# Energy markets in transition: towards unipolar oil world within double-segment global oil market?

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**Presentation at the Autumn School "CHANGING POLICIES AND CULTURES IN EUROPE AND RUSSIA: ENVIRONMENT, RESOURCES, ENERGY" jointly conducted by University of Tartu, Euro College; Freie Universität Berlin, Institute for East European Studies; University of Helsinki, Aleksanteri Institute;**
**September 18 – September 24, 2013, Tartu, Estonia**

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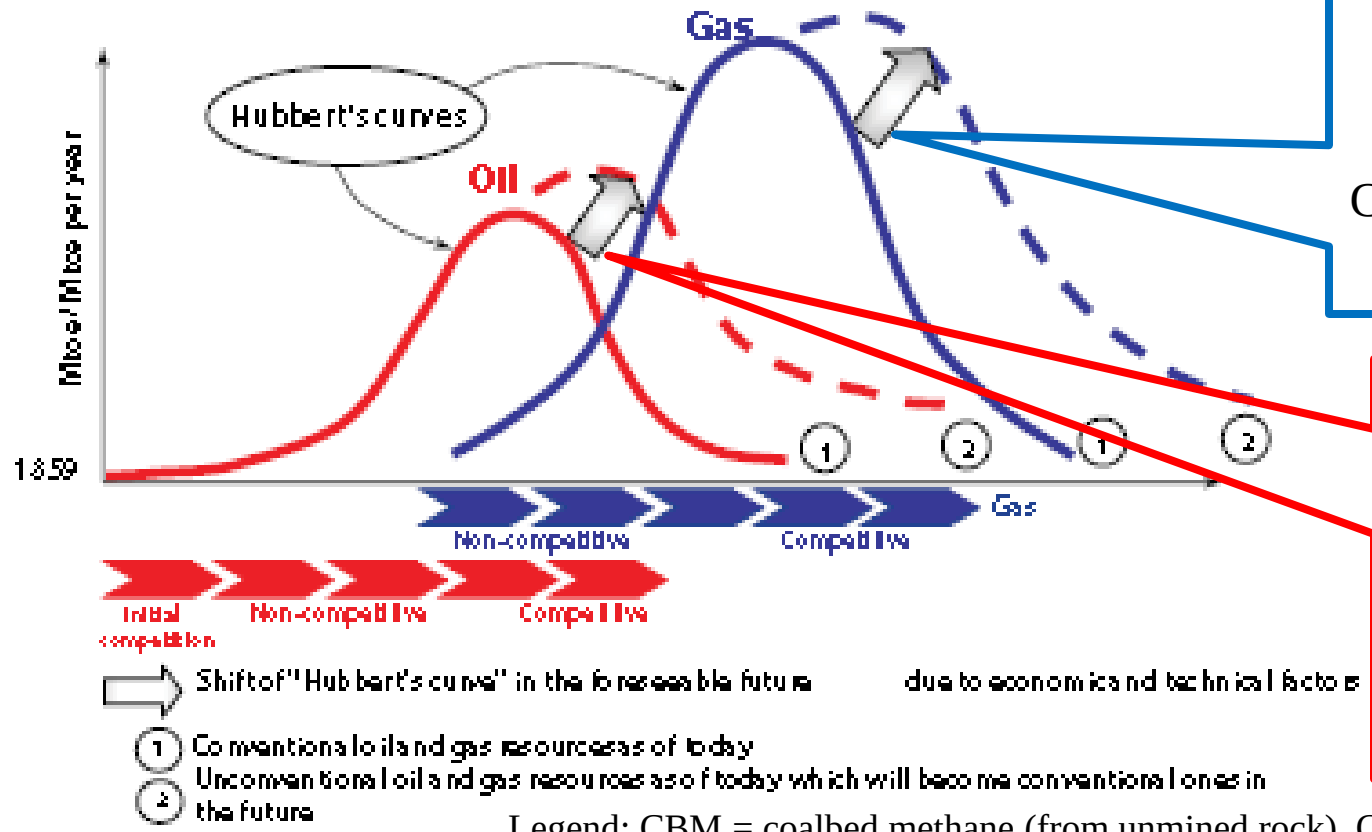
# Oil & Gas Hubbert's curves: upward-right supply peaks steady movements



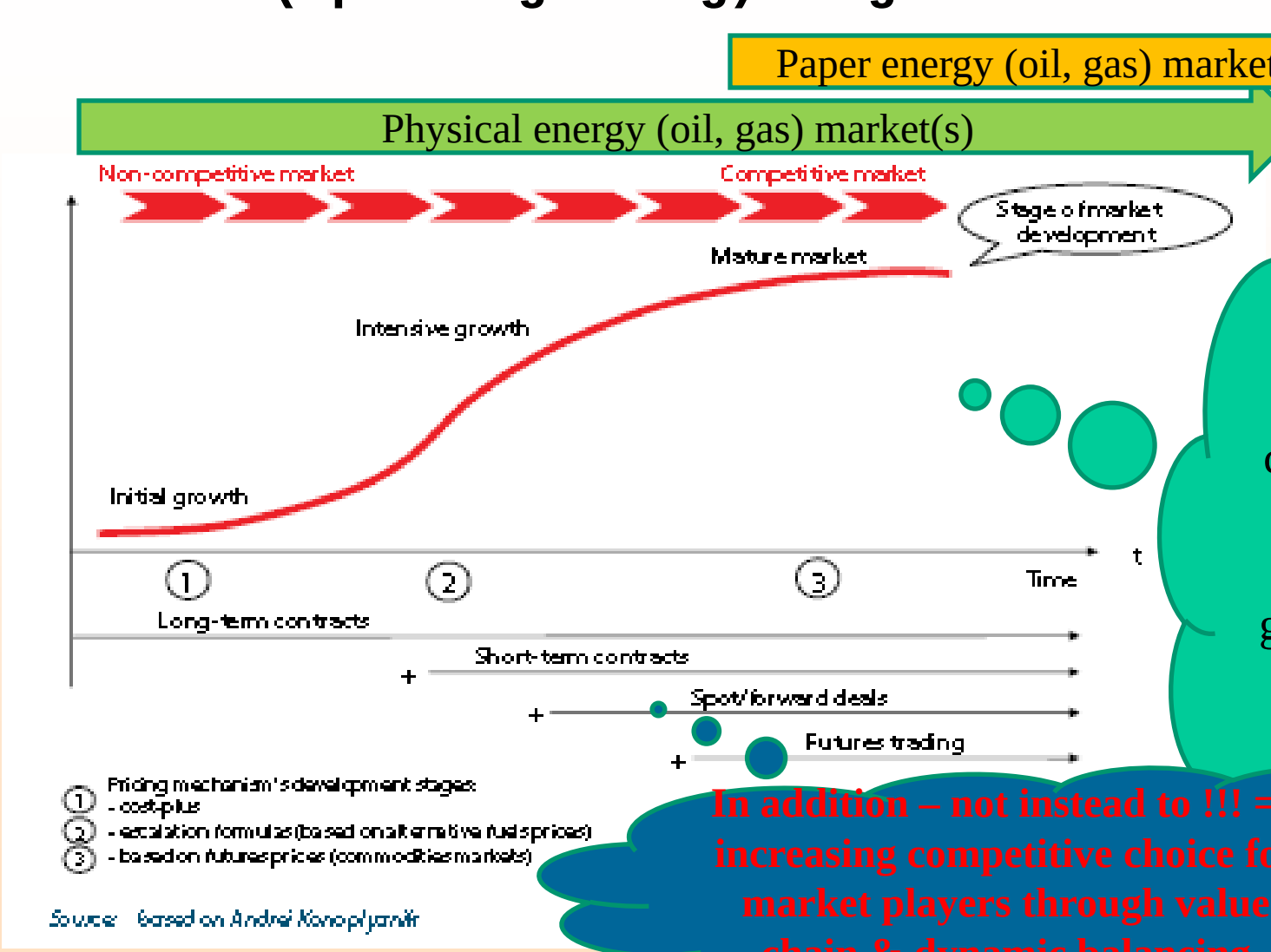

Deep horizons, deep offshore, Arctic, shale gas, CBM, CSM, CMM, tight gas, gas hydrates, etc…

Deep horizons, deep offshore, Arctic, heavy oil, shale oil, tar sands, GTL, CTL, XTL, etc…

Legend: CBM = coalbed methane (from unmined rock), CSM = coalseam methane (from active coal mines), CMM = coalmine methane (from abandoned coal mines), GTL = gas-to-liquids, CTL = coal-to-liquids, XTL = biomass to liquids

**We will not reach Hubbert's peaks in O&G at least within TWO INVESTMENT CYCLES (first - based on currently commercialized technologies, second – based on those yet not commercialized technologies that are currently at R&D stage)**

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



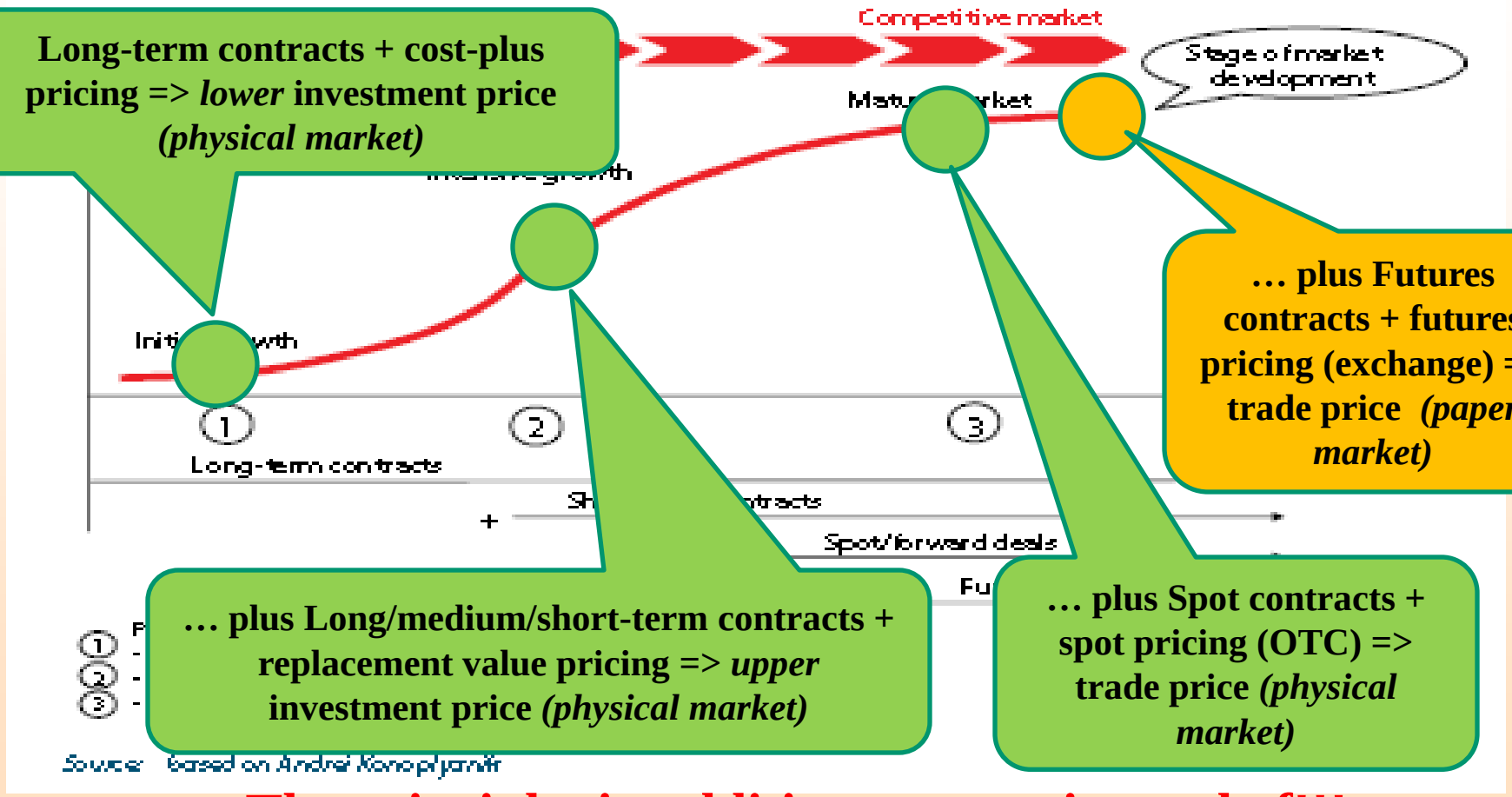

Through two investment cycles we will leave within left (upward-growing) wing of Hubbert's O&G curves

**In addition – not instead to !!! => increasing competitive choice for market players through value chain & dynamic balancing**

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

**Paper energy (oil, gas) market(s)**

**Physical energy (oil, gas) market(s)**




**Long-term contracts + cost-plus pricing => *lower* investment price *(physical market)***

**… plus Long/medium/short-term contracts + replacement value pricing => *upper* investment price *(physical market)***

**… plus Spot contracts + spot pricing (OTC) => trade price *(physical market)***

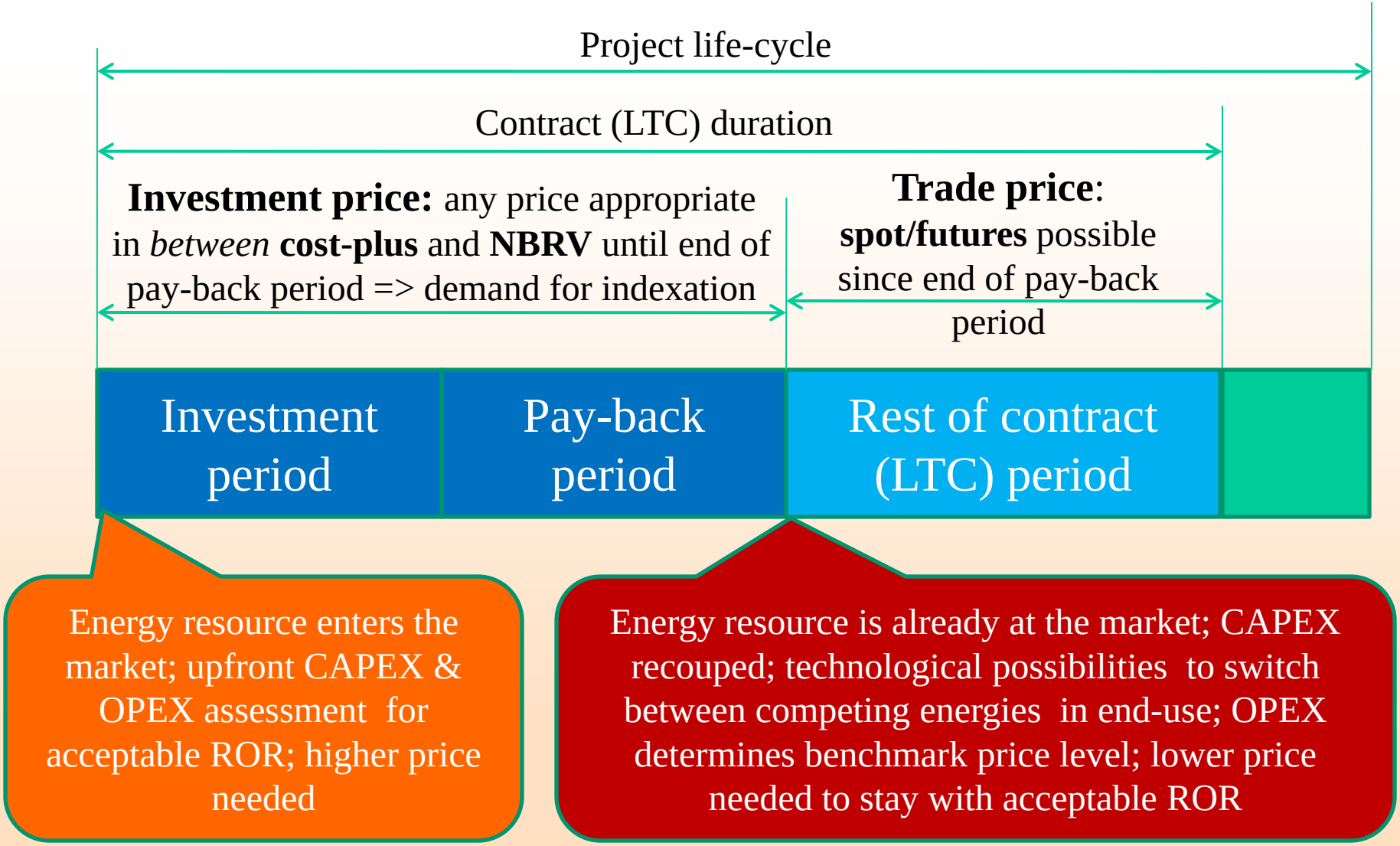
**… plus Futures contracts + futures pricing (exchange) => trade price *(paper market)***

**The principle: in addition to – not instead of!!!**

# 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 (producer's "fair price") => 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 (lowest among available options) & marketable for producer (consumer 's "fair price") => upper investment price
- **Spot/exchange:** equilibrium supply/demand price at competitive markets of physical (spot/forward) and/or paper (financial derivatives linked to futures contracts) energy => trade price => trader's/speculator's "fair price"

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



# Historical evolution of contractual structure of global oil market & its correlation with key organizational forms of market space

Transfer deals *(dominated prior to 1970-ies)*

+ **“Physical energy” markets => real deliveries of energy products (non-liquid energy markets):**

+ Long-term contracts *(since 1970-ies)*

+ Short-term contracts *(since 1970-ies)*

+ Spot deals *(since 1980-ies)*

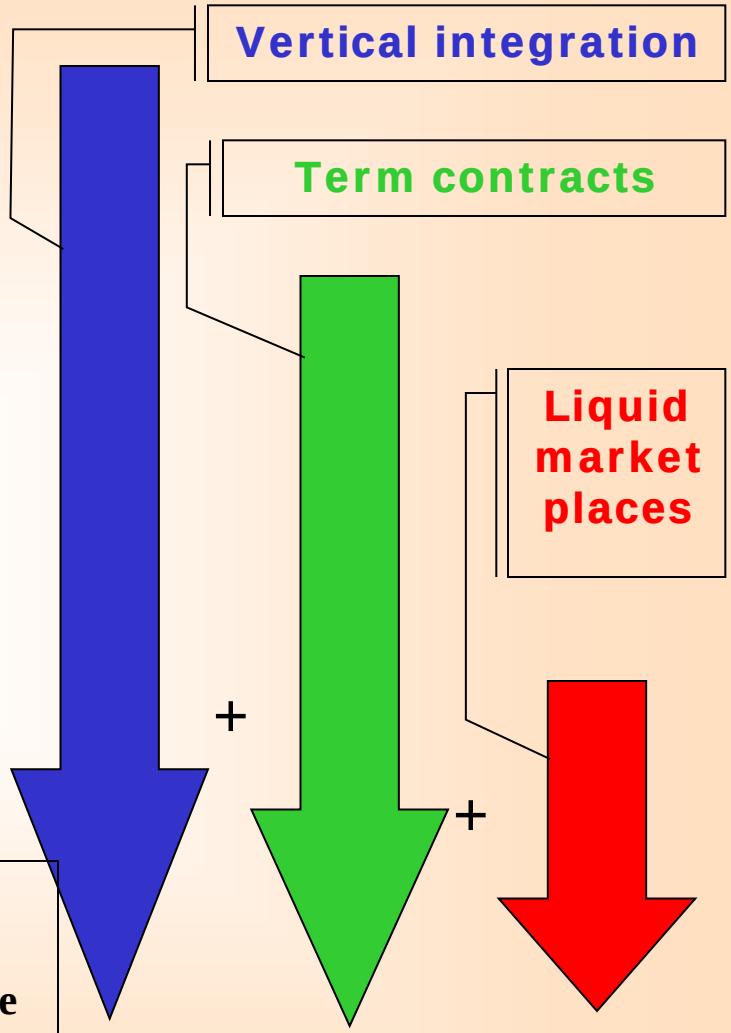
+ Forward deals-1 (with delayed deliveries of physical energy) *(since 1980-ies)*

+ **“Paper energy” markets => energy-based financial instruments & derivatives (liquid energy markets):**

+ Forward deals-2 (without deliveries of physical energy) *(since 1980-ies)*

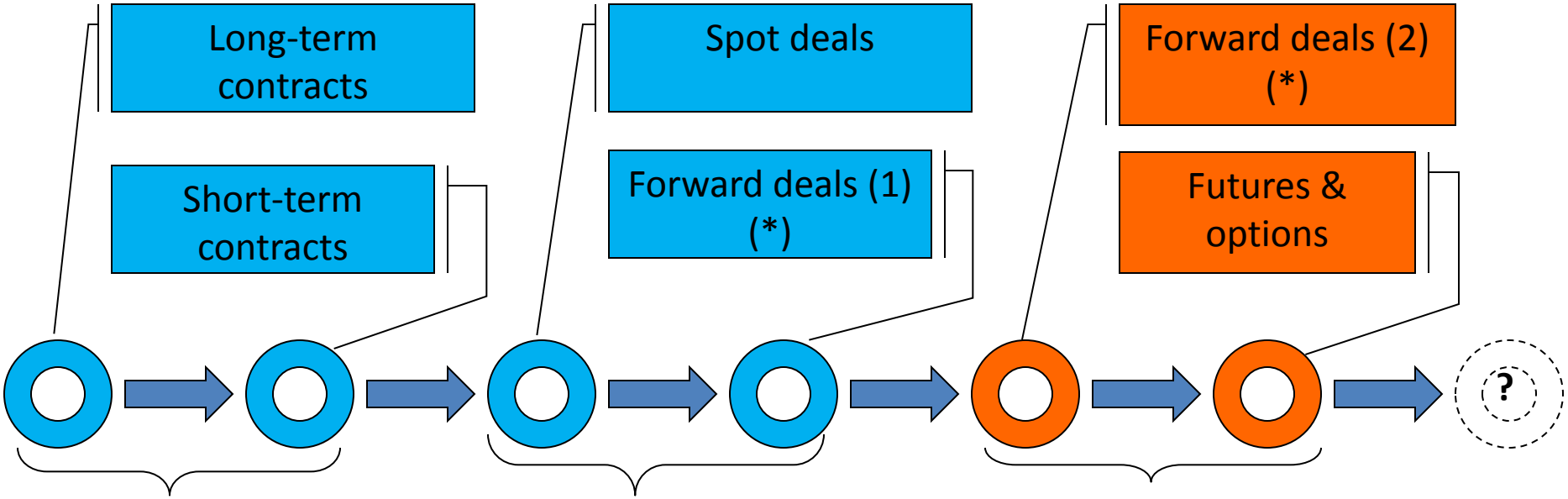
+ Futures, options, swaps *(since 1990-ies)*

+ … ? (since … ?)




**General rule:** new types of contractual relations do not cancel the preceding ones which dominated at the previous stages of energy markets development, but begin to compete with them and fight for their own competitive niches => NOT the principle “new ones instead of old ones” BUT “the new ones in addition to old ones” => strengthening of multi-facet competition at the energy markets

# Evolution of oil market: volumes of trade vs. volumes of physical supplies




Volume of trade corresponds to volume of supplies

Volume of trade exceeds volume of supplies => OTC market (subsequent re-sales of non-unified commercial batches – "daisy chains")

Volume of trade multiply exceeds volume of supplies => liquid marketplaces/exchanges (multidirectional re-sales of unified supply liabilities)

Increasing liquidity, ***but also*** growing market instability =>
good for traders/speculators, but is short-term & deprives project financing

Markets of physical goods (of "physical" oil)

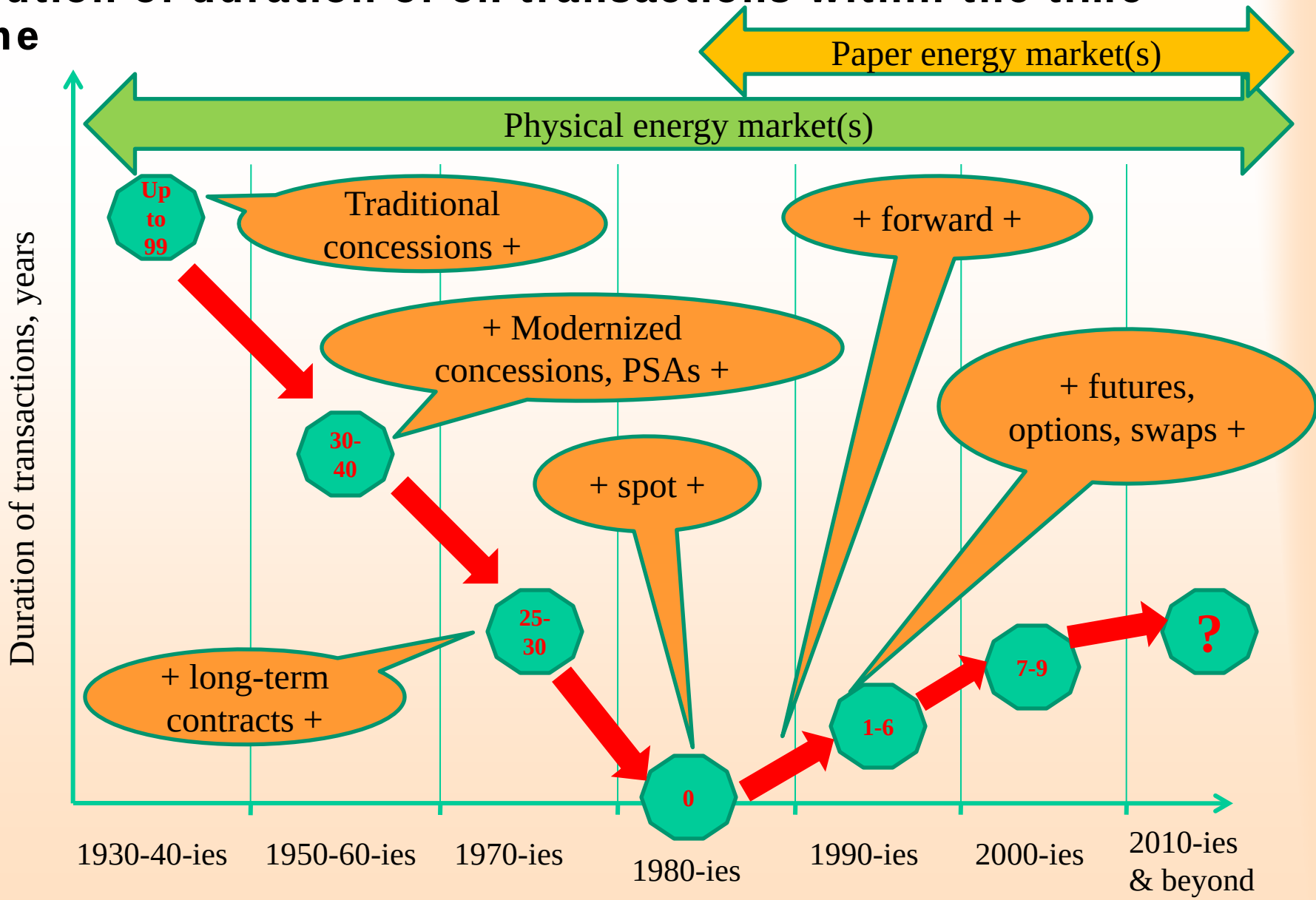
Financial markets (of "paper" oil)

(*) (1) within the limits of coverage by accumulated volumes of stocks, (2) beyond such limits



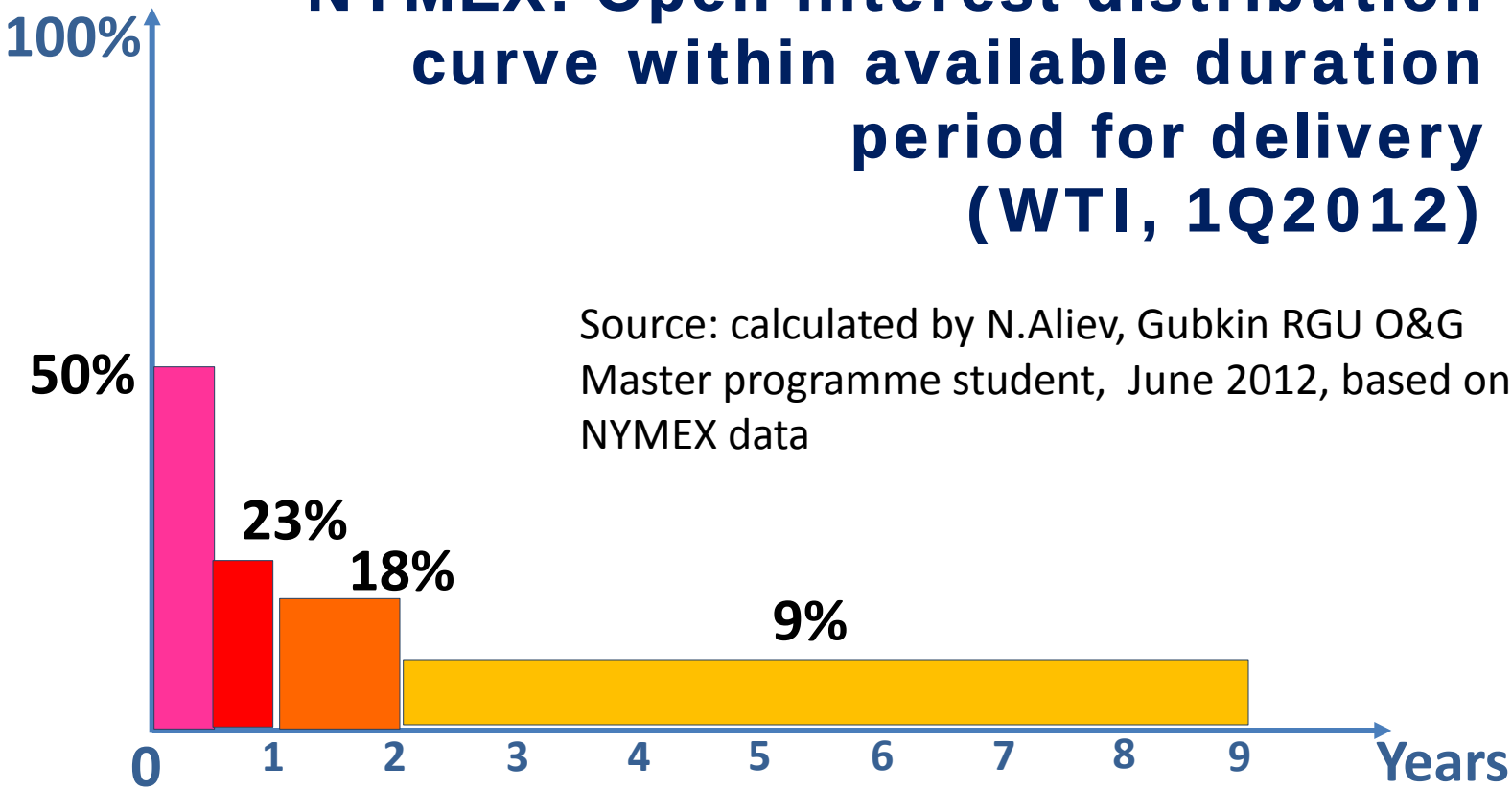
A.Konoplyanik, Tartu, 18.09.2013

# Evolution of duration of oil transactions within the time-frame




**Duration of paper oil market transactions seems to increase, but … (see next slide)**

# NYMEX: Open interest distribution curve within available duration period for delivery (WTI, 1Q2012)




Source: calculated by N.Aliev, Gubkin RGU O&G Master programme student, June 2012, based on NYMEX data

**… but most of trade is concentrated within the nearest months => increasing short-termism detrimental for long-term capital-intensive investments, while hedging just postponing investment risks, not fully mitigating them**

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# Five periods of global oil market development and their major characteristics – periods 1 & 2

| Periods | Characteristics of the period |
|---|---|
| 1928-1947<br>**(first period)** | - non-competitive physical oil market,<br>- dominance of International Oil Cartel (7 companies),<br>- “one-base pricing” (cost-plus),<br>- transfer pricing/prices within vertical integration and long-term traditional concessions, |
| 1947-1969/1973<br>**(second period)** | - non-competitive physical oil market,<br>- dominance of International Oil Cartel (7 companies),<br>- ” two-base pricing” (cost-plus in crude, net-back replacement value in petroleum products),<br>- transfer pricing/prices within vertical integration and long-term traditional & modernized concessions & PSAs,<br>- 1969-1973 – transition period from monopoly of 7 companies to monopoly of 13 states; |

# Five periods of global oil market development and their major characteristics – period 3

| Period | Characteristics of the period |
|---|---|
| 1973-1985/1986<br>**(third period)** | - non-competitive physical oil market,<br>- dominance of OPEC (cartel of 13 states),<br>- contractual and spot pricing/prices,<br>- official selling prices (cost-plus/net-forward) within long/medium/short-term contractual structures mostly linked to spot quotations,<br>- fundamentals as key pricing factors (supply-demand balance on physical oil),<br>- key players – participants of physical oil market,<br>- 1985-1986 – transition period from net-forward to net-back crude pricing based first on net-back from petroleum products basket price at the importer's market, afterwards – to oil price futures quotations on key petroleum exchanges/marketplaces; |

# Five periods of global oil market development and their major characteristics – period 4

| Period | Characteristics of the period |
|---|---|
| 1986-mid.2000-ies (approx. post-2004) **(fourth period)** | - competitive combination of mature physical plus growing paper oil markets,<br>- commoditization of the oil market,<br>- pricing established at oil marketplaces mostly driven by oil hedgers,<br>- net-back from futures oil quotations,<br>- formation of the global paper oil market and its institutes based on the institutes of financial markets (instruments and institutions imported to paper oil market by financial managers from financial markets),<br>- transition from physical to paper market predetermined unstable, relatively low and volatile prices which has led to underinvestment of global oil industry which created material preconditions for later growth of costs and prices,<br>- hedgers as key players (participants at both physical and paper oil market),<br>- fundamentals still as key pricing factors; |

# Five periods of global oil market development and their major characteristics – period 5

| Period | Characteristics of the period |
|---|---|
| Since mid-2000-ies (approx. post-2004) **(fifth period)** | - competitive combination of both physical and paper mature oil markets,<br>- further movement from commoditization to financialization of oil market<br>- paper market dominates in volumes of trade,<br>- global institutes of paper oil market are formed which enable paper oil market to work in 7X24 regime,<br>- globalization, IT-technologies, broad spectrum of financial products converted crude oil into global financial asset available (accessible) to every category of professional and non-professional investors (effect of financial “vacuum sweeper”),<br>- paper oil market is an insignificant segment of global financial market,<br>- key players are non-oil speculators which have been bulling the market and have manipulated it (investment banks and their affiliated oil traders),<br>- pricing established outside of oil marketplaces (at non-oil financial markets) mostly by non-oil speculators,<br>- net-back from futures oil quotations & oil financial derivatives,<br>- key pricing factors are mostly financial: supply-demand balance for oil-related financial derivatives within short time-horizon. |

# Evolution of pricing mechanisms at international oil market

| Periods, who establish the price | Pricing formula for physical supplies |
|---|---|
| (1) **1928-1947**: International Oil Cartel (one-base pricing) | Net forward: $P_{CIF}$ = = $P_{FOB}$ (Mex.Gulf) + Freight fict. (Mex.Gulf) |
| (2) **1947-1969/73:** International Oil Cartel (two-base pricing) | *To the West of neutral point:* Net forward: $P_{CIF}$ = = $P_{FOB}$ (Mex.Gulf) + Freight fict. (Mex.Gulf) *To the East of neutral point:* Net forward: $P_{CIF}$ = = $P_{FOB}$ (Mex.Gulf) + Freight real (Pers.Gulf) |
| (3) **1973-1986:** OPEC | Net forward: $P_{CIF}$ = = $P_{FOB}$ (OPEC OSP) + Freight real (OPEC) |
| (4) **1986-mid-2000's:** oil exchange 1 (hedgers => oil speculators) | Net back: $P_{FOB}$ = $P_{CIF}$/exchange – Freight real *$P_{CIF}$ = Exchange quotations (oil paper market)* |
| (5) **Mid-2000's & beyond**: oil exchange 2 (***NON***-oil speculators) | Net back: $P_{FOB}$ = $P_{CIF}$/exchange – Freight real *$P_{CIF}$ = Exchange quotations (**NON-**oil non-commodities paper markets)* |

# Legend to Figure

$P_{CIF}$ (net forward) - price CIF (at importer end) calculated as cost-plus;

$P_{FOB}$ (Mex.Gulf) - price FOB (at supplier end) in the Mexican Gulf area;

Freight fict. (Mex.Gulf) – freight rates for fictitious oil deliveries from Mexican Gulf area to importers;

Freight real (Mex.Gulf), Freight real (Pers.Gulf) – freight rates for real oil deliveries from Mexican and Persian Gulf areas;

$P_{FOB}$ (OPEC OSP) – OPEC official selling prices FOB;

Freight real (OPEC) – freight rates for real oil deliveries from OPEC member-states to importers;

$P_{FOB}$ (netback) - price FOB, calculated as netback price (price CIF less transportations costs);

$Ц_{CIF}$ (exchange) - price CIF as exchange quotations (at consumer end);

Freight real – freight rates for real oil deliveries to importers from production areas.

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# 2000-ies: new stage in oil pricing

- Underinvestment of the 1990-ies => cost increase since early 2000-ies + decrease in spare production capacities
- China, India, etc. – accelerated demand growth (since 2003) + accumulation of strategic petroleum reserves in developed countries (USA), China
- Abolition of Glass-Stegal Act (1999) + US Commodity Futures Modernization Act (CFMA) (Dec. 2000)
- Evolution of commodities (exchange, futures) trade:
  - Internet + IT technologies => electronic marketplaces/trading floors (IPE=>ICE=> end of voice floor trading) => robotization of electronic trading => increase in amount of traders + ease of market entry
  - Decrease of USD exchange rate (increase of oil import => increase in trade & budget deficit) => appearance of index oil funds => expansion of possibilities for financial investments in oil-related instruments + hedging against fall of USD rate
  - Globalization of financial operations => ease of horizontal financial flows from/to financial (non-oil) sectors into/from paper oil market
  - Ease of financial investments into oil market (derivatives on derivatives) => "Belgian dentist" as key private (non-institutional) financial investor at the paper oil market
- Oil-linked derivatives of index funds become the new class of financial assets aimed at compensating, inter alia, from fall of USD exchange rate
- Switch of oil pricing from physical market (supply/demand of physical oil) – to paper market (supply/demand of oil-related financial derivatives)

# Characteristics of spot, forward, futures, options deals

**There is no obligation for physical supplies under paper oil contracts (financial derivatives) !!!**

| Contract | Spot | Forward | Futures | Options |
|---|---|---|---|---|
| Trading | OTC | OTC | exchange | OTC / exchange |
| Derivatives | no | yes | yes | yes |
| Delivery | yes | (yes) | (no) | (no) |

Source: Putting a PRICE on Energy: International Pricing Mechanisms for Oil & Gas. – ECS, 2007, p. 81

# Paper oil market: key players

- **Hedgers** (since 1980's):
  - Usually producers/consumers of physical goods using futures (financial) markets to mitigate price risks
  - NYMEX: 1978 – LFO, 1983 – WTI
  - IPE: 1988 – Brent => today crude of reference of appr. 2/3 of internationally traded oil
- **Oil speculators** (since 1990's):
  - Players aimed at earning their profit from price fluctuations without physical deliveries/purchases – working mostly within paper oil market (no major horizontal capital flows to other non-oil financial markets)
- ***Non*-oil speculators** (since mid-2000's):
  - The same – players aimed at pure monetary results, but working within the whole spectrum of global financial markets => enter paper oil market from non-oil & non-commodities paper markets

# Evolution of oil futures markets

- For 2 decades (mid-80-ies/mid-00-ies) oil futures markets were playground for physical market players:
  - Energy companies, major users of petroleum products (airline & maritime transport, utilities)
  - They wanted to hedge price risk in their own business (physical deliveries/purchases)
- Since mid-00-ies these markets started to attract growing number of financial market traders:
  - Banks, investment/hedge/pension funds,
  - They are completely foreign to physical oil market

# Correlation of scales of oil, commodities and financial & monetary markets (order of figures)

**Prior to 2008 = 1%, 2008 = 2%**
(R.Jones, IEA, at Global Commodities Forum, UNCTAD, Geneva, 31.01.2011)

Financial & monetary markets = 100+

R.Jones: 500-1000 (31.01.2011)

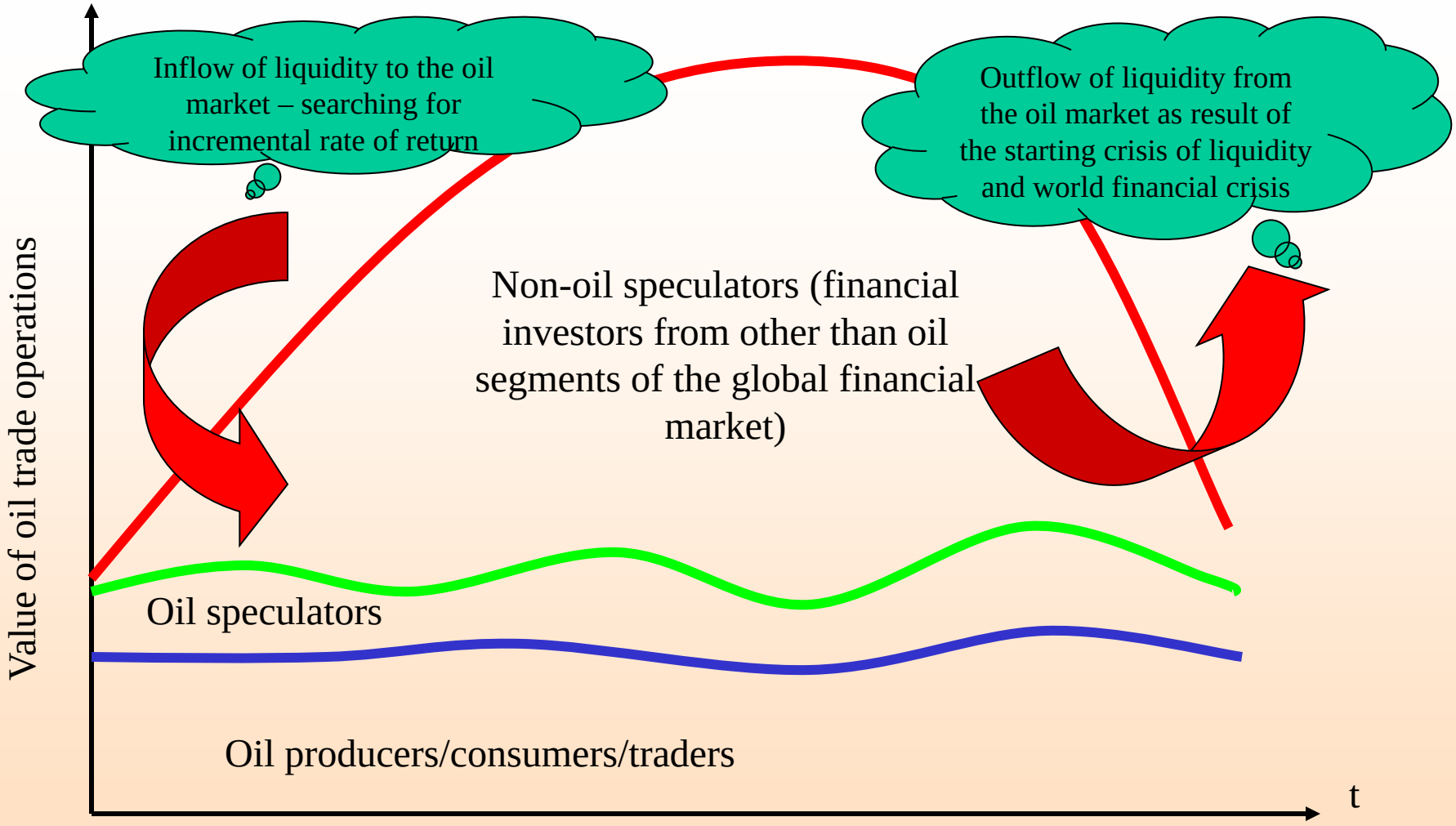
Commodities market = 10+

"Paper" oil market = 3+

I.Kopytin: 10+ (IMEMO RAS, 22.06.2011)

"Physical" oil market = 1

# Role of non-oil speculators (global "financial investors") in forming "price bubble" at the global oil market in 2007-2008 (principal scheme)



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# Damages and repairs of global oil futures/commodities markets: US role

- US past damaging role:
  - Abolition of Glass-Stigal Law (1999)
  - Commodities Futures Modernization Act (CFMA) (Dec. 2000)
  - CFMA left commodity transactions largely outside the reach of CFTC => left companies with minimal regulatory obligations from too risky operations
- US expected future repairing role:
  - Wall Street Transparency and Accountability Act (Dodd-Frank Act) (enacted by US Congress on July 21, 2010; to come into effect on July 14, 2011 =>?)
  - Dodd-Frank effectively replaces CFMA & makes it illegal for producers to execute trades outside forthcoming & more restrictive CFTC rules

# Saudi Arabia and USA – two countries really influencing today global oil market

- **Saudi Arabia (physical oil market):**
  - Level of production +
  - Level of spare capacities (historically swing producer) +
  - So-called “fair oil price” argued internationally = de facto fiscal price of Saudi Arabia non-deficit budget
- **USA (paper oil market):**
  - US role in global economy & global financial markets +
  - Value of financial oil derivatives under US control +
  - Oil pricing in US dollars (both physical oil & financial oil derivatives) +
  - USD emission controlled by US FRS +
  - Recycling of petrodollars
  - In result: US today as oil importer spend less (at physical oil market) than it earns in oil-related financial transactions (at paper oil market) (IMEMO RAS)

# USA at global oil market: what happens next?

- **USA (increasing role at physical oil market):**
  - Decreasing crude import
  - Increasing exports of petroleum products
  - From shale gas to shale oil revolution (same technologies within same institutional environment to the market with higher monetization prospects)
  - US: from gas importer to LNG exporter => further on to oil exporter?
- **Whether we are moving towards unipolar oil world within double-segment global oil market?**

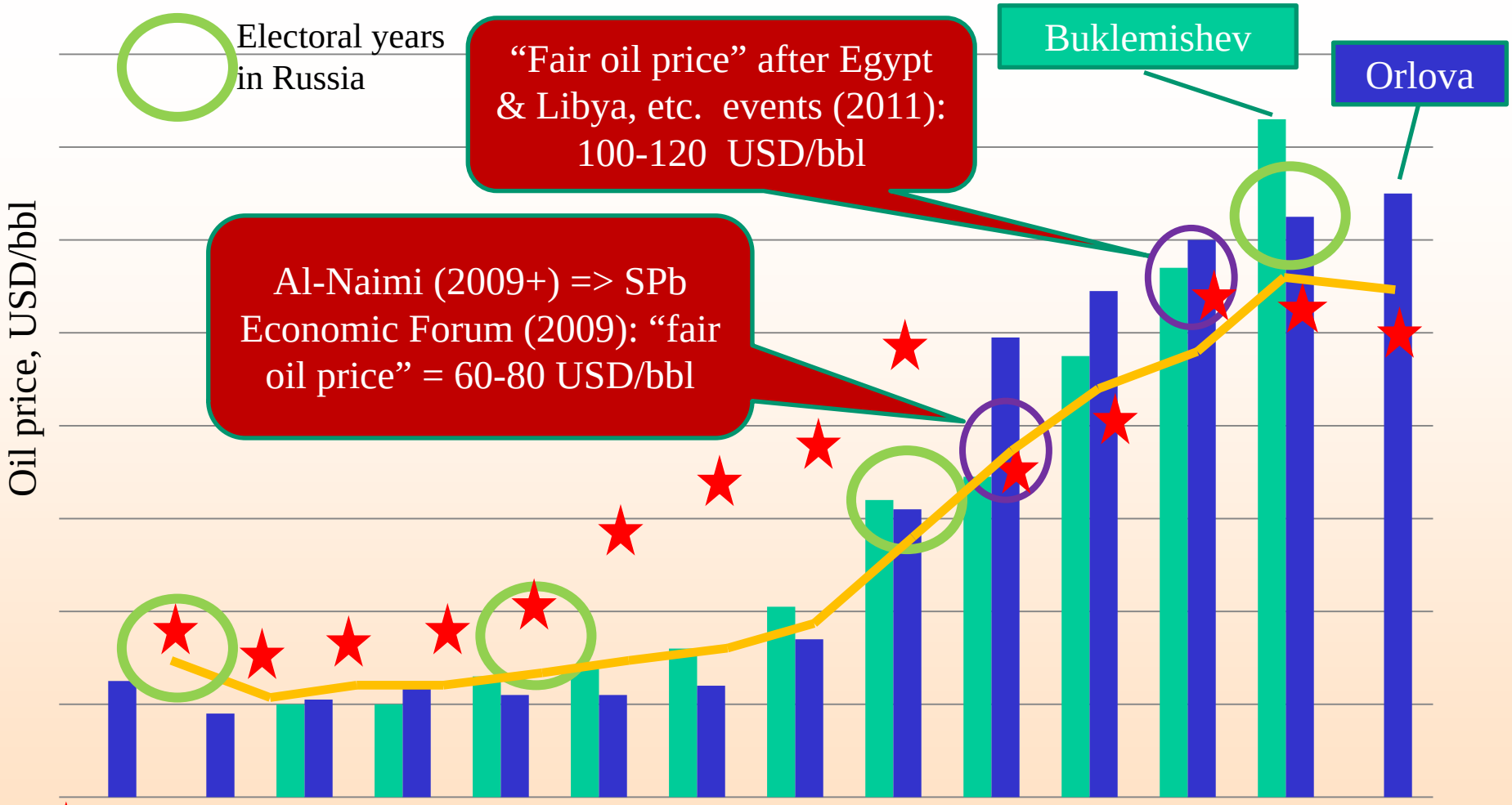
# USSR / Russia at the global oil market (1)

- **Yesterday: USSR** at the "physical oil" market stages (stages 2-3):
  - USSR oil production level did not play significant role in defining state of the international oil market => USSR was a «price-taker», not a «price-maker»:
    - Geography – far away from world consumption centers,
    - High costs level,
    - No reserve capacities, but in case of their appearance – no economically justified possibilities to arbitrage them for price-making reasons

# USSR / Russia at the global oil market (2)

- **Today: Russia** at the "paper oil" market stages (stages 4-5):
  - Russian oil production level does not play significant role in defining state of the international oil market => Russia is a «price-taker», not a «price-maker», it is not (and can't be) an "energy superpower":
    - The same factors as in the USSR (worsening geography/geology, high costs, no reserve capacities), plus yet underdevelopment of domestic financial market/system:
      - Russia de facto not represented at the oil financial derivatives markets (at the level of statistical discrepancy?) => whether it can play noticeable role there if/when domestic financial market underdeveloped ?
      - Yet absence of domestic oil exchange market (local monopolies at physical market + underdeveloped financial market + absence of "quality bank" for oil + …)
      - Sequence of actions: first – financial system – then oil exchange trading (historical experience from global oil market development)

# Oil price balancing Russian budget (with & without "corruption tax") - & "fair oil price"




★ - *Average annual Urals oil price (according to Russian Ministry for Economic De3velopment)*

—— - *Arithmetic mean price of Buklemishev & Orlova less "corruption tax"*

Source: Konoplyanik 2011a (figure created by the author based on the data from presentations of Buklemishev O.V. & Orlova N.V. at the conference "20 years after USSR. What's next?" (Moscow, 09.06.2011) who have kindly provided their data to the author)

# Thank you for your attention!

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