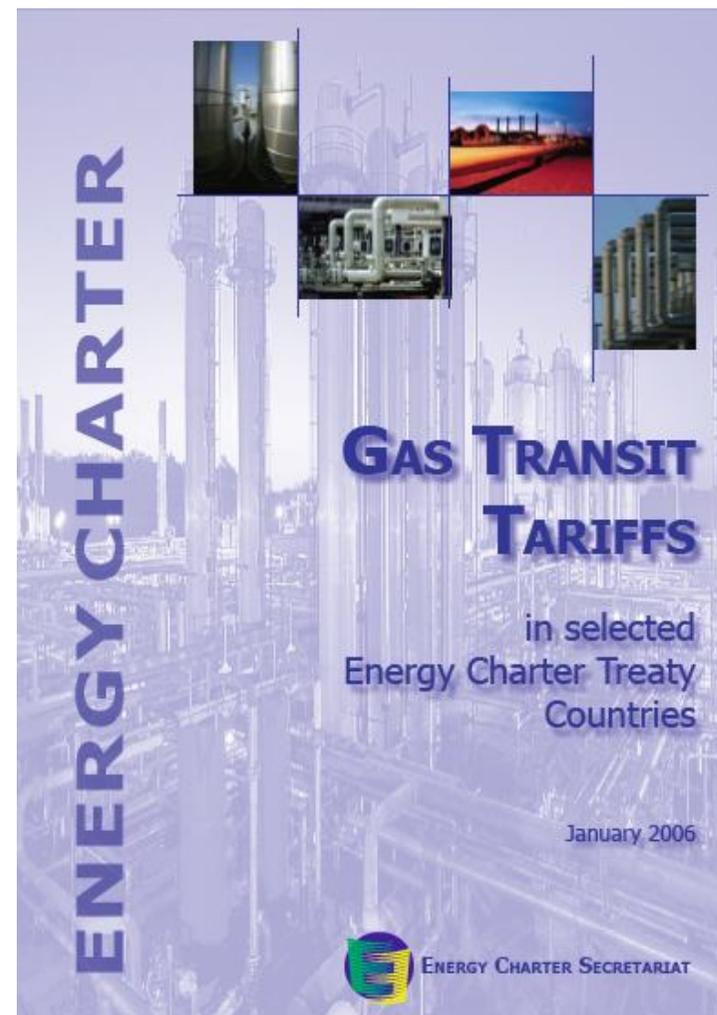
Map source: CGES

Some conclusions

- One universal pricing system for gas exports within FSU based on pricing principles in Continental Europe (Groningen-type LTGEC)
- Aim - maximization of Hotelling rent; pricing instrument - netted back replacement value
- Since 2010-11 no more political pricing within in FSU
- Adaptation to market-based pricing will take time, discipline and transparency to best effectively settle disputes & escape new crises
- Adaptation to market-based formation of transit tariffs and UGS tariffs – to follow gas pricing with time-lag
- Indirect consequences: changing geopolitical stimuli for new pipelines from CA to Europe

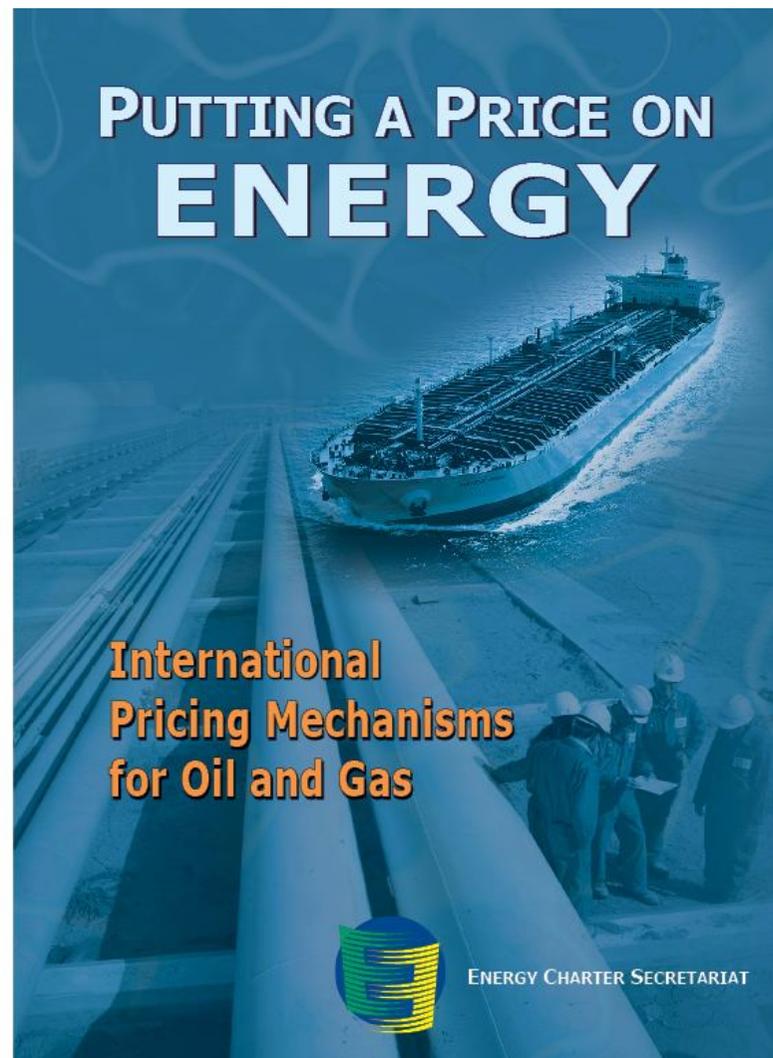
Back-up slides

Report on Tariffs by the Energy Charter



The Report can be downloaded free of charge at: www.encharter.org

Report on Pricing by the Energy Charter

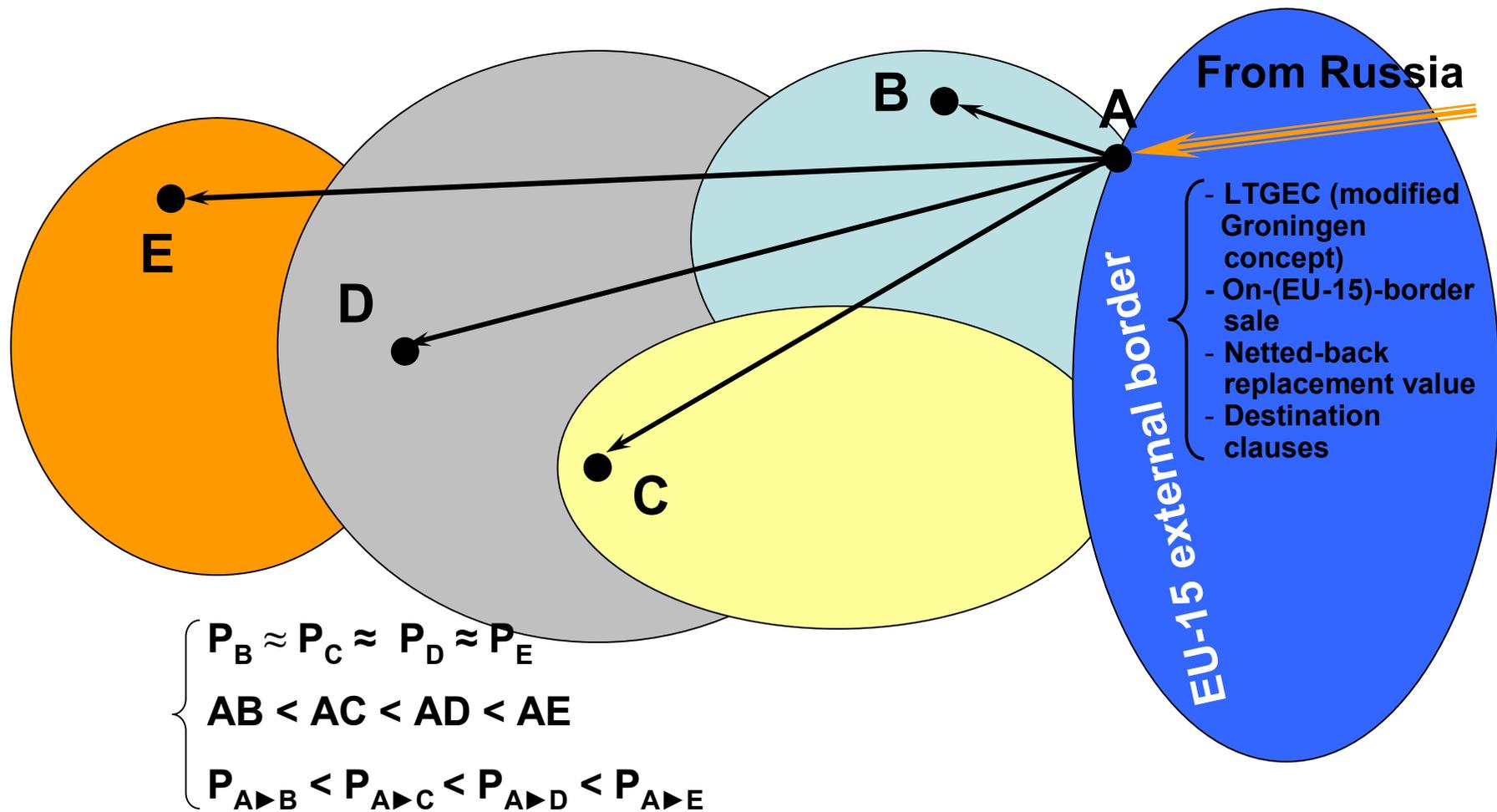


The Report can be downloaded free of charge at: www.encharter.org

Russian/Soviet & Groningen (Dutch) 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 + 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 |

Destination Clauses: Economically Motivated Integral Part of Soviet / Russian Export Schemes to Europe



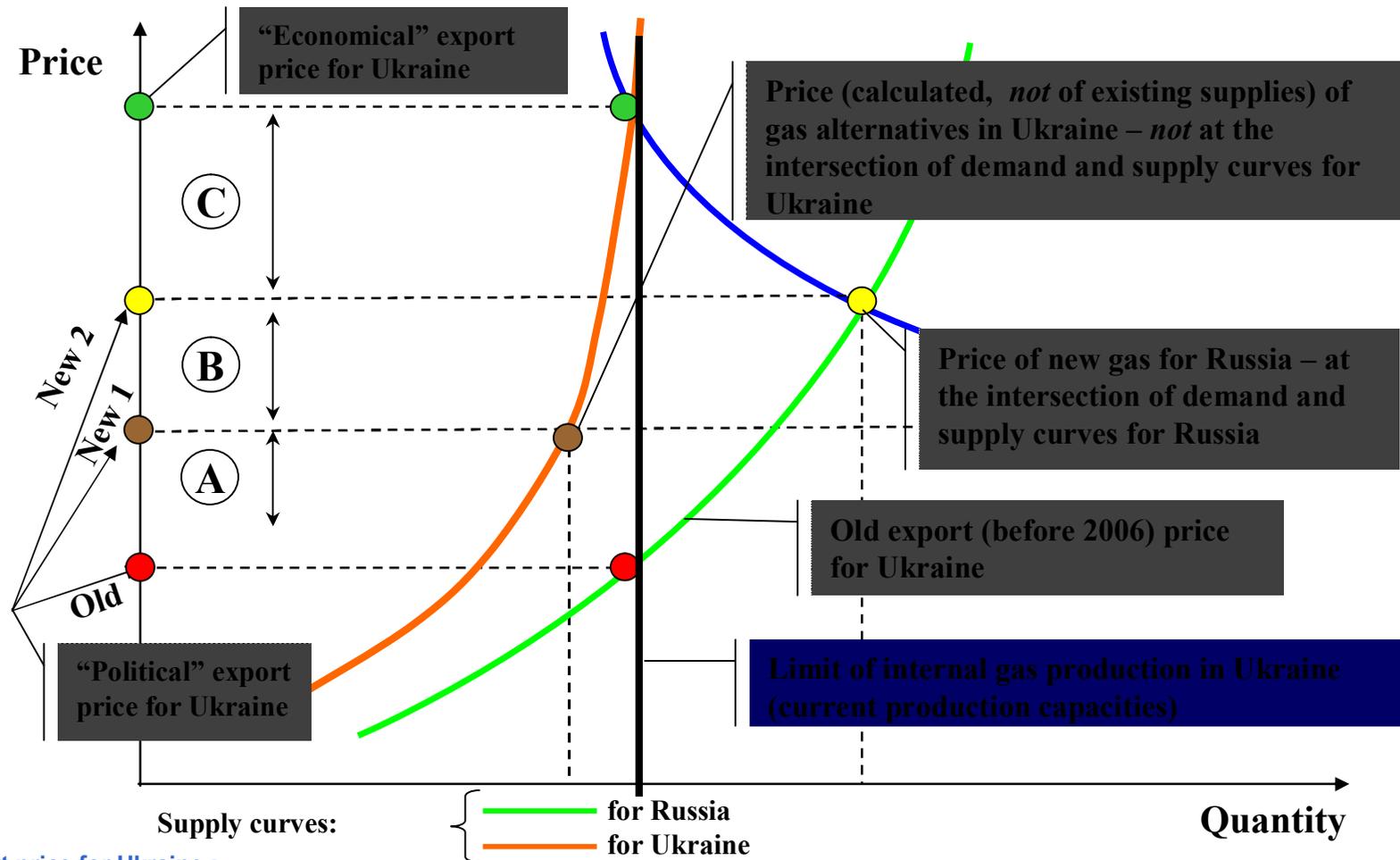
“Destination clauses” allowed gas supplier to sell gas to different buyers at different prices and other contractual terms at one and the same delivery point to protect its competitiveness at the end-use market (to prevent arbitrage by buyers)

Regional Specificity: Will Gas follow Oil to Become a Global Commodity?

| Will Gas Follow Oil to Become a (Global) Commodity? | | | | | | |
|---|---|---|--|--|---|--|
| North America and United Kingdom | | | | Continental Europe and Japan / Korea | | |
| ➤ development based on own resources, no initial dependence on imports | | | | ➤ high import dependence from the start | | |
| ➤ supply based on small to medium sized gas fields | | | | ➤ supply based on imports from giant / super giant fields | | |
| ➤ standardised rent taking development decision by private players | | | | ➤ rent maximisation of exporting countries development decision by exporting country | | |
| ➤ demand elasticity from gas to power generation | | | | ➤ limited demand elasticity | | |
| ➤ gas-gas competition but price path for gas still tracks oil prices | | | | ➤ oil prices as reference in price formula | | |
| | | | Linkages | | | |
| market restructuring as of 1980s | | | ⇒ model for reform | market restructuring as of late 1990s | | |
| North America | | UK | LNG trade | Continental EU | | Japan/Korea |
| Hubs created by industry, churn 100, many players, high LNG absorption potential. | ⇔ | NBP created by regulation, churn 15 to 10, many players, limited absorption of LNG. | no LNG Hub but LNG as price transmitter ⇔ | few industry hubs, churn <10, few strong players, dominance LTCs. | ⇔ | no hub so far, few strong players, dominance LTCs. |

Source: "Putting a Price on Energy: International Pricing Mechanisms for Oil & Gas", Energy Charter Secretariat, 2007

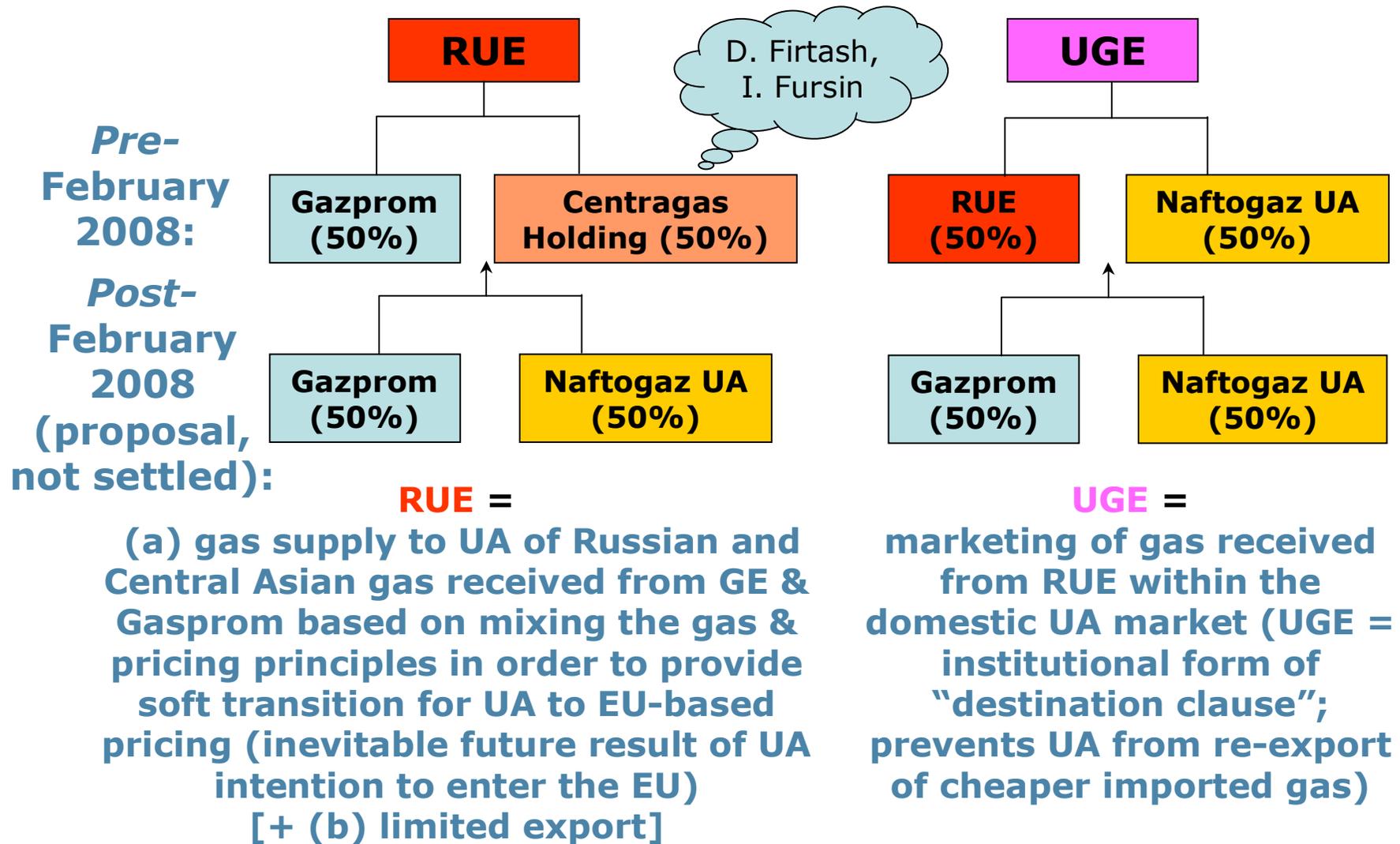
Pricing Options in Russia-Ukraine Gas Trade & Economic Theory



“Political” export price for Ukraine :

- **Old** = current internal Russian price plus cost of transportation to Russia-Ukraine border
(Russian export subsidy to Ukraine = $A+B+C$)
- **[New 1]** = if equated to production costs («cost-plus» in Ukraine) of replacing energies, based purely on the possibility of their production within the internal market of Ukraine (e.g. A.Illarionov)
(Russian export subsidy to Ukraine = $B+C$)
- **[New 2]** = if equated to internal Russian price (production costs/“cost-plus” in Russia) of new Russian gas
(Russian export subsidy to Ukraine = C)
- **“Economic” export price for Ukraine** = gas replacement value at the internal EU market (calculated on long-term contracts gas pricing formulas) netted-back to Russia-Ukraine border

February 2008: Debates on Intermediaries – personal aspects ?



Central Asian alternative (1)

- To sell its gas directly to Ukraine:
 - ▶ During 2005-2006 Russia-Ukraine gas dispute Ukraine was arguing for gas import price calculation on the basis of gas replacement value within Ukrainian domestic market, which is much lower than within EU market =>
 - ▶ If Ukraine to follow consistent policy regarding import gas pricing, it is to present the same pricing principles to Central Asian gas exporting states as well,
 - ▶ Export gas price at external border of Central Asian exporter, if calculated as net-back replacement value at the domestic Ukrainian market, will be relatively low

Central Asian alternative (2)

- To sell its gas to Ukraine via Russia:
 - Russia agreed to buy Central Asian gas at their external borders at the price calculated as net-back replacement value at the EU market =>
 - Export price at external border of Central Asian exporter would be relatively high – higher than according to Ukrainian scenario (previous slide)
+
 - Russia contracted (booked) all export volumes of Central Asian gas and took all costs and risks of its transportation to the end-use markets

Central Asian alternative (3)

- Central Asian gas exporting states are willing to receive maximum Hotelling rent & to minimize export costs & risks =>
- It is profitable for them to sell their gas to Russia at their external borders at the price, linked to gas replacement value at the EU market (maximization of Hotelling rent), with further Westward transportation of their gas by Gasprom (exclusion of risks & costs of transit)

Responds by Ukraine

- Compensatory increase of transit tariffs? NO, since it is NOT a market-based and NOT an economically proved, but just a politically motivated respond:
 - Development of export gas prices (if based on replacement values and/or on exchange quotations) and of transit tariffs is NOT correlated (after contractual separation of gas supply and transit),
 - Export prices within LTGEC = replacement values; gas-to-gas competition (exchange quotations) will rather long not become (if will become at all) a dominant pricing mechanism within gas market(s) of Continental Europe,
 - Transit tariffs = “cost-based” (cost-plus) (draft Energy Charter Protocol on Transit, mutually agreed Art.10.3) => fair & competent accounting of investment & operational costs & reasonable rate of return (9.32 USD/mcm/100km = “triple-count” of investment costs?)
- Increase of energy efficiency within all segments of energy value chain & within all sectors of Ukrainian energy economy => YES !!!