A new model for the European gas market: questions to be further discussed (integration, collaboration, spot market vs LTC, oil-indexation, TOP, gas pricing & a more open gas market, etc.)

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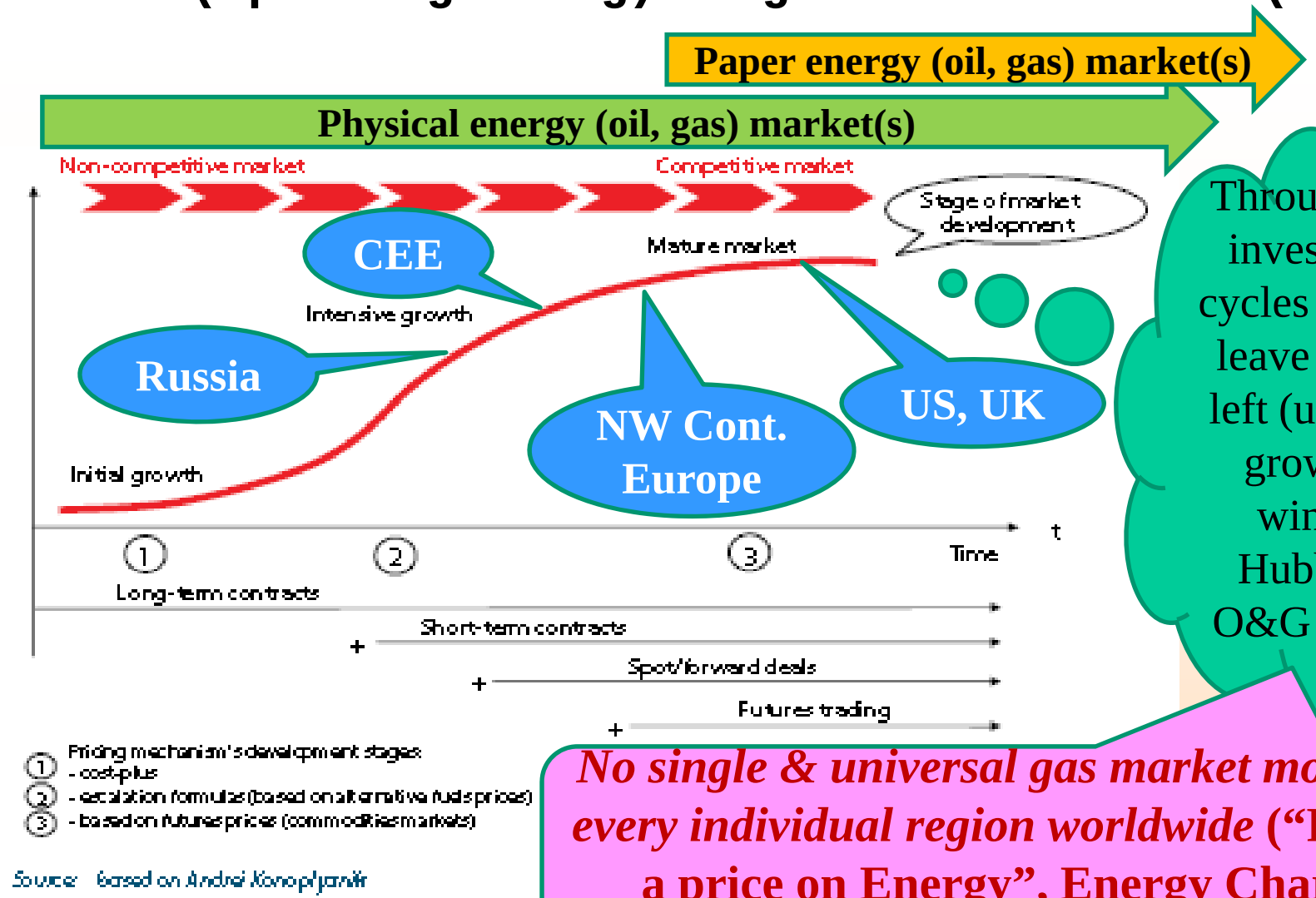
- **A small piece of theory on evolution of energy markets, contractual structures & pricing mechanisms**
- To the debate on EU gas market structure under 3rd Energy Package
- To the debate on EU gas pricing scenarios

Evolution of oil & gas markets: correlation of development stages, contractual structures, pricing mechanisms on the left (upward-growing) wing of Hubbet's curve (1)



Through two investment cycles we will leave within left (upward-growing) wing of Hubbert's O&G curves

***No single & universal gas market model for every individual region worldwide* ("Putting a price on Energy", Energy Charter Secretariat, Brussels, 2007)**

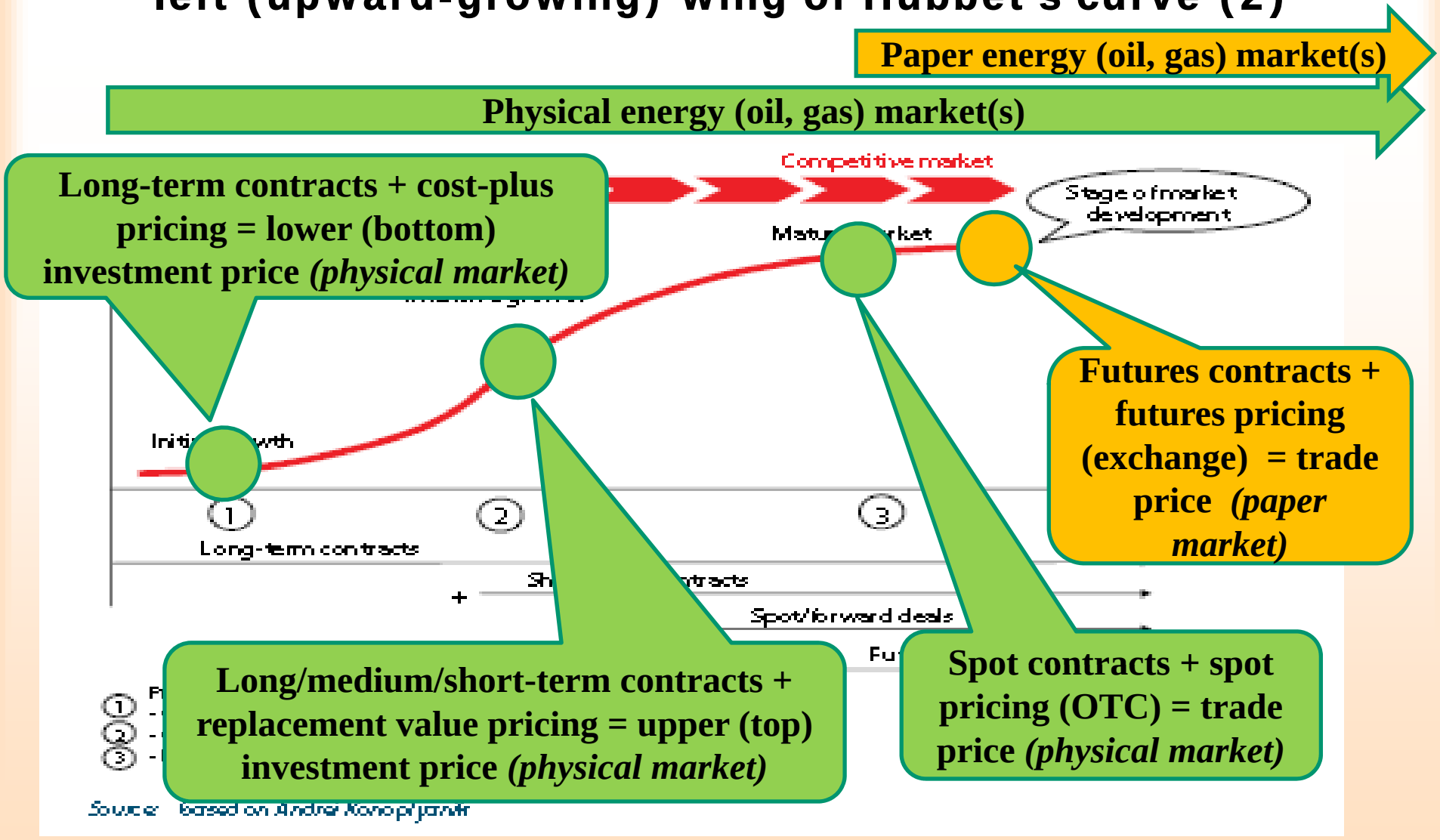
Three major pricing mechanisms in international energy

- **Cost-plus (net-forward):** price linked to cost of energy production & delivery/transportation (incl. ROR) to the consumer/delivery point => utilized at non-competitive markets of physical energy => low benchmark price level acceptable for producer => **lower investment price**
- **(Net-back) replacement value:** price linked (with discount) to price of competing energies at the end-user => utilized at competitive markets of physical energy => upper benchmark price level acceptable for consumer => **upper investment price** *('Note de Pous'/Groningen LTGEC model, 1962 + Res.1803 UNGA, 1962 + Art.18 ECT, 1994-1998)*
- **Spot/exchange:** equilibrium supply/demand price at competitive markets of physical (spot/forward) and/or paper (financial derivatives linked to futures contracts) energy acceptable for trader/speculator => **trade price**

Market stages, pricing mechanisms & contractual structures: coexistence not substitution (increasing multiplicity of choices for market participants)

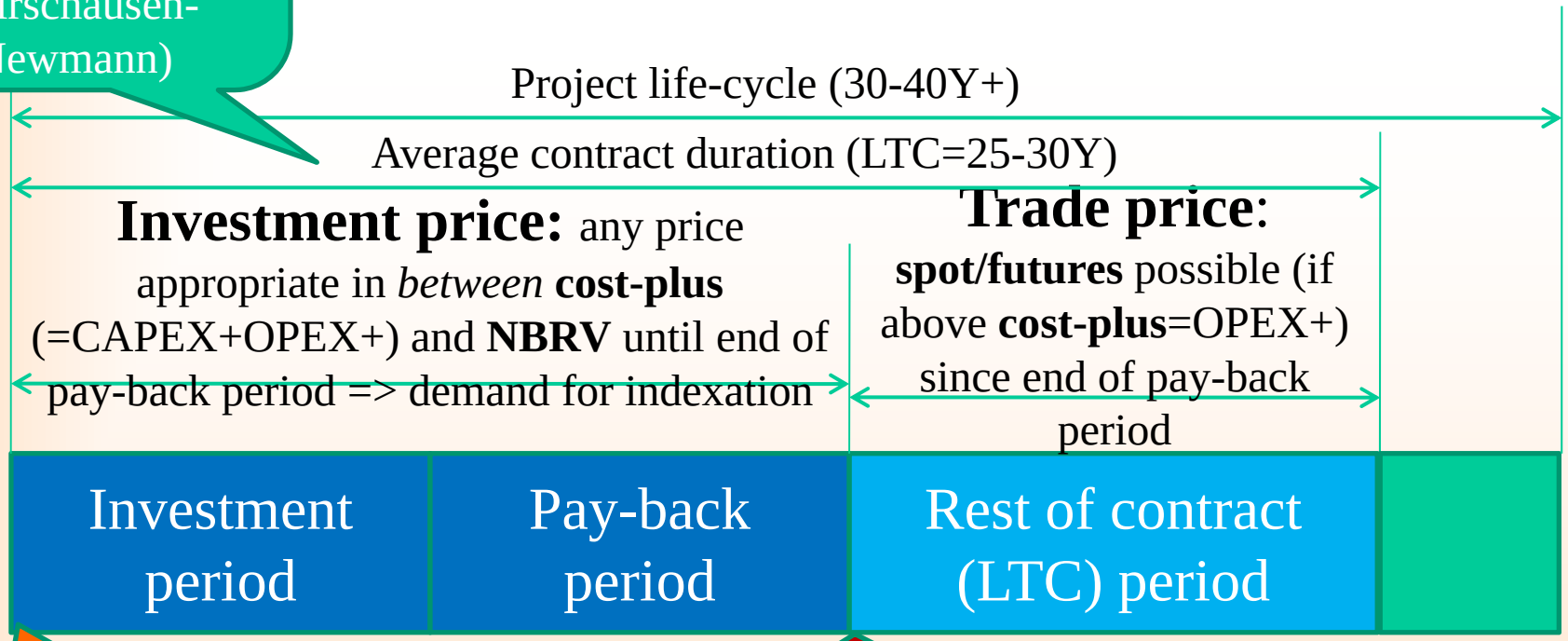
Energy markets development stage	Physical energy markets	Paper energy markets
Initial growth => *non*-competitive market of physical energy, *no* paper energy market *possible*	Cost-plus (LTC)	-
Intensive growth => competitive market of physical energy, *no* paper energy market *available*	+ Net-back replacement value (LTC)	-
Mature market => competitive markets of *both* physical & paper energy	+ Spot (OTC)	+ Futures-options (exchange & OTC)

Evolution of oil & gas markets: correlation of development stages, contractual structures, pricing mechanisms on the left (upward-growing) wing of Hubbet's curve (2)



Economic preconditions for different pricing mechanisms at different stages of investment project life-cycle

EU import LTC signed (pipeline + LNG): 1980 (30Y) => 2004 (15Y), (Hirschausen-Newmann)



Energy resource enters the market; upfront CAPEX & OPEX assessment incl. risks for acceptable ROR; higher price needed

Energy resource is already at the market; CAPEX recouped; technological possibilities to switch between competing energies in end-use; OPEX determines benchmark price level; lower price needed to stay with acceptable ROR

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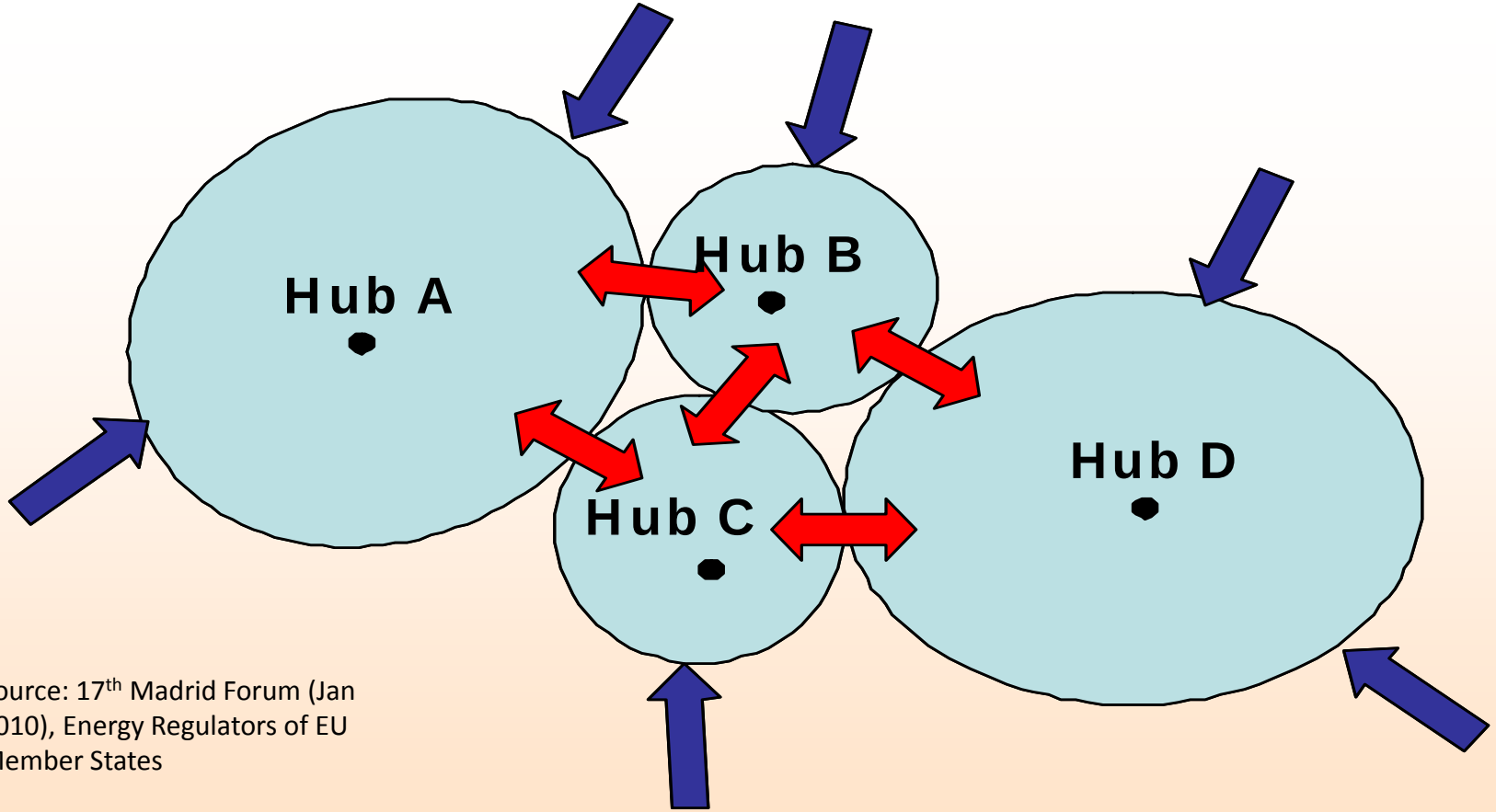
EU internal gas market architecture according to Third EU Energy Package (entry-exit zones with virtual trading points / hubs)

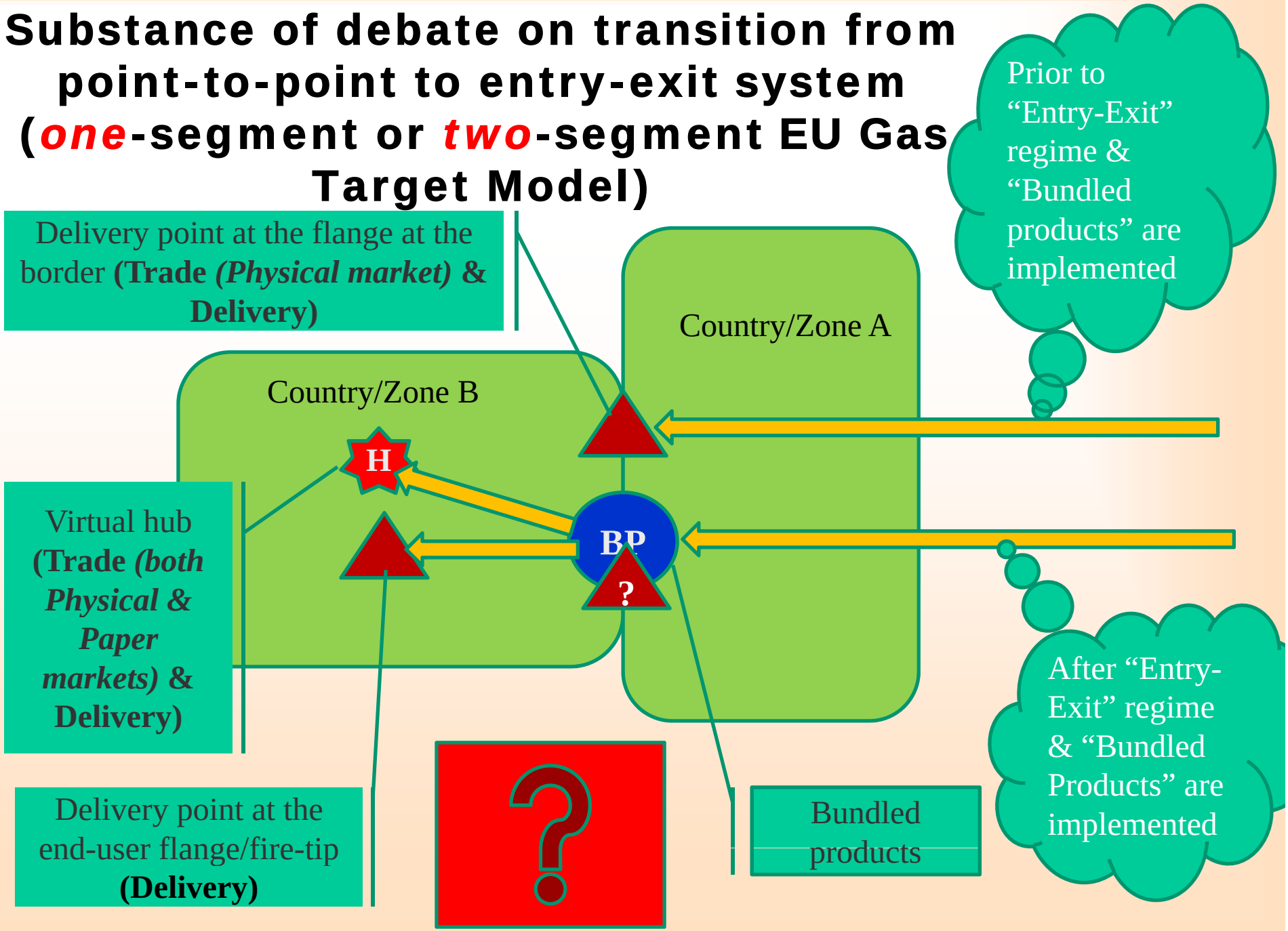


Source: 17th Madrid Forum (Jan 2010), Energy Regulators of EU Member States

Pipelines-interconnectors between EU zones

Supplies to the EU from non-EU

Substance of debate on transition from point-to-point to entry-exit system (*one*-segment or *two*-segment EU Gas Target Model)



Vision of possible "two-segment" EU gas market model under GTM (for discussion & consideration within RF-EU Consultations / WS-2 GAC)

- **Long-term supplies (firm contracts, main / basic demand load):**
  - More flexible LTGEC (re off-taking of contractual volumes (TOP), pricing formulas & price review rules)
  - + long-term access to transportation capacity for full duration & volume of LTGEC (open seasons)
  - + modified pricing formulas linking gas to its replacement fuels (indexation not only to petroleum products => coal, RES, spot, etc.)
- **Short-term supplies (interruptible contracts, additional / semi-peak & peak demand load):**
  - Spot contracts & prices (delivery & trading) =>(physical market)
  - + exchange pricing (futures..., gas indexes, forward curves) => (paper market)

US & UK gas market models are <u>not</u> appropriate in Continental Europe/Eurasia **("Putting a price on Energy", Energy Charter Secretariat, Brussels, 2007)**

Initially GTM did not consider risks & uncertainties for this market segment => these questions have been added on a step-by-step basis in result of RF-EU informal expert Consultations

Initial drafts of GTM covered only this segment of gas market, long-term long-distant supplies and related risks & uncertainties stayed beyond consideration of justified concerns of market participants

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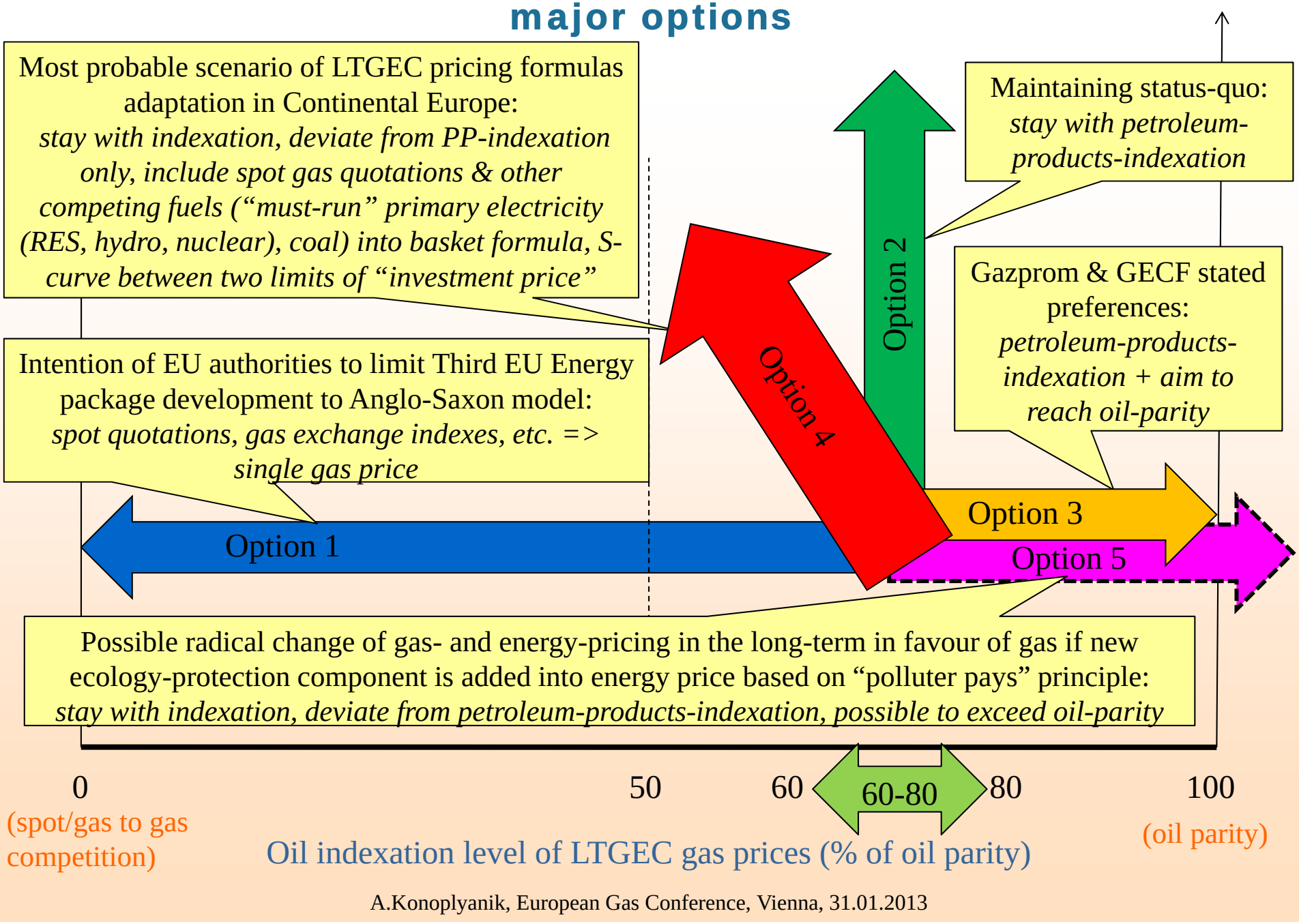
Gas pricing prospects in Europe: "between Komlev & Stern"?(*)

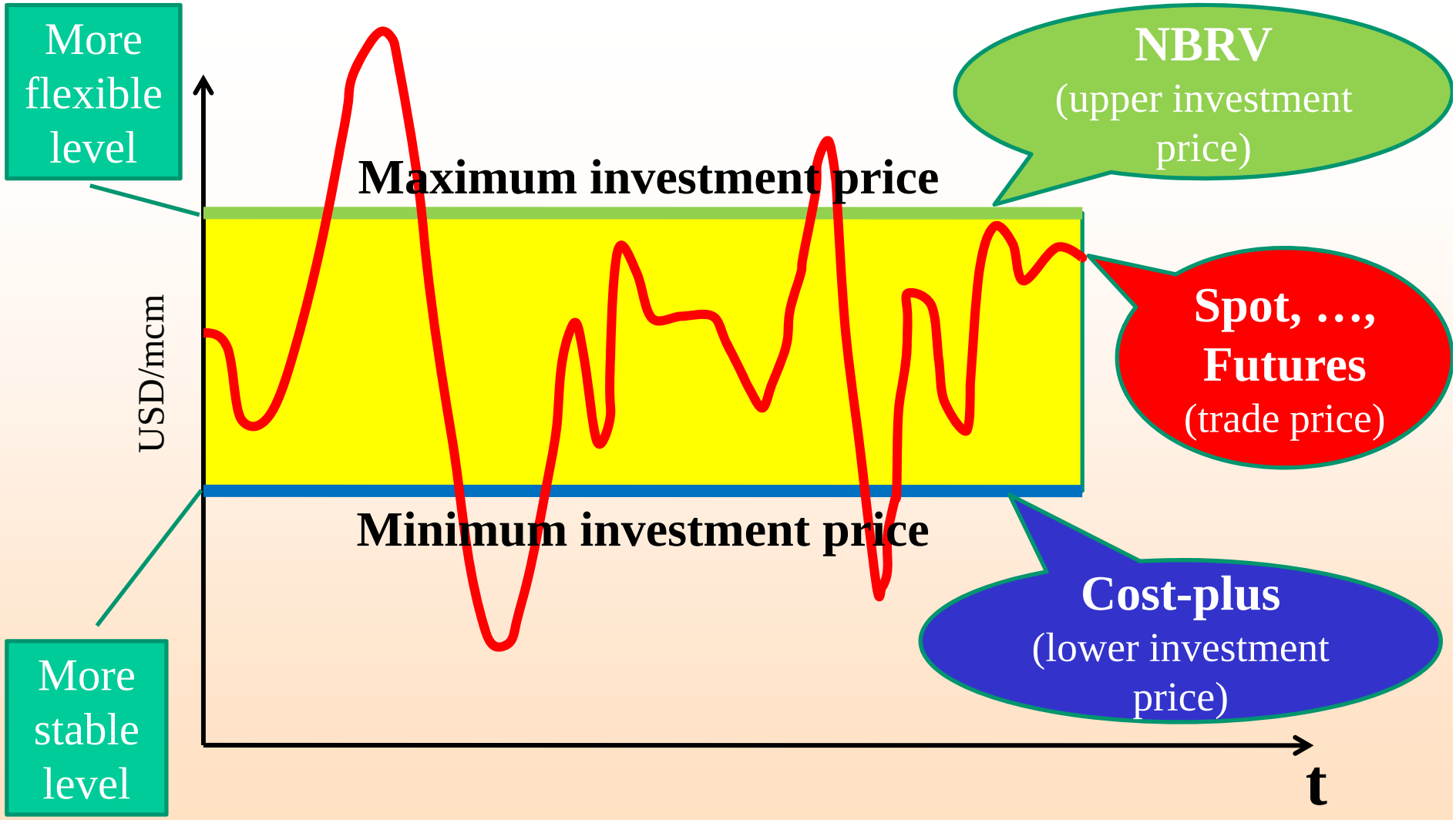
- **S.Komlev/Gazprom/GECF:** LTGEC to continue dominate + stay with PP-indexation (+ aim oil parity)
- **J.Stern/3rd EU Energy Package (first draft GTM)/EU energy regulators:** market share for LTGEC to stay, but (soft – J.Stern) switch from PP-indexation to spot/futures quotations as LTGEC pricing mechanism (f.i., in 5 years – J.Stern /similar to "RF-Belarus 2007 model") => ***BUT***: 3rd package does NOT prescribe any specific pricing model NOR only single one pricing model (like spot / futures / hubs / etc.) => "market" does not mean "single price" market
- **Any alternative/compromise options?** (if aim is to support long-term gas market share of Russian gas at EU market)

(*) acc. to Jan Klepac, Executive Director of Slovak Gas & Oil Association, Sept'2012

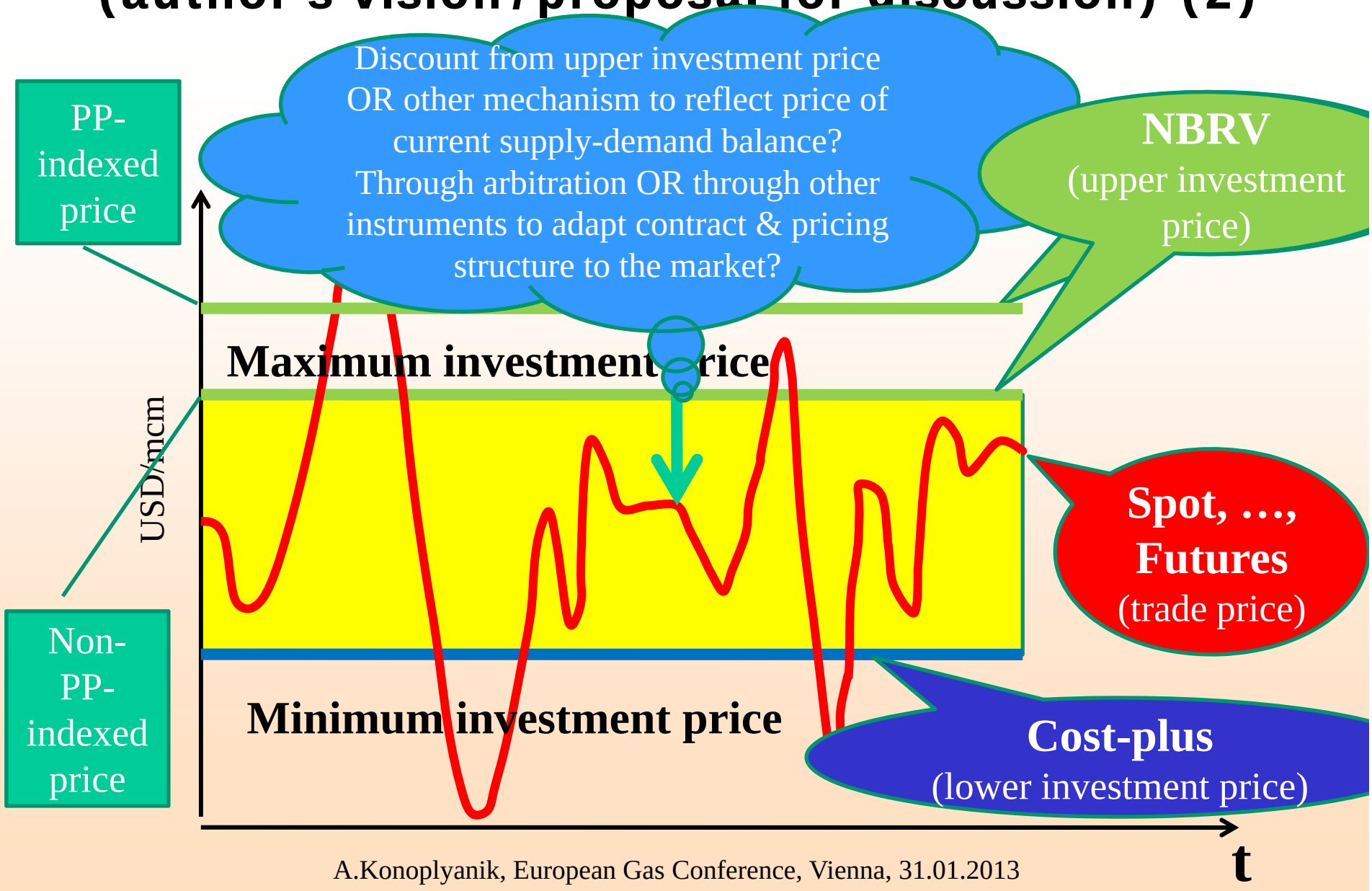
Evolution / adaptation of gas pricing mechanisms in Europe: major options



S-curve approach for indexation in Continental Europe within contractual pricing (author's vision / proposal for discussion) (1)



S-curve approach for indexation in Continental Europe within contractual pricing (author's vision / proposal for discussion) (2)



Thank you for your attention!

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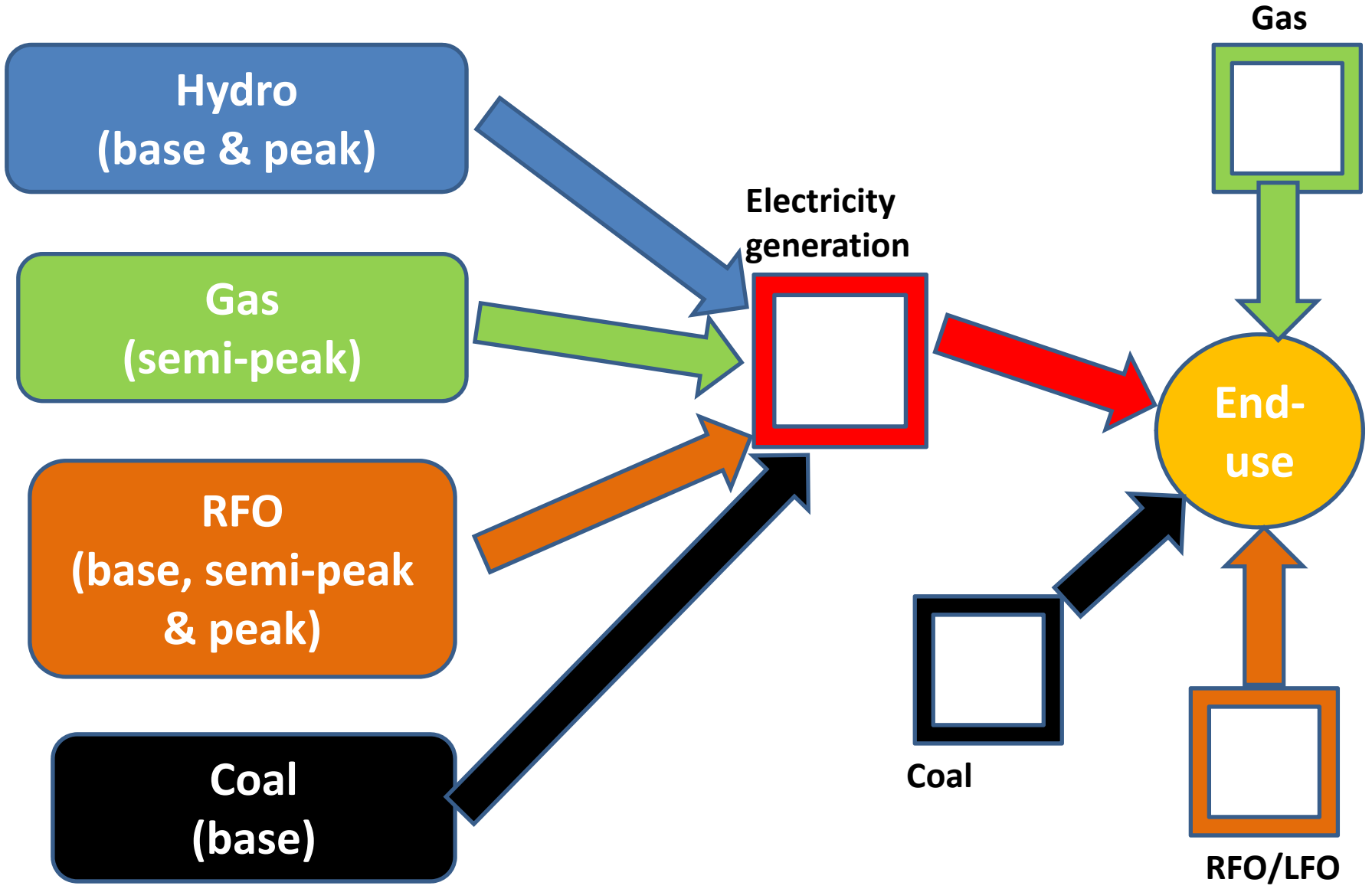
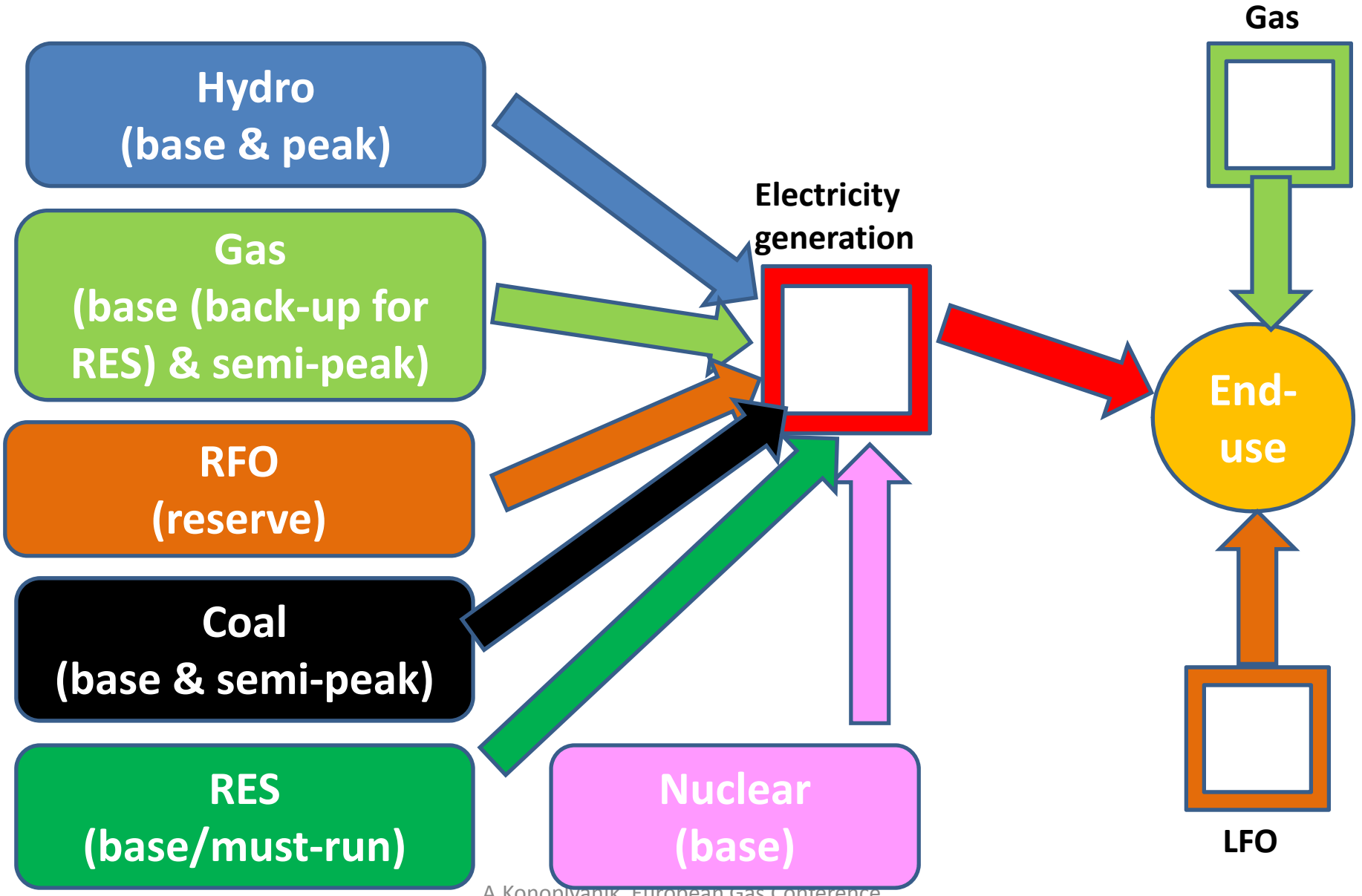
Reserve slides

Replacement value for gas: then & now => 1960-ies



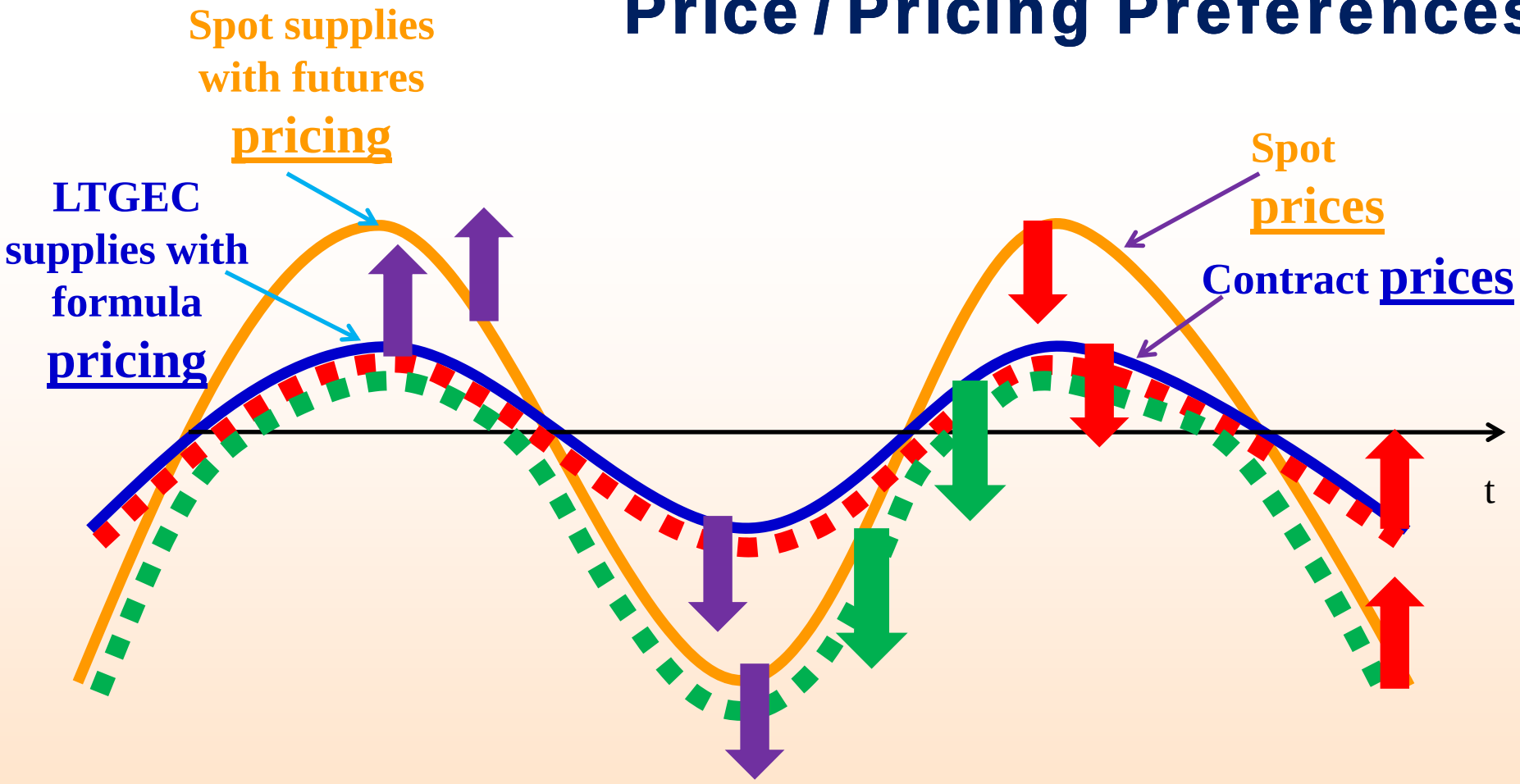
Replacement value for gas: then & now => 2010-ies



Gas in EU inter-fuel competition & pricing

- Then (1960-ies): inter-fuel competition for gas mostly in end-use (gas vs. RFO/LFO)
- Now (2010-ies): inter-fuel competition for gas mostly in electricity generation:
  - "clean" gas vs cheap "dirty" coal: but what about decarbonization/climate change policies,
  - "clean" non-subsidicized gas vs "clean" subsidicized RES: but what about (i) state subsidies =>correlation w WTO rules, (ii) market distortions => unfair (?) competition
- Competition moves from energy end-use in gas to electricity generation => centre of pricing moves there as well?
- If so, what influence it will have on gas pricing?

Producers, Consumers & Speculators Price / Pricing Preferences



Preferences of the producers / exporters / hedgers

Preferences of the importers / consumers

Preferences of the speculators