"Economic background of gas problems within Russia-EU-Ukraine triangle and possibilities for mutually acceptable compromise"

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Informal Russia-EU Expert Consultations on Third EU Energy Package issues
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New post-2009 gas world & its European dimension within Broader Energy Europe

1) **Oversupply due to:**
   a) **Demand-side** => market niche for gas narrowed in EU:
      i. overall decline = (i) economic crisis + (ii) energy efficiency
      ii. gas substitution = (i) subsidized RES *vs* (oil-indexed) gas + (ii) cheap US imported coal (*US shale gas domino effect #2*) *vs* (oil-indexed) gas
   b) **Supply-side** => competition within this narrowed market niche for gas in EU increases:
      i. Qatari LNG *("garbage gas")* to EU prior to Fukushima (*US shale gas domino effect #1*)
2) **Institutional** => 3rd EU Energy Package => concurrent with EU oversupply situation which triggered liberalization (upside-down gas reforms)
3) **Political** => RF-UA gas transit crises => consequences for EU/Ukraine/Russia & whole Broader Energy Europe

Russia-EU-Ukraine's new circumstances: 22 days vs. 40+ years => RF-UA vs RF-EU

- Ukraine as integral element of Russia-EU gas supply chain =>
- "Matrix effects" & "Domino effects" of Russia-UA Jan'06/09 gas crises for Russia-EU gas relations/supply chain:
  - 22 days of interruptions of Russian gas supplies to the EU via Ukraine = 3 days in Jan'2006 + 19 days in Jan'2009:
  - has overbalanced previous 40+ years (since 1968) of stable & non-interruptible supplies =>
  - has changed ***perceptions*** within ***all three parties*** on stability & non-interruptible character of future gas supply through this chain => each party has its own vision & answers & lines of actions
- New perceptions as starting points for objective "domino effects":
  - political statements & decisions => legal documents => investment decisions aimed at new ***perceived*** equilibrium to be reached
  - when investments are made, 'no return' points are passed through
- ***"No return" points for each party*** => What are they? Whether they are reached/ passed through already by each party?

EU-Ukraine-Russia: in search for new post-2009 equilibrium with different aims & responds & lines of actions

- **EU:** *to diminish dominant role of Russia as major gas supplier*
- **Ukraine:** *to escape monopoly of Russia as one single gas supplier*
- **Russia:** *to escape monopoly of Ukraine as one dominant gas transit route*
- The aims seems to be totally different (are they?) => to find new equilibrium within multidirectional individually enforced changes
- Technical, economic, legal, political dimensions…
- Narrowing corridor for new equilibrium – but it is still there (technical, economic, legal) => though (political) "a long & winding road"(*The Beatles*) to new compromise… - if a goodwill is there - "…but not yet" *(Gladiator/Ridley Scott)*

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1) New post-2009 gas world & its material & perceived realities in Broader Energy Europe
2) **EU's respond to new realities: diversification (importer's angle)**
   a. NWE vs CEE: two different EUs in preparedness for diversification (density of infrastructure)
   b. From Groningen model LTGEC to Third EU Energy Package in gas (new institutional structure of supplies)
   c. Hubs development in the EU & in the world (how liquid are EU hubs)
   d. EU Gas Target Model: "pluralism of supplies" requires financeable rules for investments
3) Ukraine's respond to new realities: diversification (transit state angle)
   a. Russia-Ukraine supply contract: price & payment issue
   b. Reverse flows issue
4) Russia's respond to new realities: diversification (exporter's angle)
   a. Adaptation within new EU gas market architecture (new flexibility)
   b. Diversity of pipelines routes
   c. New pipelines by-passing UA vs modernization of UA GTS: comparative economics in project financing world

New risks, new challenges, new responds, "no return" points: the EU (1)

- Perception: *as if* non-reliable future supplies from Russia via Ukraine to EU
- Responds: organization of new internal EU gas market architecture with ***multiple supplies*** & (high) ***flexibility***
- ***Multiple supplies (diminish dominant role of Russia as major supplier)***:
  - **Alternatives to Russian gas (*supply side*):** SOS Directive => Reg.994/2010 (3+ gas supply sources/MS, 'N-1' rule, etc.), LNG, shale gas, UGS
  - **Alternatives to (Russian) gas (*demand side*):** climate change => decarbonization => RES, energy efficiency => shrinking gas share in fuel mix => the loser would be a less competitive gas supplier
    - General perception in EU: this will be most distant & costly in production & oil-indexed-priced Russian gas
- **BUT** *(in: "Reducing European Dependence on Russian Gas: distinguishing natural gas security from geopolitics," (ed.) J.Stern, OIES, October 2014)*:
  - **"The main finding of this paper is that there is limited scope for significantly reducing *overall* European dependence on Russian gas before the mid-2020s. …**
  - **Russian gas deliveries to Europe will be highly competitive with all other pipeline gas and LNG (including US LNG) supplies throughout the period to 2030, and Gazprom's market power to impact European hub prices may be considerable. "**

New risks, new challenges, new responds, "no return" points: the EU (2)

- (High) ***flexibility*** by:
  - Diminishing barriers for gas flows: CMP rules (UIOLI, SoP), interconnectors, reverse flows, spot trade, demand for softening LTGEC provisions (TOP, hub-based pricing, etc.), …, new market organization => Third EU Energy Package
- Third EU Energy Package (03.09.2009 => 03.03.2011):
  - Set of legal instruments providing ***multiple supplies*** & ***flexibility*** within EU (28) & Energy Community Treaty (28+9) area based on new principles of internal market organization
  - from a chain of 3 consecutive LTCs (1968-2009) – to Entry-Exit zones with Virtual Trading Points (hubs) (2009-onwards)
  - New architecture of EU gas market under development/in the making => Gas Target Model + 12 Framework Guidelines + 12 Network Codes + …
- => **"No return" point has been passed by EU as a whole !!!**
- **BUT:** economic realities (& their technical background) in NWE & CEE differ significantly => not possible to provide synchronous development of market zones, to implement legally binding EU decisions on diversification ("3+ sources" rule - Reg.994/2010) which is an objective basis for competition => infrastructure density issue…

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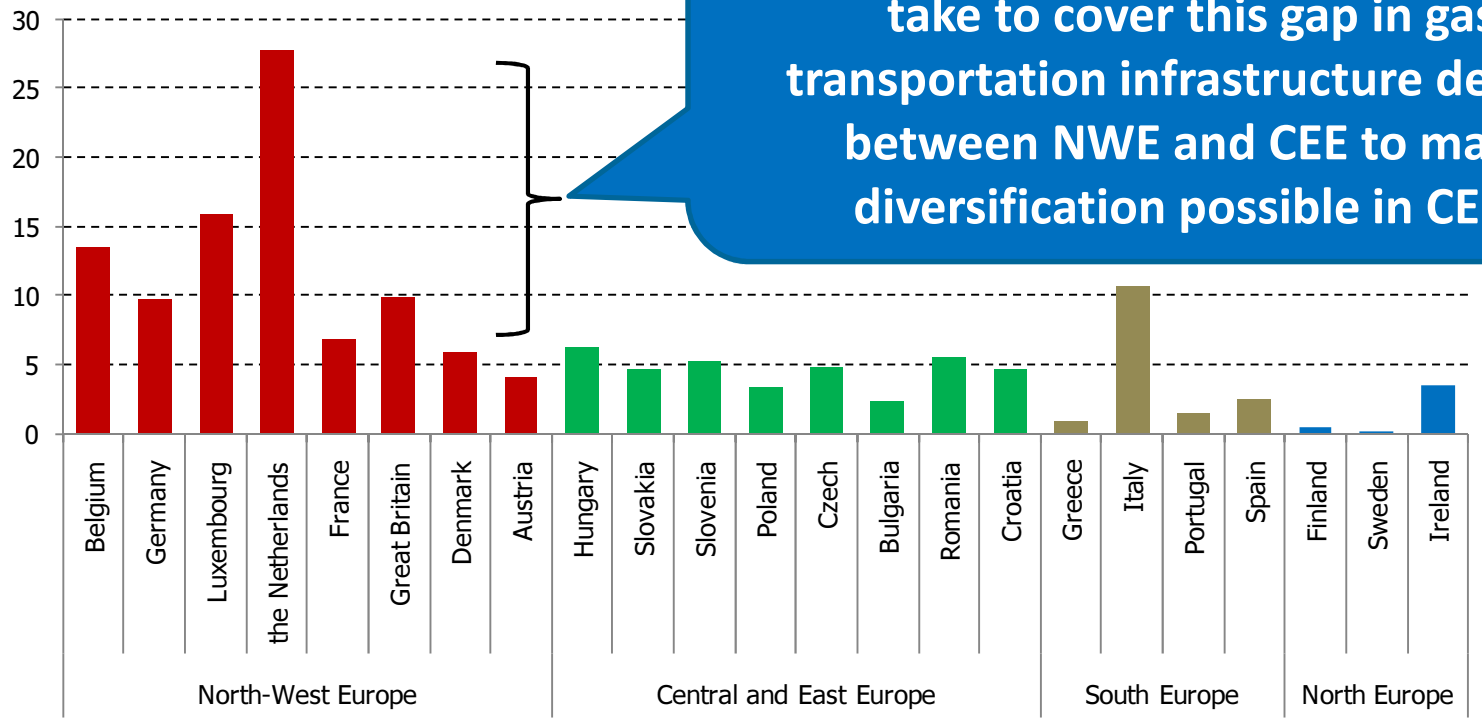
Gas transportation infrastructure density in the EU* (*trunk* lines only, km/100 km²)

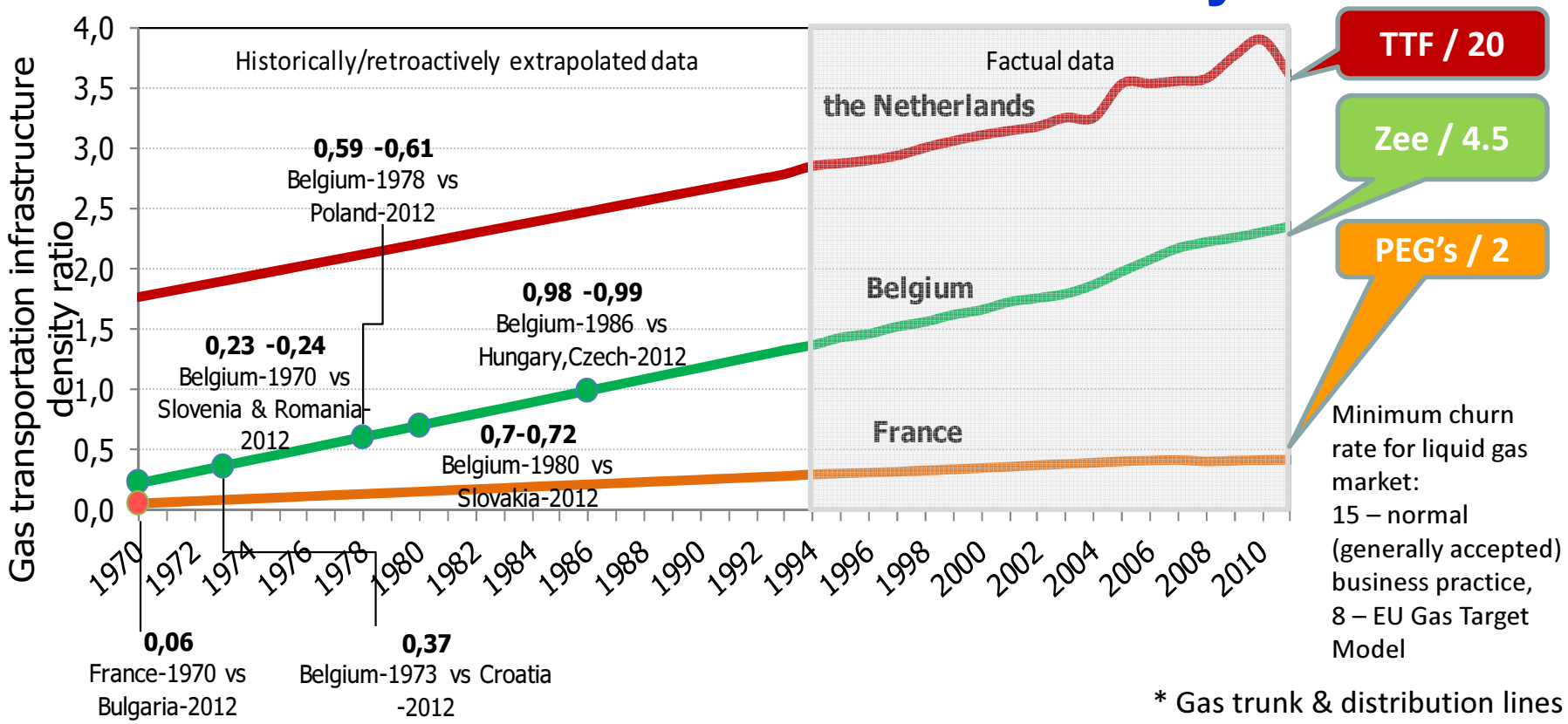


* Preliminary results

Calculations made by E.Orlova, PHD postgraduate student, Chair "International Oil and Gas Business", Russian State University of Oil and Gas, based on the data 2011/2012, kindly provided by ENTSOG

Source: A.Konoplyanik-E.Orlova-13 WS2 GAC/20 Consultations, Vienna, 15.07.2014

CEE (2012) & corresponding NWE gas transportation infrastructure* density ratios (km/km²): time gap measured by decades

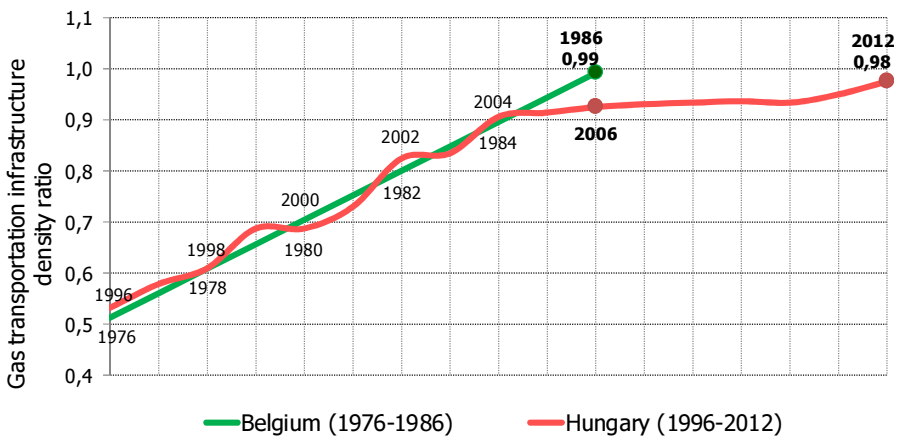


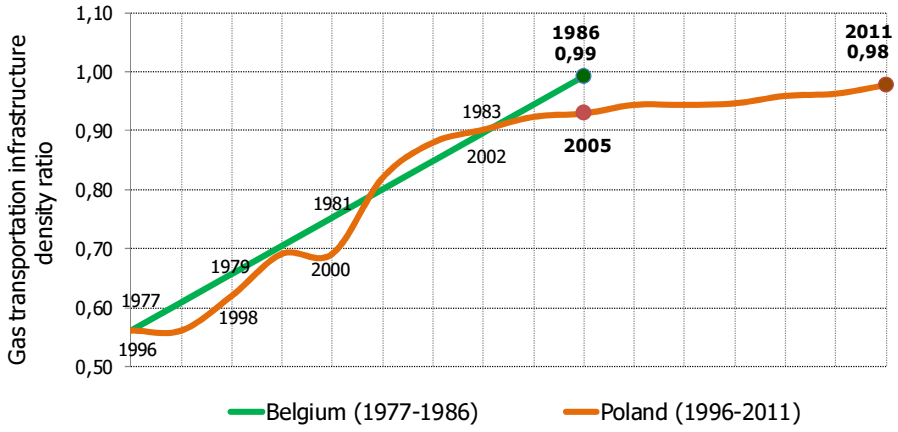
* Gas trunk & distribution lines

Calculations made by E.Orlova, PHD postgraduate student, Chair "International Oil and Gas Business", Russian State University of Oil and Gas, based on the data 2011/2012, kindly provided by ENTSOG, Eurogas; Churn rates: ICIS Heren European Gas Hub Report October 2013

Source: A.Konoplyanik-E.Orlova-13 WS2 GAC/20 Consultations-Vienna-15.07.2014

Gas transportation infrastructure* density ratios comparison, (km/km^2)





Surprise (!?): stagnation of gas transportation infrastructure density ratio in CEE after joining the EU? Is it really so? Why so???

* Gas trunk & distribution lines, preliminary results

Calculations made by E.Orlova, PHD postgraduate student, Chair "International Oil and Gas Business", Russian State University of Oil and Gas, based on the data 2011/2012, kindly provided by ENTSOG, Eurogas

Source: A.Konoplyanik-E.Orlova-13 WS2 GAC/20 Consultations-Vienna-15.07.2014

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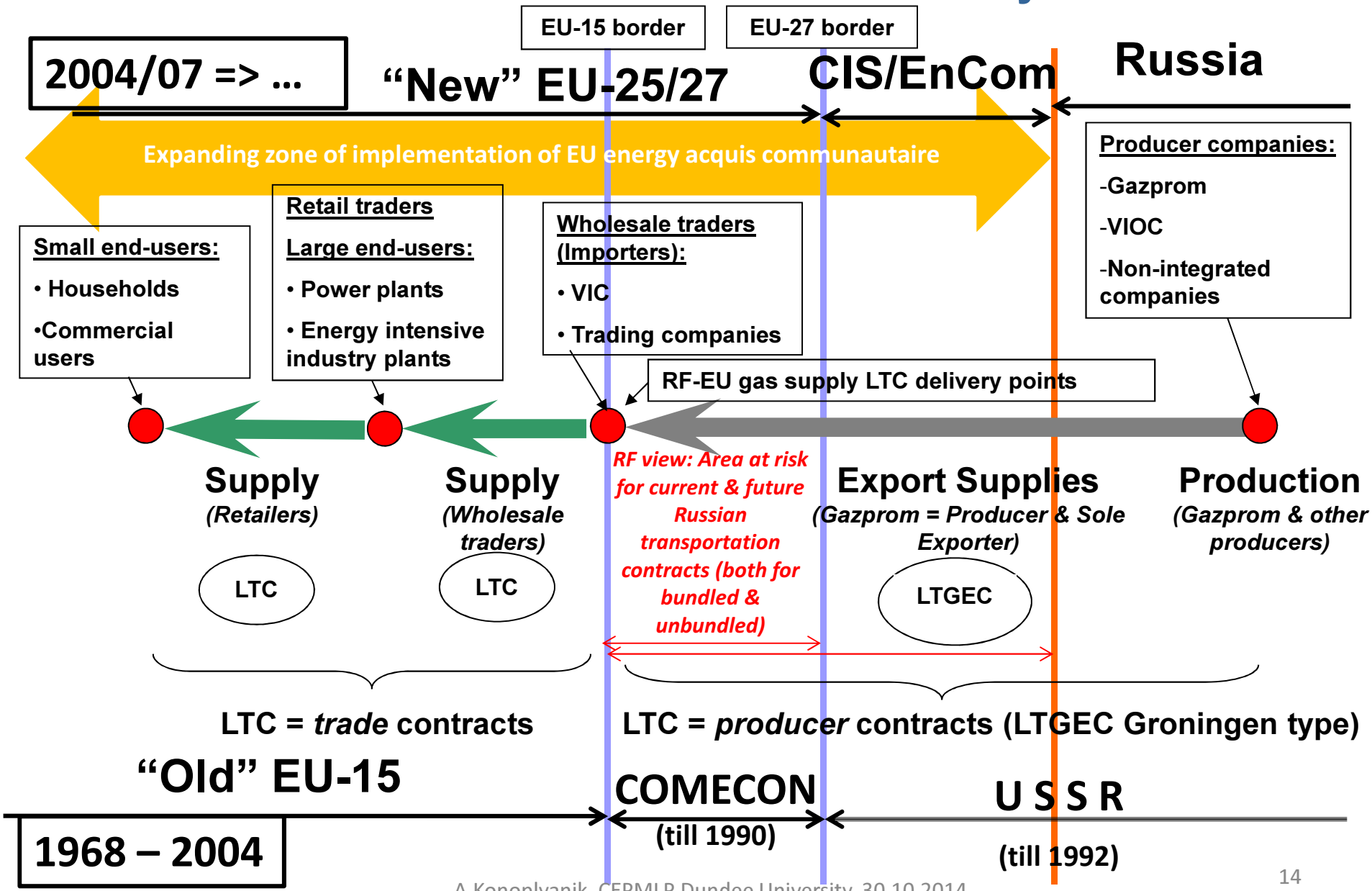
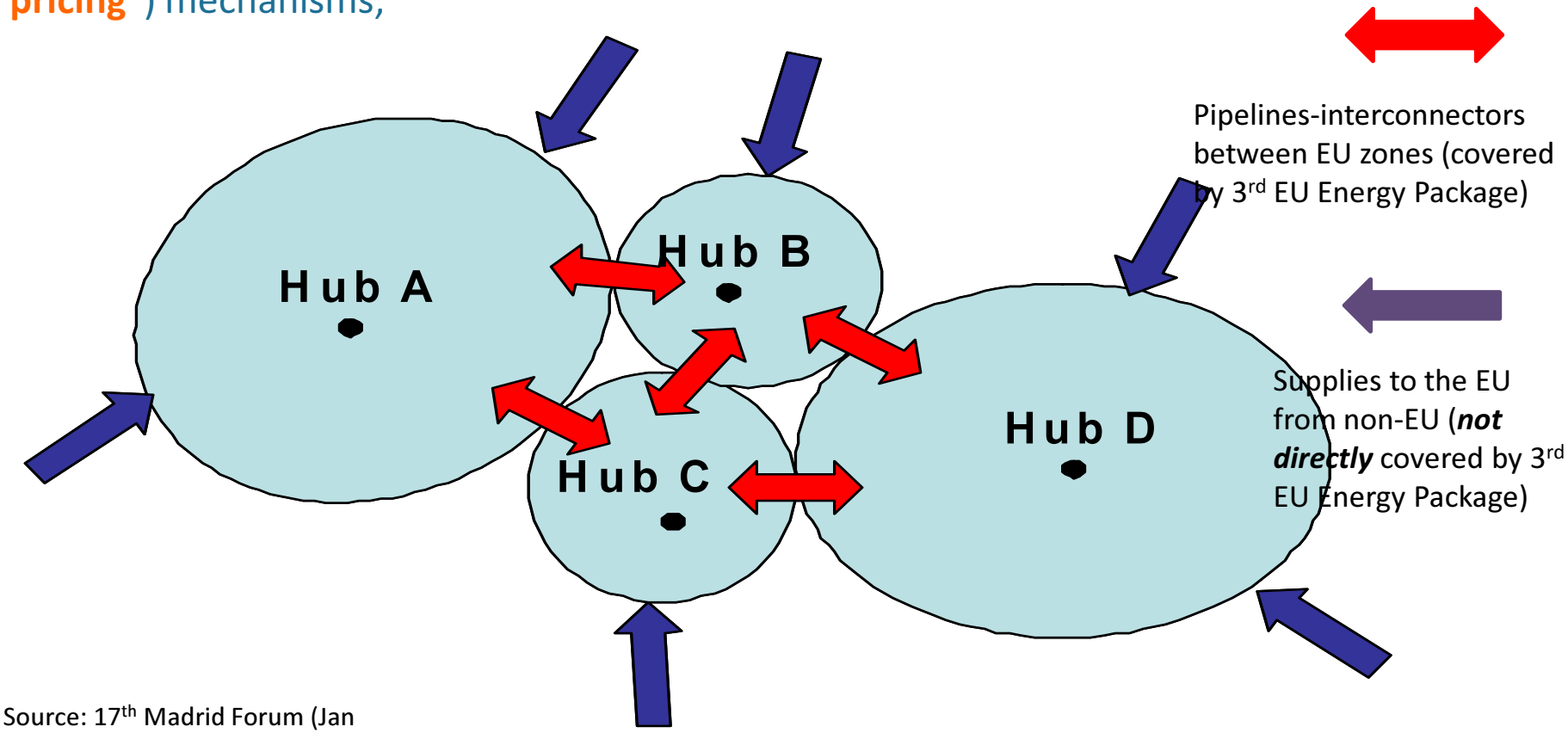
Russia-EU gas value chain: three-step LTC Groningen-type structure since 1968 till nowadays



Organization of (emerging) internal EU gas market according to Third EU Energy Package: radical change of previous wholesale EU gas market architecture

- No single (homogenous) internal EU gas market in the near future even as economic model
- All market areas to be organized as **entry–exit zones** with **virtual (*aimed to be*) liquid hubs**

=> Towards uniform capacity allocation ("**bundled products**") & gas pricing ("**spot & exchange pricing**") mechanisms;



Source: 17th Madrid Forum (Jan 2010), Energy Regulators EU MS

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Comparative liquidity of EU gas hubs (churn rates)

EU gas hubs:

NBP (UK) & TTF (Netherlands)	**10-15/20**
Zee (Belgium)	**5**
Other hubs (Continental Europe)	**3 & less**

For comparison:

USA (crude oil): NYMEX (WTI) (Feb.2010)	**1680-2240**
UK (crude oil): ICE (Brent) (Feb.2010)	**2014**
USA (gas): NYMEX Henry Hub (av.2009)	**377**

Benchmark churn level for liquid hubs/marketplaces:

- acc. to business views	**15**
- in 1st EU Gas Target Model	**8**

But if to measure not by churn only…

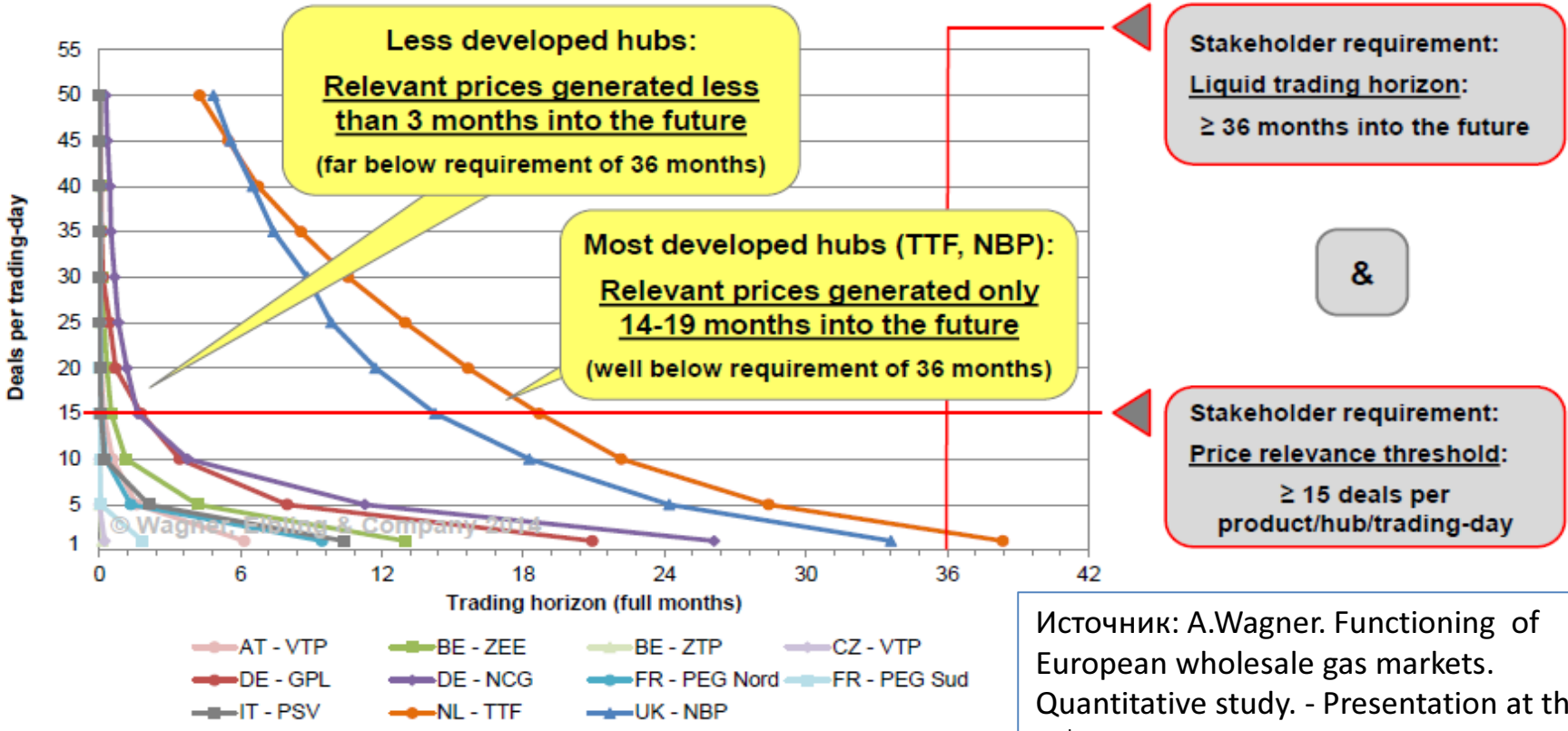
To introduce EU hubs as more liquid than they are in reality (as assessed by market participants)?

Источник: “Gas Matters”, IHS-CERA, IEA, M.Kanai (then ECS), GasTerra, EU GTM

To which extent current EU gas hubs correspond to wholesale trade liquidity criteria acc. to EU gas market players poll results (1)

Wagner, Elbling & Company
Management Advisors

Price discovery:
Deal count per day vs. trading horizon
2013



A.Konoplyanik, CEPMLP Dundee University, 30.10.2014

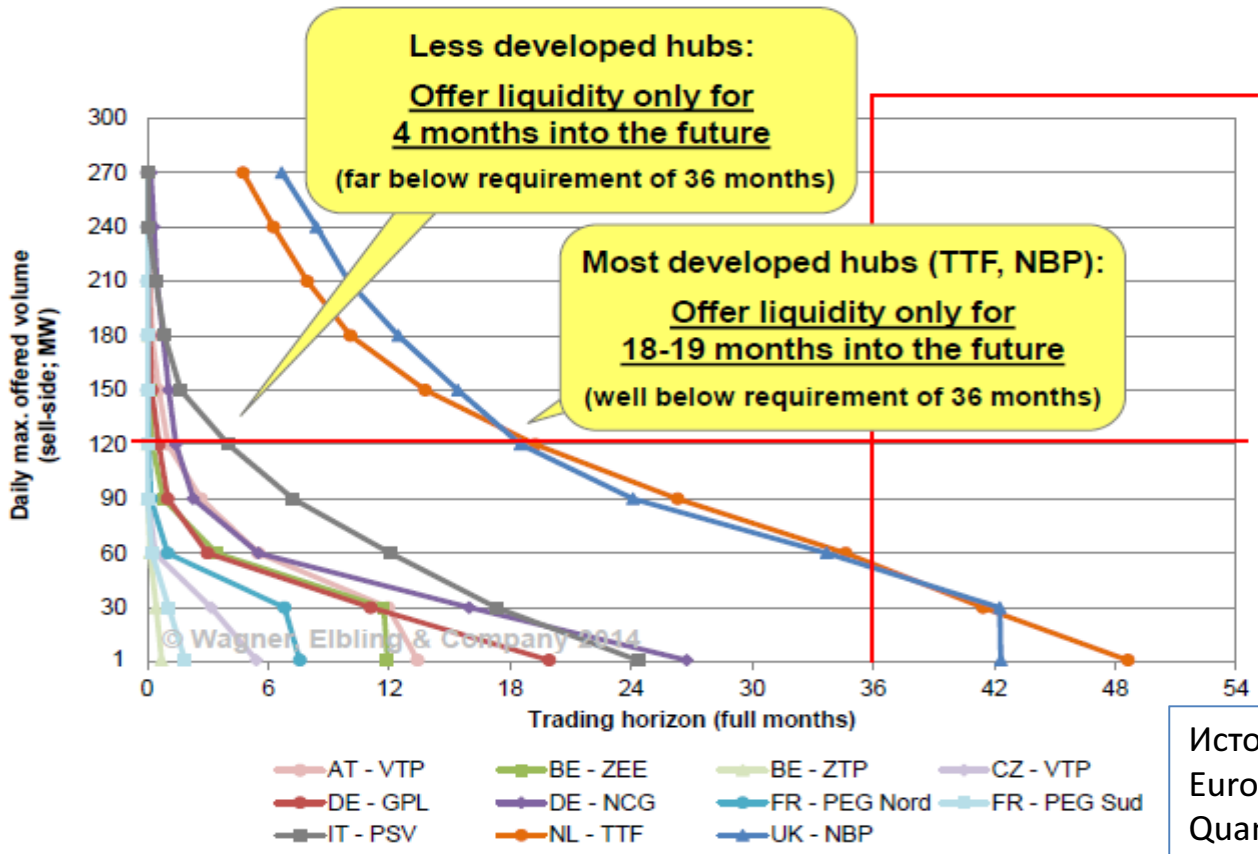
Source and assumptions: See upcoming study by Wagner, Elbling & Company on gas market functioning.

Источник: A.Wagner. Functioning of European wholesale gas markets. Quantitative study. - Presentation at the 3rd ACER Workshop on Gas Target Model review and update, Brussels, 15.05.2014

To which extent current EU gas hubs correspond to wholesale trade liquidity criteria acc. to EU gas market players poll results (2)

Wagner, Elbling & Company
Management Advisors

Availability of gas: Sell-side (offered) volumes vs. trading horizon 2013



Stakeholder requirement:
Liquid trading horizon:
≥ 36 months into the future

&

Stakeholder requirement:
Liquidity threshold:
≥ 120 MW gas offered per product/hub/trading-day

Источник: A.Wagner. Functioning of European wholesale gas markets. Quantitative study. - Presentation at the 3rd ACER Workshop on Gas Target Model review and update, Brussels, 15.05.2014

Source and assumptions: See upcoming study by Wagner, Elbling & Company on gas market functioning.

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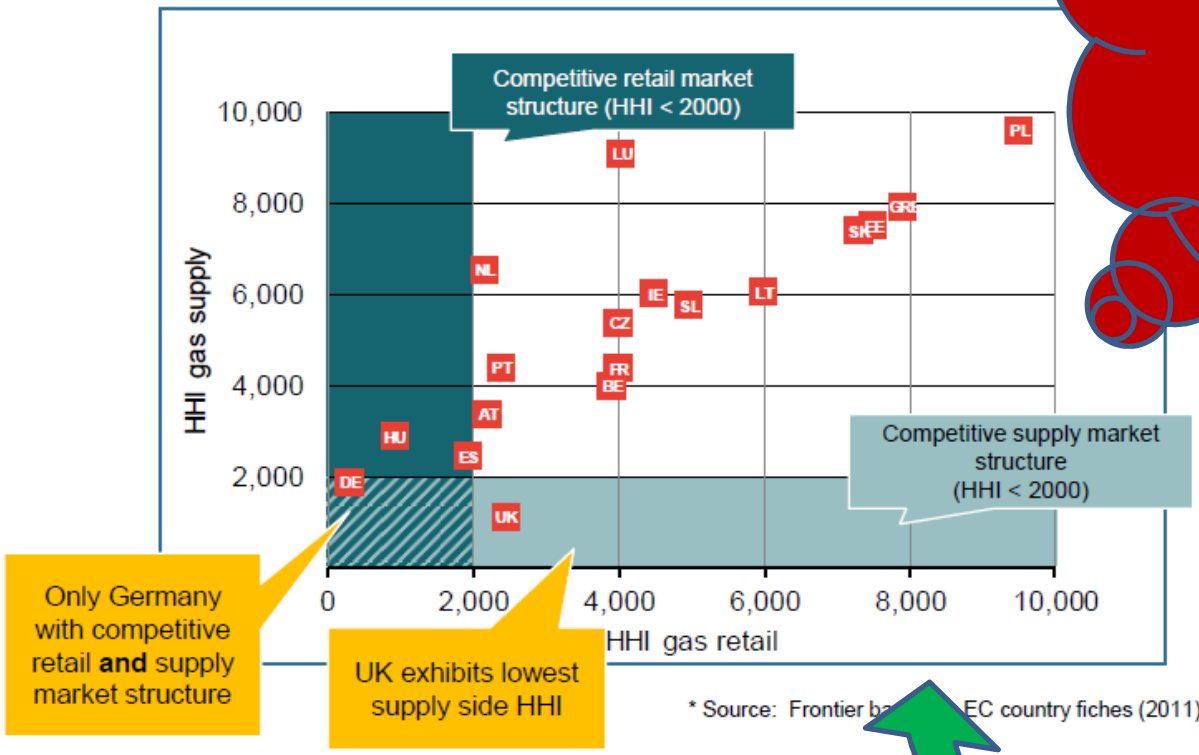
EU Gas Target Model & its key parameters: HHI (market concentration index)

Remaining barriers inhibit new entry in retail markets



One can't expect many physical players in the market (low HHI) when gas infrastructure is in deficit => to invest in infrastructure development => adequate investment rules needed

Measure	CEER criteria
Size of Entry-Exit zones	≥ 20 BCM (215 TWh)
Pluralism of sources of supply	≥ 3 significant sources
Market concentration	HHI < 2000
Liquidity of the market	Churn rates > 8

Источник: M.Graf. Developing interactive models in Austria for regional markets integration. – 7th European Gas Conference, Vienna, 29.01.2014

EU Gas Target Model & its key parameters: "Pluralism of supplies" & RSI Index *

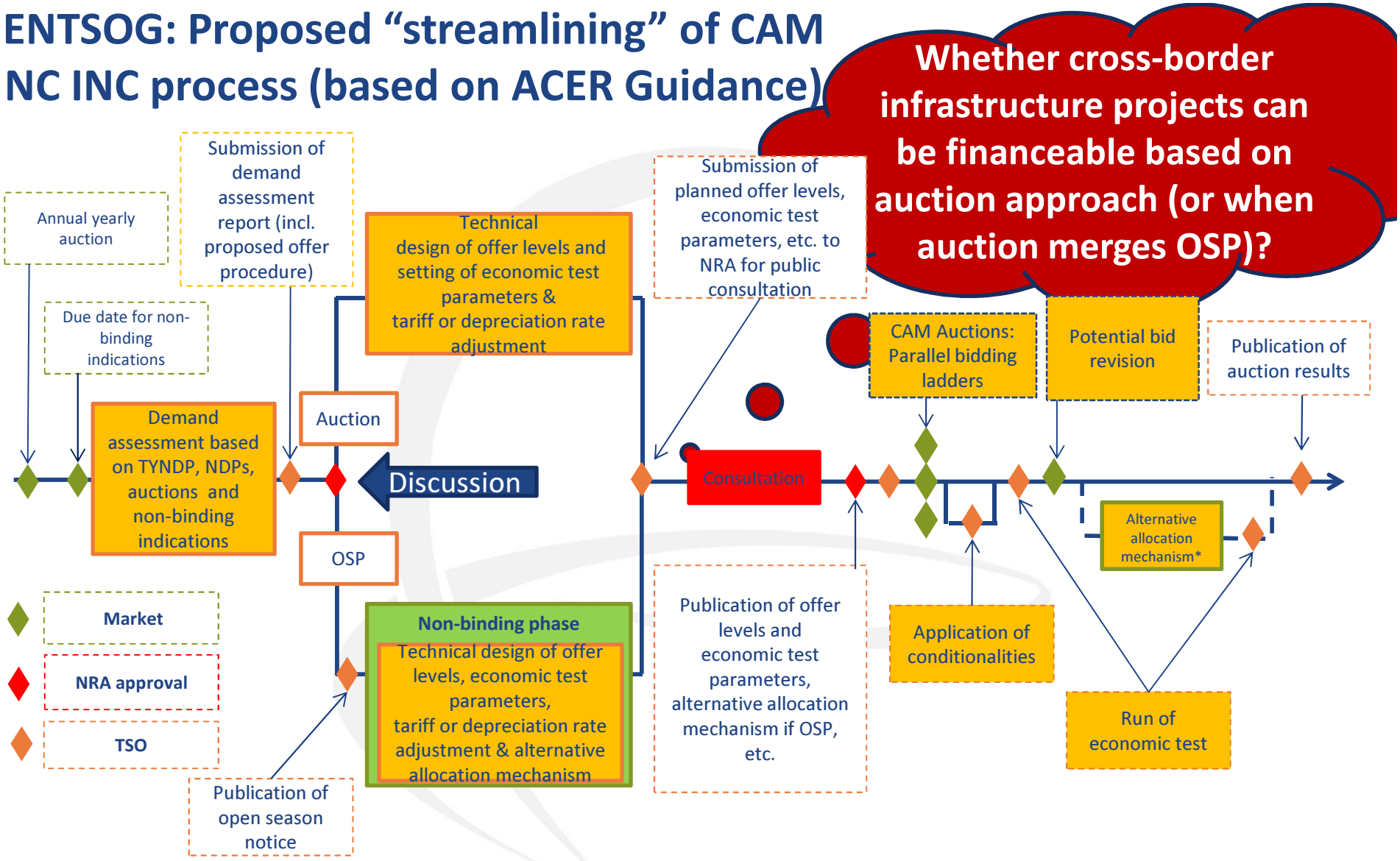
Member State	Number of sources	RSI
Austria	3	143%
Belgium	8	279%
Bulgaria	2	13%
Croatia	5	125%
Czech Republic	3	159%
Denmark	2	22%
Estonia	1	0%
Finland	1	0%
France	13	137%
Germany	4	116%
Greece	9	131%
Hungary	4	60%
Ireland	2	8%

Member State	Number of sources	RSI
Italy	12	108%
Latvia	1	0%
Lithuania	1	0%
Luxembourg	4	0%
Netherlands	6	189%
Poland	3	66%
Portugal	2	93%
Romania	4	104%
Slovkia	2	369%
Slovenia	5	74%
Spain	12	159%
Sweden	1	0%
United Kingdom	11	142%
GTM target	≥ 3	≥ 110%

To achieve "pluralism of supplies" one should invest in their diversification => attractive investment rules needed…

*Residual Supply Index (RSI) в ЦМРГ ЕС: должен превышать 110% в течение более чем 95% дней в году.
Источник: W.Boltz. Review of the GTM and the integration of the gas markets. – 26th Madrid Forum, 15-16.10.2014

ENTSOG: Proposed "streamlining" of CAM NC INC process (based on ACER Guidance)



* An alternative allocation mechanism can only be applied in Open Season Procedures and if the default allocation mechanism prevents a positive economic test

Источник: M.Wiekens. ENTSOG Draft Refined Incremental Proposal. 21st Consultations/14th WS2 RF-EU GAC meeting, Brussels, 22.09.2014

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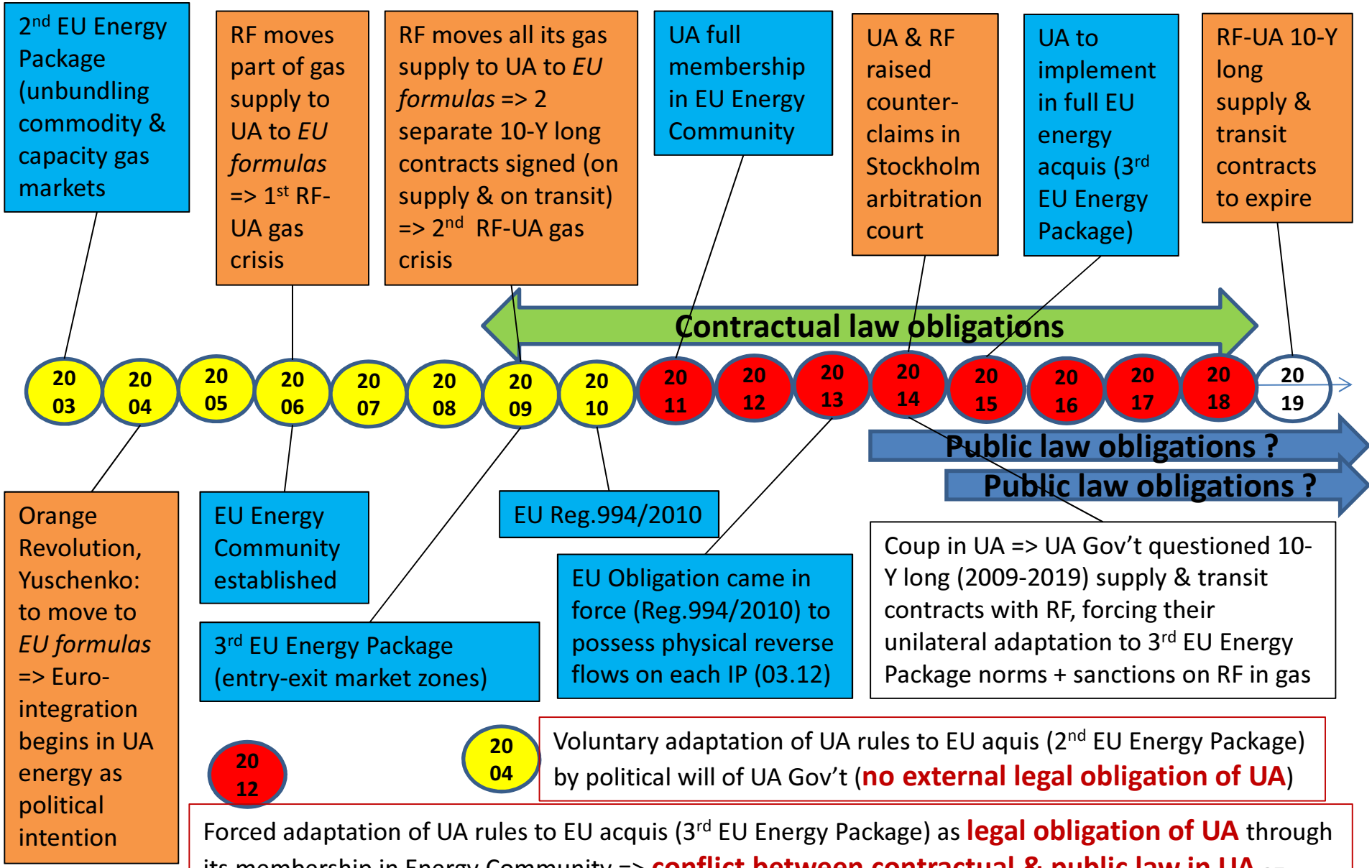
New risks, new challenges, new responds, "no return" points: Ukraine (1)

- **UA: Euro-integration** vs. **CIS-integration** => this "no return" point was passed in 2004 => Euro-integration choice de facto in place ***in energy sector*** since then =>
- Since Spring'2004 => UA demand to unbundle supply & transit contracts & to move to "European formulas" in RUS-UA gas trade:
  - UA expectations: to receive higher transit rates
  - UA reality: has received higher import prices
- Since 2006/2009: UA disagreement on import pricing formula & price level resulted from the move to "European formulas"=> transit crises Jan'2006 & Jan'2009 resulted, inter alia, from disagreements with "European formulas" in supply contracts
- UA perception of further RUS supply risks => search for multiple supplies => ***to escape monopoly of Russia as one single supplier*** =>

New risks, new challenges, new responds, "no return" points: Ukraine (2)

- UA economic & legal motivation to diminish dependence on RUS gas supplies:
  - **Economic:** High import price & RUS/Gazprom unwillingness to soften pricing policy (no price review results achieved yet – though price concessions) stipulated UA search for:
    - **alternatives to RUS gas (*supply side*):** domestic production – onshore & offshore, shale gas, LNG import, reverse flows & UGS, and
    - **to deviate from (RUS) gas (*demand side*):** switch gas to coal, nuclear, energy saving & improving efficiency
  - **Legal:** Euro-integration policy, membership in Energy Community Treaty => implementation of EU energy acquis (Second => Third EU Energy Package) in UA => ***legal obligations*** for alternative supplies, interconnectors, reverse flows, unbundling Naftogas Ukraine, MTPA => ***BUT:*** *new & incremental risks for transit via Ukraine (both for RF & EU)*
- **"No return" point is reached? "Yes" – in policy, "No" – in results, but** – is it just a matter of time since trend "away from Russian gas" is not to be changed in UA?

Russia-Ukraine gas problems reflects, inter alia, "domino effects" of Ukraine's transition to new/EU institutional gas market structure



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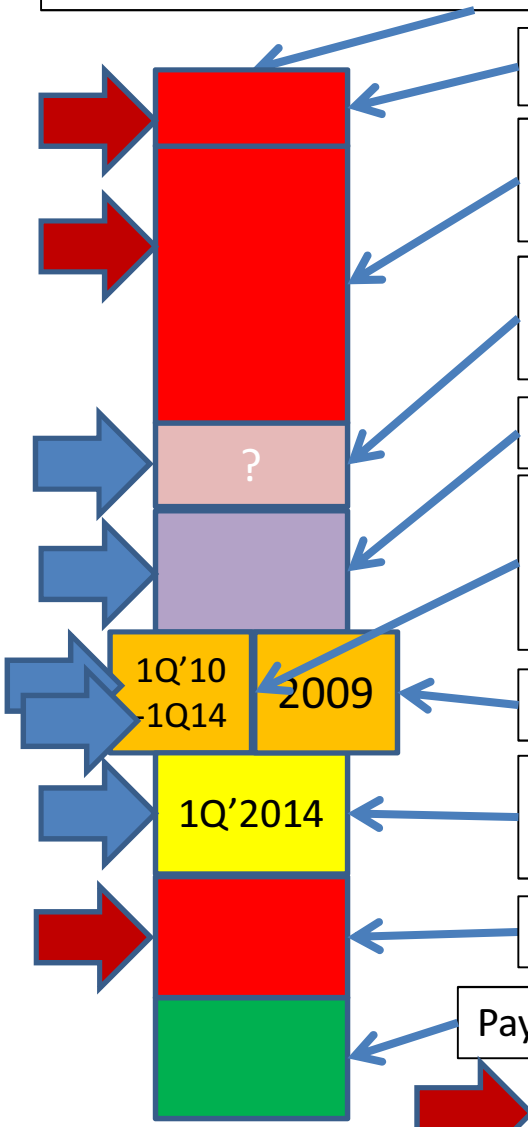
Why it is NOT justifiable (from economic & legal standpoint) to import NWE spot prices into RF-UA gas supply contract

- **EU/UA view:** to take as a basis for UA import gas RUS price a NWE spot price index which reflects competitive character of the NWE market where:
  - Multiple supplies/suppliers
  - Contractual/physical oversupply (excessive spot gas, inter alia, is mostly RUS/Gazprom TOP gas)
- ***BUT =>*** UA (yet): non-competitive market, no alternative to RUS gas;
- => Until there is no alternative to RUS gas RF/Gazprom has a legal right to obtain maximum marketable resource rent via diff. mechanisms, incl. oil indexation (*European formulas*)
  - International legal protection: UN GA Res.1803 (1962), ECT Art.18 (1994/98) – on sovereignty on natural/energy resources
- **BUT =>** RF/Gazprom long providing multiple unilateral discounts to UA to soften its transition to *European formulas*
- ***AND:*** the higher the import price, more stimuli for importer to substitute/deviate from… (oil market case 1970/80-ies)

Russia-Ukraine gas supply contract: contractual & factual payments vs. non-payments & subsidies



"European formula"-based market price (net-back replacement value, petroleum-product indexation)

Other penalties (non-timely payments, etc.)

Lost revenue due to off-takes below contracted volumes (f.i.: TOP 80% = 41.6 BCM vs 12.9 BCM/2013)

Other discounts (on top of non-penalties for lower off-takes, for late payments, etc. ?

Factual discount on gas supplied to chemical industry enterprises via banking

Discount by "Kharkov agreement" (2Q'2010-1Q'2014), 100 USD/mcm by interstate budgetary clearing (prolongation of post-2017 Sevastopol NB lease for today's gas purchases), cancelled after Crimea reunited with Russia

Discount 20% of P0 (90USD/mcm) for 2009, written in contract

Discount (Dec'2013) for add.100 USD/mcm, conditioned by regular payments, cancelled since 2Q'2014 due to non-payments in 1Q'2014

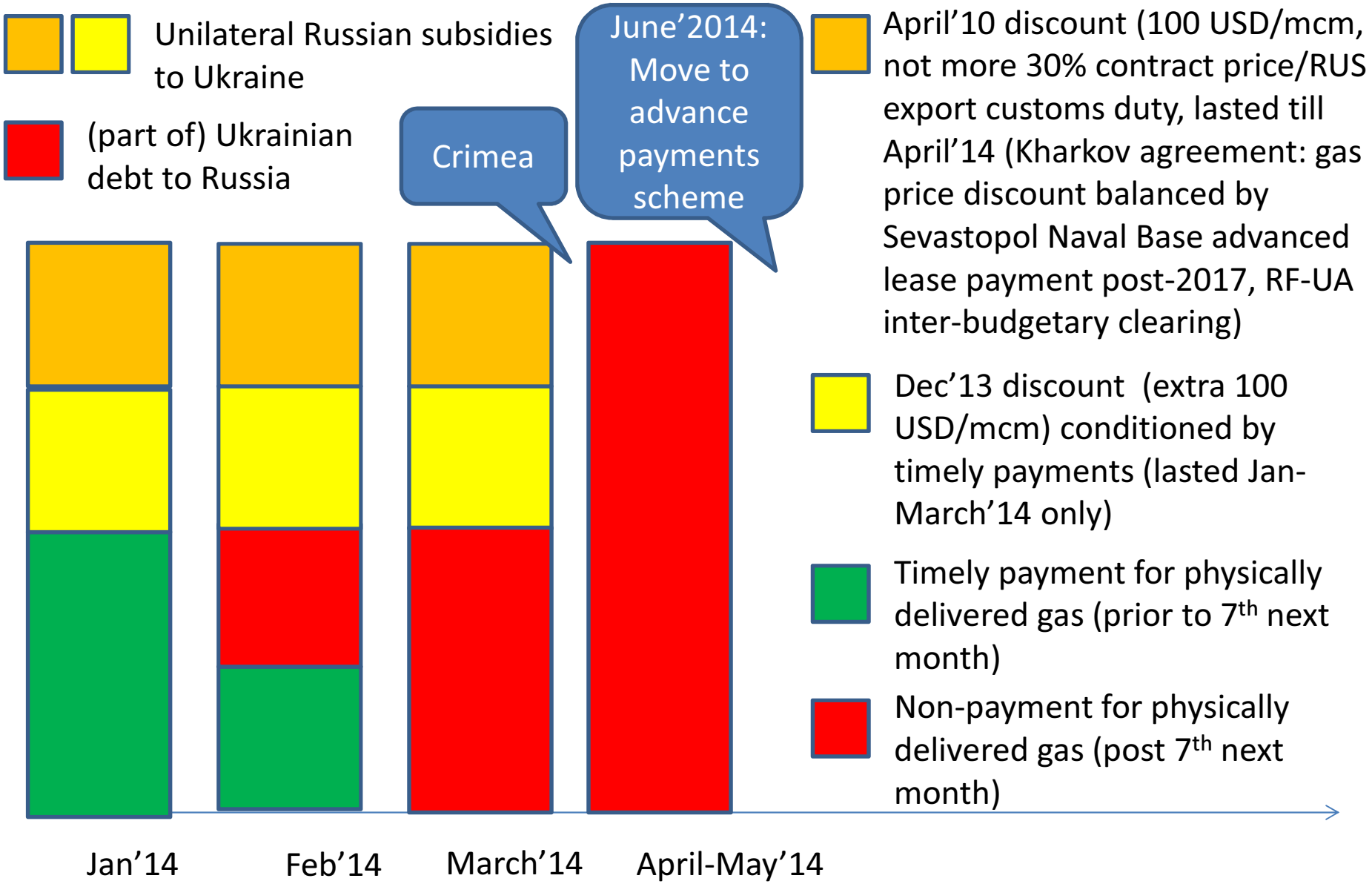
Non-payment for delivered gas at factual price at contract date (7th next M)

Payment for delivered gas at factual price (contractual price with all discounts)

Non-payments, penalties, debts

Direct subsidies, debt converted to subsidies

Structure of Russian gas price to Ukraine 2014



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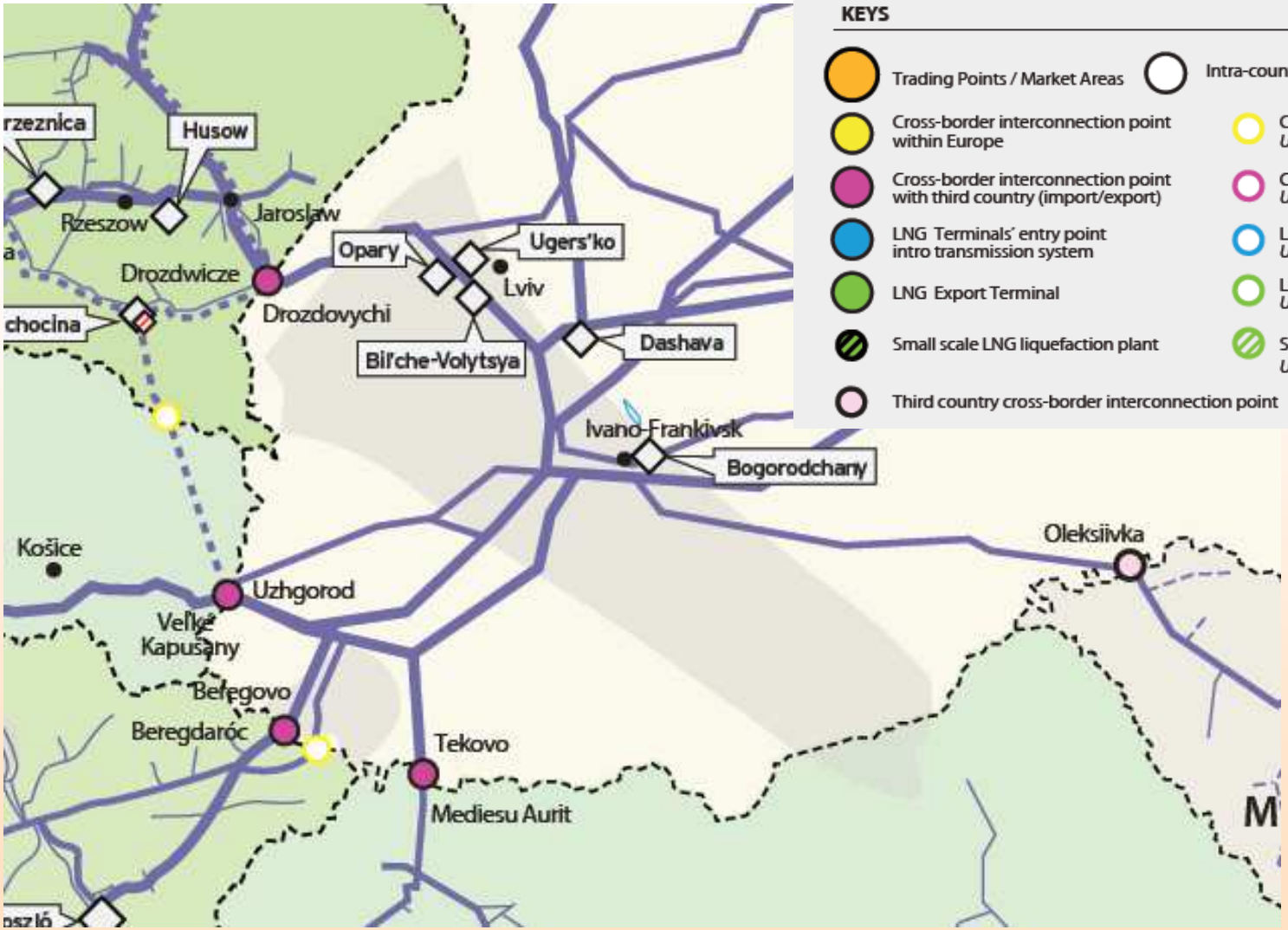
Ukraine: cross-border points where it obliged to possess physical reverse flow capacity due to its membership in Energy Community



Источник карты: ENTSOG System Development map 2012. http://www.gie.eu/download/maps/ENTSOG_SYSDEV_MAP2012.pdf

UA reverse gas flows: conflict of public & contractual law, not a technical issue

- RF-UA Contractual law obligations (since Jan'1, 2009):
  - TOP mutual obligations (52BCM => 80%TOP => 41.6 BCM)
- UA Public law obligations (since Dec'3, 2013):
  - UA joined Energy Community Treaty since Feb'1, 2011 => obligation to apply EU energy acquis within UA (since 2015), incl. Regulation 994/2010 (inter alia, Art. 6.5 on reverse flows – "03.12.2013 at latest")
- Conflict between two legal obligations for UA with different enforcement dates = direct economic losses for producer/gas resource owner (RF):
  - Reverse flows (from West) to substitute contract flows (from East); while both flows are de facto of the same (Russian) origin
  - Lower UA off-takes (13.9 BCM in 2013) prevent pay-back of earlier Gazprom CAPEX in advanced upstream developments aimed at guaranteeing fulfillment of its contractual supply obligations to UA
- The earlier obligation prevails (Pacta sund servanda)

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Preconditions for new Russian gas supply model to Europe

1) **Diversification of routes/means of supplies: from former GOSPLAN's "no more than one pipe to each market" to current "no less than two pipes/means of supply to each market":**
   a. Change of the concept of risk assessment/minimization: from central planning & direct control on each export route through to delivery point – to competitive choice among few routes/means of supply (taking into consideration comparative costs & risks)
   b. Economic justification of new pipelines/means of supply to mature markets: not new gas, but liquidation of transit monopoly
2) **Changing contracting structures & pricing mechanisms – operation within new EU gas market architecture:**
   a. From the **chain of three consequential LTC** with (first bundled, then unbundled, but to be mutually correlated) supply and transportation contracts - to the system of **"entry-exit" market zones** with VTP (hubs) within unbundled commodity and capacity markets
   b. Unbundled **capacity** market: supplier as a shipper only, capacity allocation – mostly by auctions, in rare cases - OSP
   c. Unbundled **commodity** market: mature & oversupplied (either contractually or physically) market, "gas-to-gas" competition, two market segments – contractual & spot – in competitive coexistence

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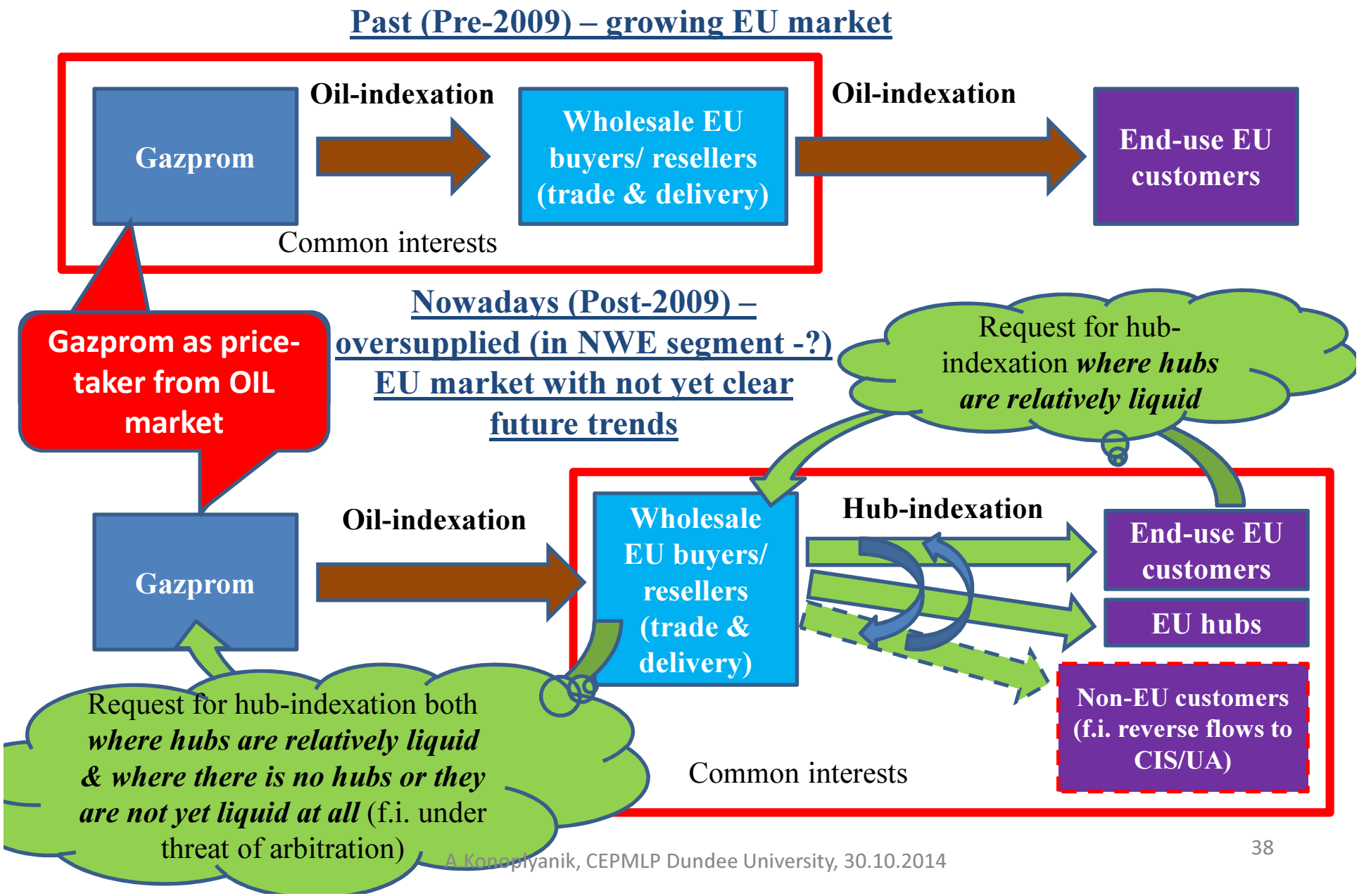
New model for EU: Evolution of gas value chain & pricing mechanism of Russian gas to EU (1)

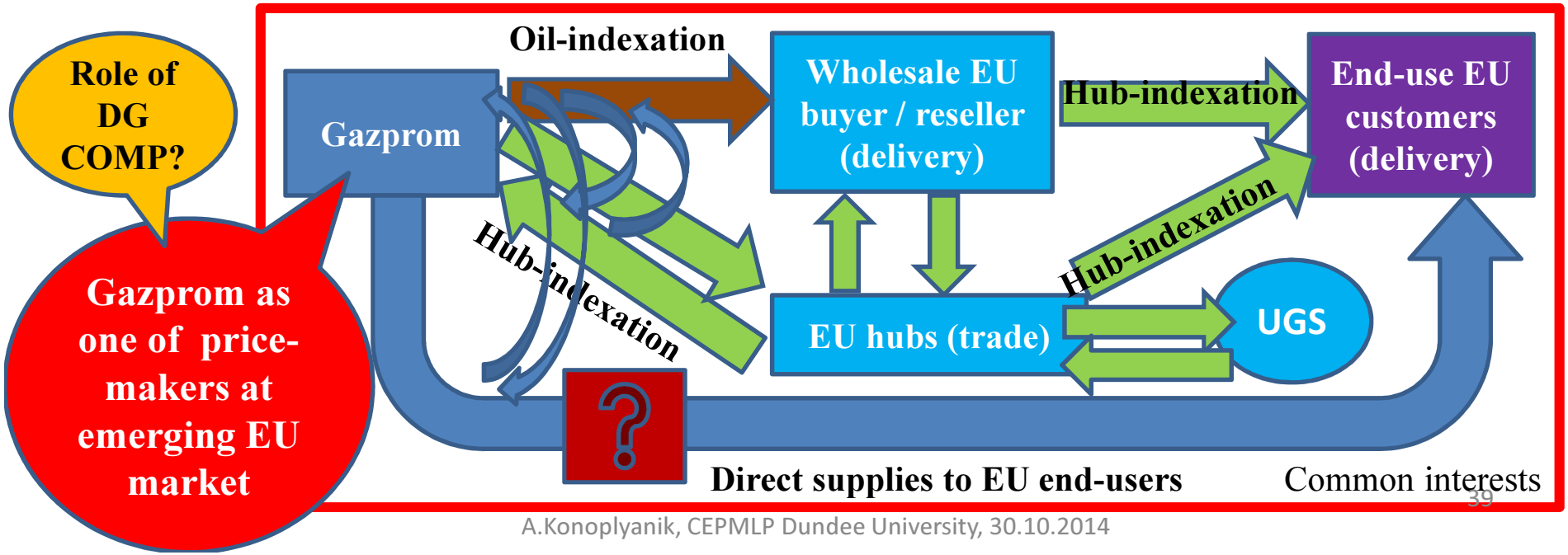


New model for EU: Evolution of gas value chain & pricing mechanism of Russian gas to EU (2)

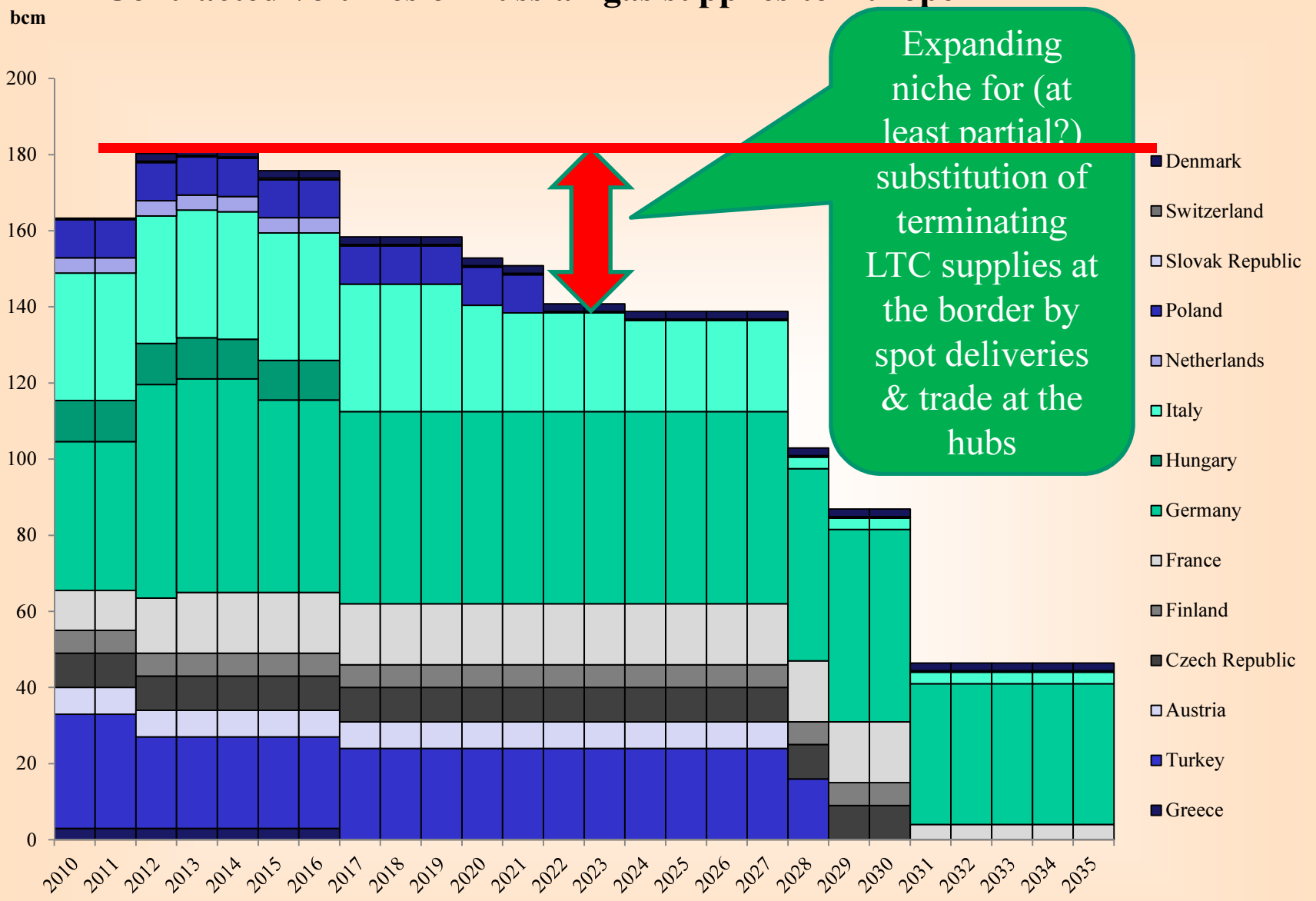
Future ("NO GO" contractual scheme under any (?) supply-demand scenario)

Gazprom as price-taker from GAS BUYER's market (with no participation on it)? => NO GO

Future (what competitive niche for oil-indexed LTC & spot deliveries & trade to/within EU?)



Contracted volumes of Russian gas supplies to Europe



Source (primary chart): ERI RAS (T.Mitrova), reproduced in & taken from «The Russian Gas Matrix: How Markets Are Driving Change», Ed. by J.Henderson & S.Pirani, Oxford University Press, 2014, Fig.3.1/p.53.

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New risks, new challenges, new responds, "no return" points: Russia (1)

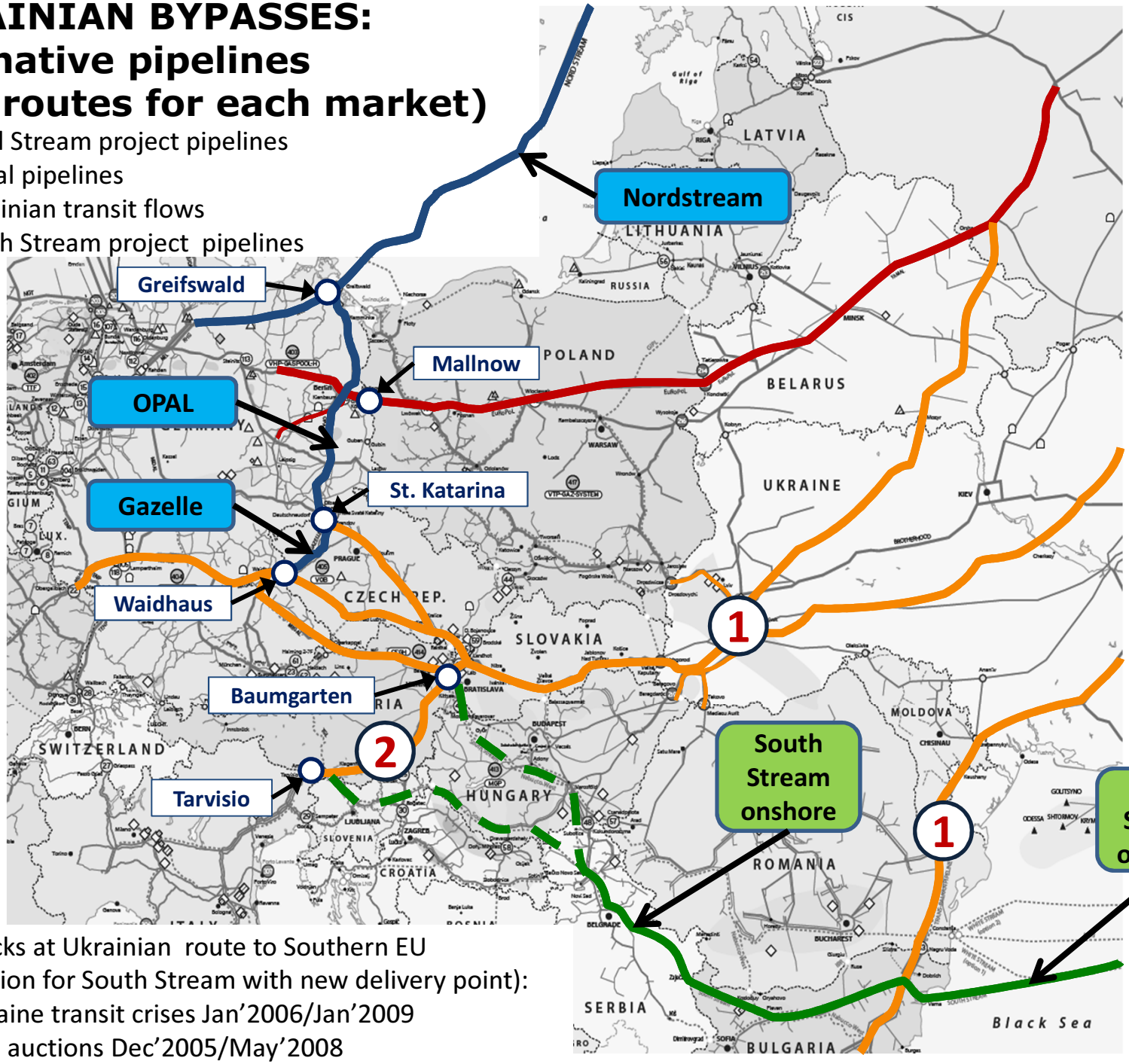
- Supply risks:
  - non-fulfillment of contractual obligations by UA (lower offtakes) = inter alia, negative upstream investment consequences for Russia
- Transit risks (within UA territory, post-2006/2009) – both materialized & perceived risks,
  - ***Materialized:*** not sanctioned off-take of gas in transit (at least 2 episodes – Jan'2006 & Jan'2009) => but:
    - it is RUS supplier who is fully responsible for gas delivery to EU delivery point (non-dependent e.g. transit problems) =>
    - risk of legal claims of EU customer against RUS supplier in case of non-delivery (supply contract) even if violation of transit contract =>
    - EU customers have not raised such claims in Jan'2006 / Jan'2009 cases, but what about the future if repeated?
  - ***Perceived***: to materialize in near future – result of UA accession to Energy Community Treaty & adaptation to EU internal market rules:
    - MTPA vs transit flows (risk of contractual mismatch)
    - Forthcoming unbundling of Naftogas UA => risk of factual unilateral change (disappearance) of one Contracting Party to 10Y-long transit contract
    - Totally new proposed transit structure (UA-EU-US consortium), etc.

New risks, new challenges, new responds, "no return" points: Russia (2)

- Change of the whole transit economics for supplier if precedent-based "risk" element included => responds:
  - ***to escape monopoly of Ukraine as one dominant transit route*** => to create *alternative* & *non-transit* routes => their economics compared to existing *transit* routes improved by increasing value of transit risks (see next chapter) =>
- Dilemma:
  - **Two routes (incl. transit)** to each major markets ("least radical" scenario):
    - (a) UA GTS + [Nord Stream/OPAL/Gazelle] => to North-West Europe,
    - (b) UA GTS + [South Stream (offshore + onshore)] => to Southern Europe,
    - Supply volumes to be distributed within each pair of routes, or
  - **One direct new (non transit) route** to each major market ("most radical" scenario):
    - (a) Nord Stream/OPAL/Gazelle => to North-West Europe,
    - (b) South Stream (offshore + onshore) => to Southern Europe
    - All transit volumes switched to new routes? => UA GTS dried up?
- **Different "no return" points under different scenarios: some are passed, other – not yet** => no clear final picture yet…

UKRAINIAN BYPASSES: alternative pipelines (two routes for each market)

- Nord Stream project pipelines
- Yamal pipelines
- Ukrainian transit flows
- South Stream project pipelines



Bottlenecks at Ukrainian route to Southern EU (justification for South Stream with new delivery point):

1. Ukraine transit crises Jan'2006/Jan'2009
2. TAG auctions Dec'2005/May'2008

A.Konoplyanik, CEPMLP Dundee University, 30.10.2014

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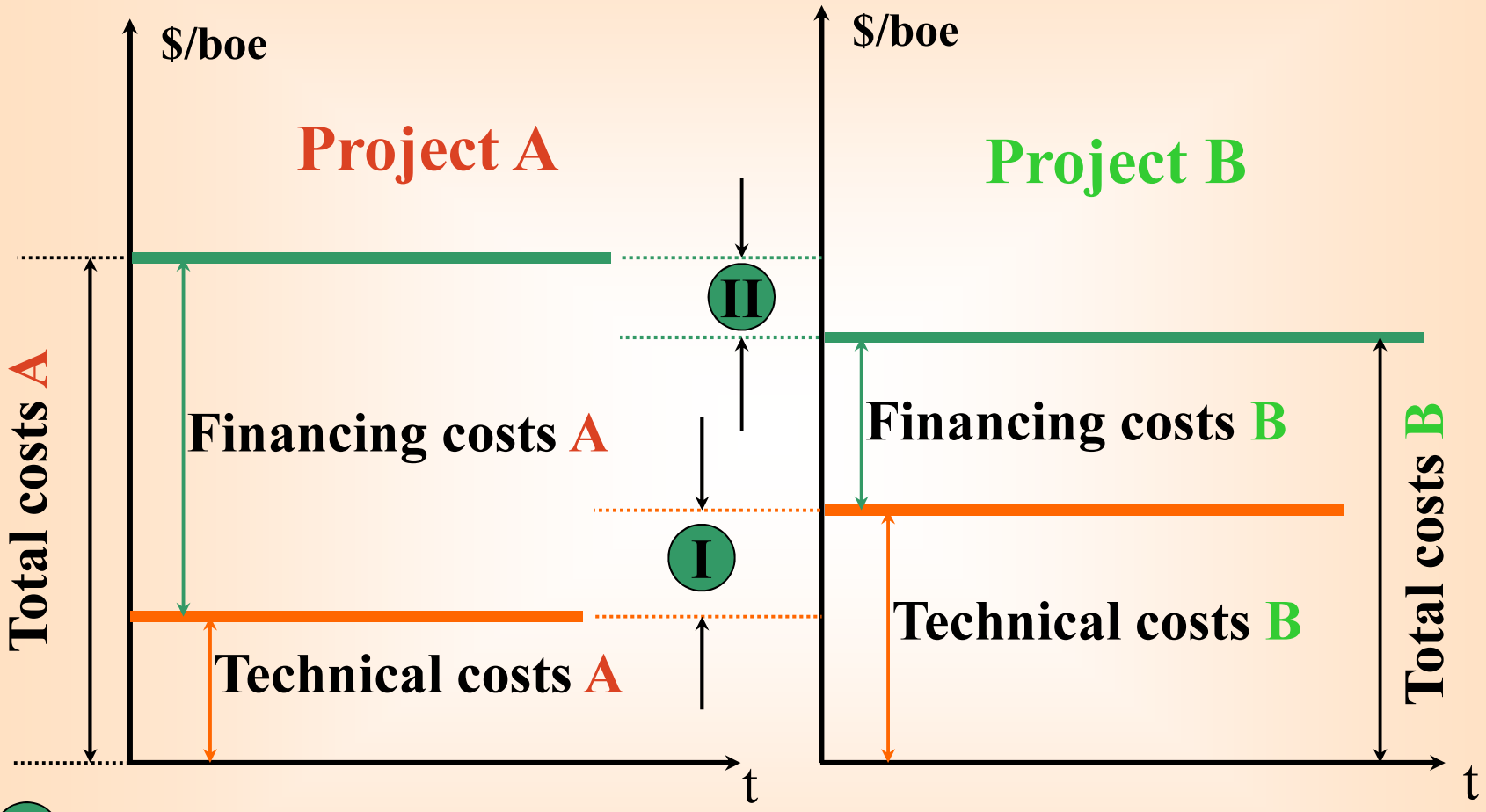
In project financing world both technical & financing costs does matter…



I "Natural advantage" of project A over project B (A < B)

II Final competitive *dis*advantage of project A over project B (A > B)

Financing costs (LIBOR+) = f [R(country) X R(company) X R(project)]

Russia & Ukraine at the scale of major international rating agencies
(long-term investment credit ratings in foreign currency)

	Moody's	Standard & Poor's	Fitch IBCA	Short description	LIBOR+ (*)
Investment grades	Aaa	AAA	AAA	Maximum safety level	Up to 4,25%
	Aa1	AA+	AA+	High level of reliability	
	Aa2	AA	AA		
	Aa3	AA-	AA-		
	A1	A+	A+	Reliability above medium	
	A2	A	A		
	A3	A-	A-		
	Baa1	BBB+	BBB+	Reliability below medium	Up to 6%
	Baa2 (RF: 17.10.14)	BBB	BBB (RF: 04.02.09)		
	Baa3	BBB- (RF: 25.04.14)	BBB-		
Speculative grades	Ba1	BB+	BB+	Non-investment, speculative grade	Up to 14%
	Ba2	BB	BB		
	Ba3	BB-	BB-		
	B1	B+	B+	Highly speculative grade	Up to 19%
	B2	B	B		
	B3	B-	B-		
	Caa1	CCC+	--	High risk, emitter is in difficult situation	
	Caa2	CCC (UA, 21.02.14)	CCC (UA, 07.02.14)		
	Caa3 (UA: 04.04.14)	CCC-	--		
	Ca	CC	--	Highest speculative rating, default possible	
	C	C	--		
	--	--	DDD	Default	Up to 204%
	--	SD	DD		
	--	D	D		
	--	--			

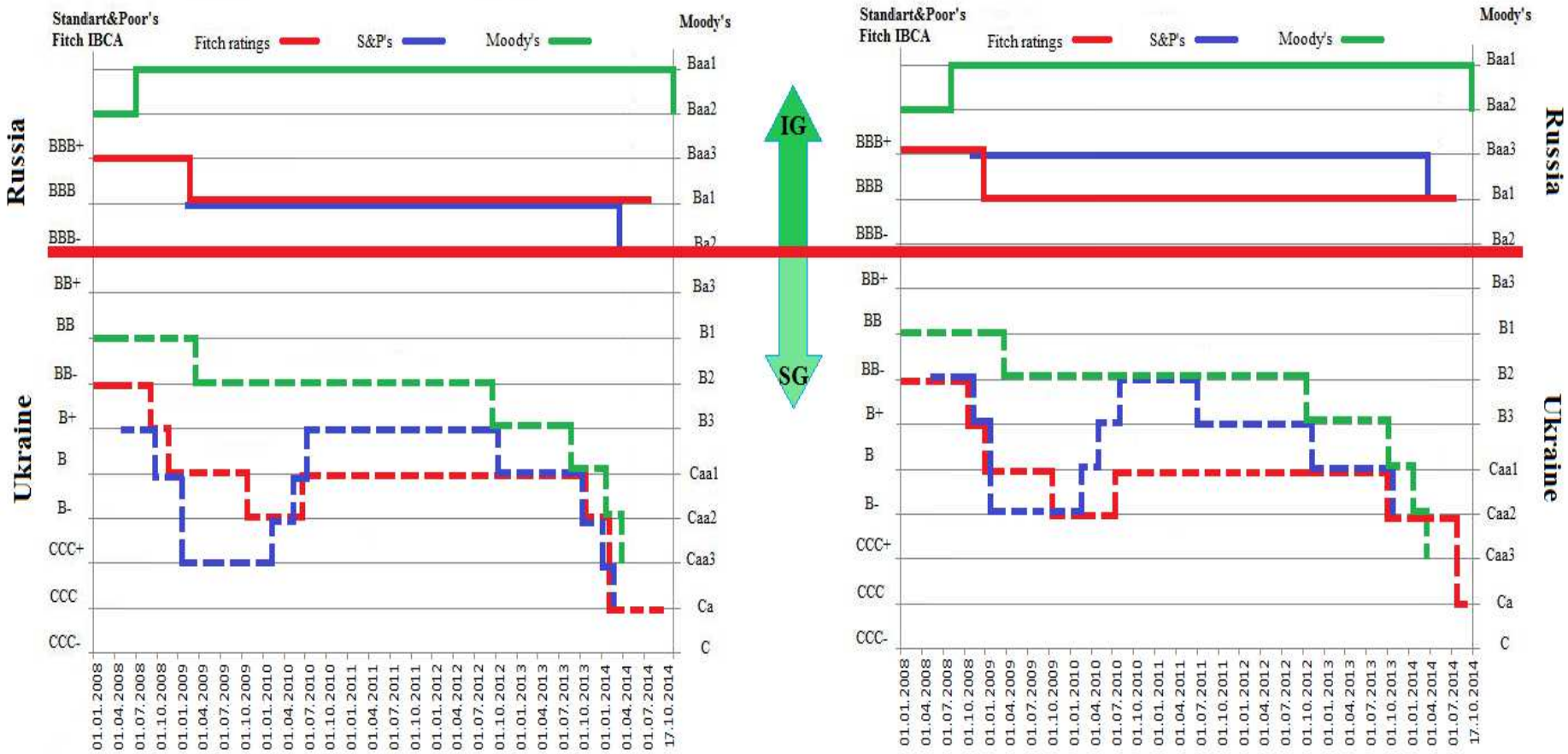
LIBOR 1Y 21.10.2014: USD=0.54, GBP=1.01 EUR=0.31

(*) Acc. to one of the issues of "Project Finance" magazine

Russia & Ukraine: evolution of long-term credit ratings

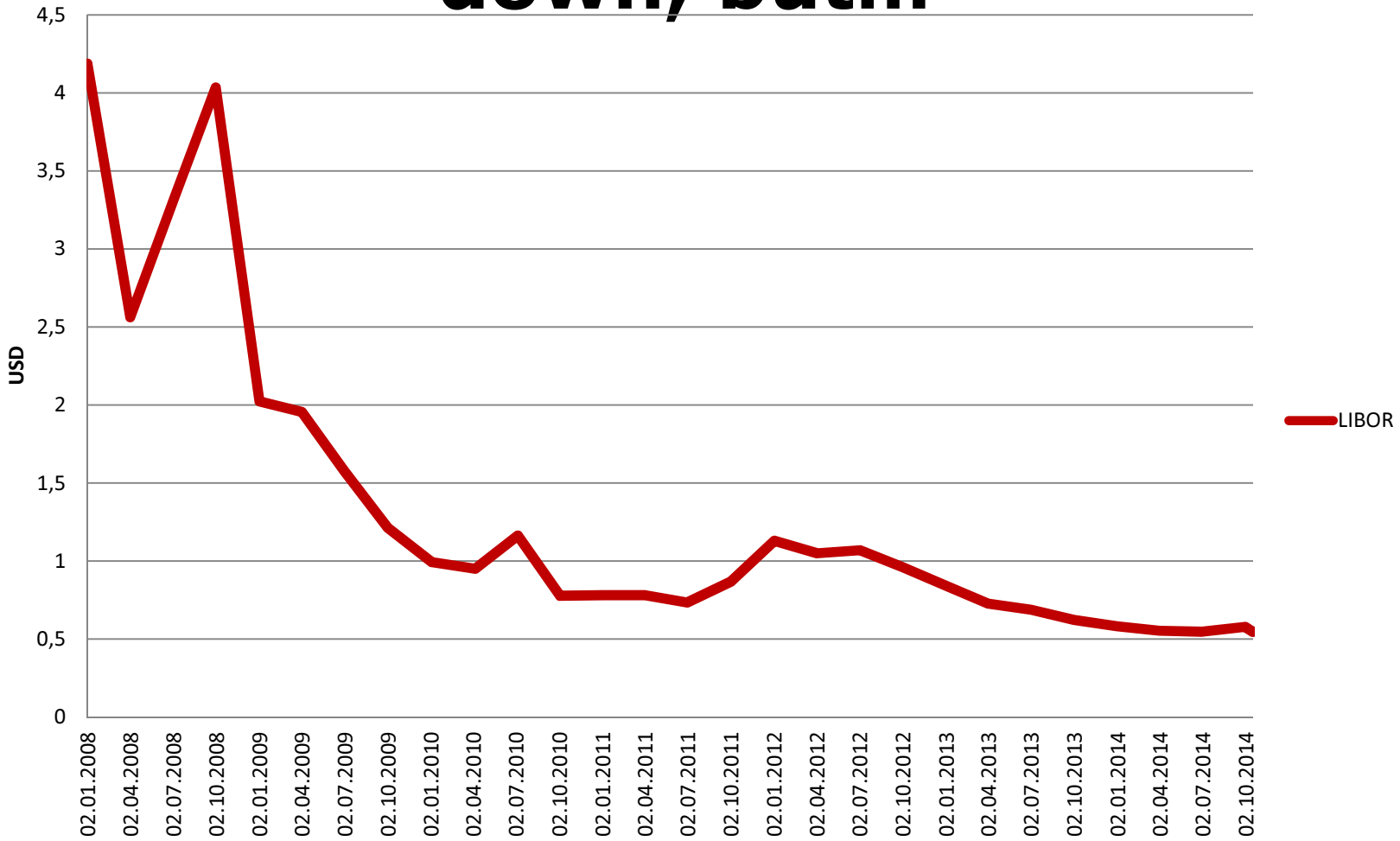
(A) In foreign currency

(B) In local currency



Compiled by M.Larionova, Russian Gubkin State Oil & Gas University, Chair "International Oil & Gas Business", Masters programme 2013-2015, based on credit rating agency's data.

1-year LIBOR, 2008-2014: – going down, but…



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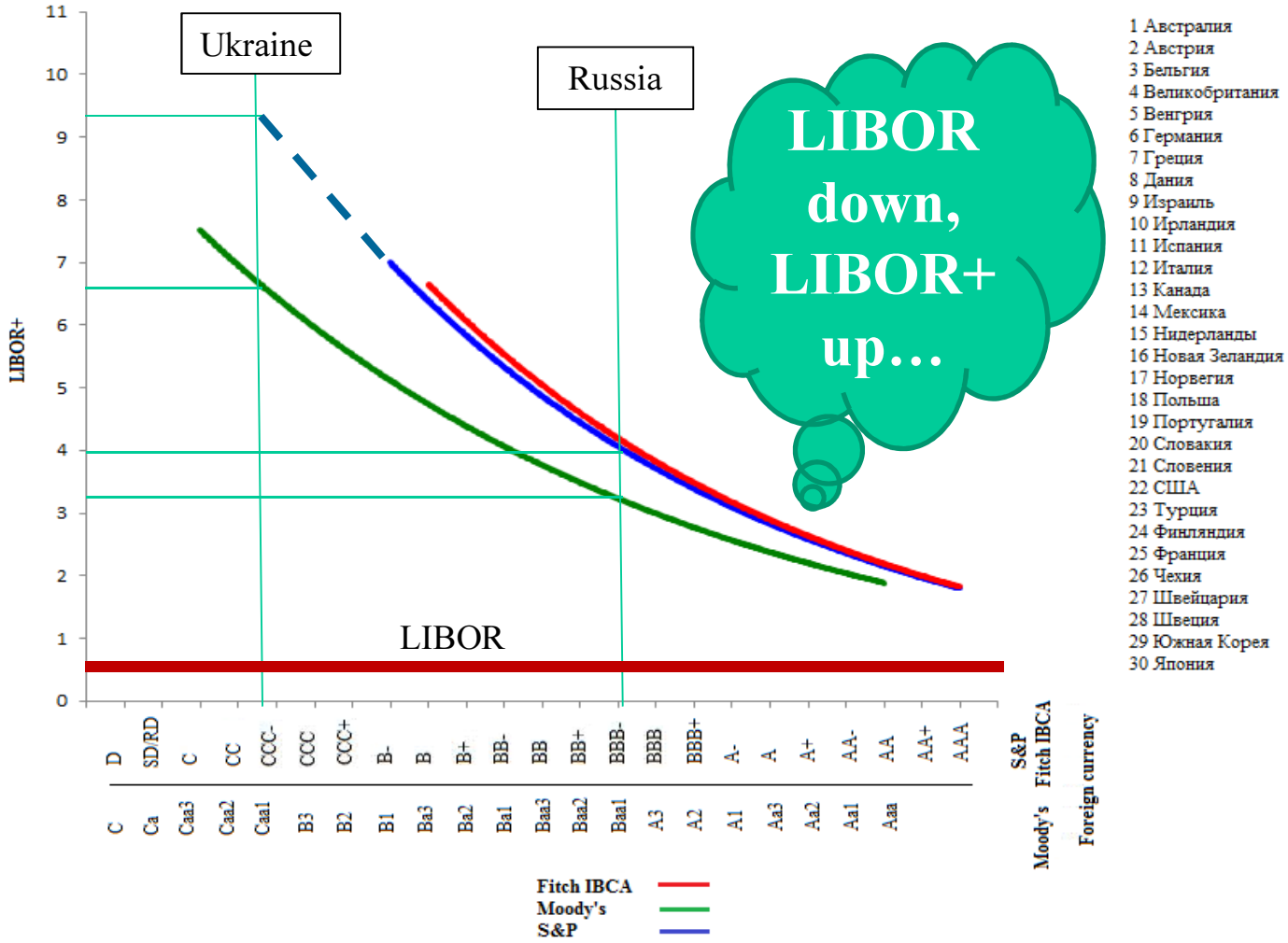
LIBOR+ for OECD states (23.05.2014) vs Russia & Ukraine long term credit ratings in foreign currency



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NJSC Naftogaz of Ukraine: evolution of long-term credit rating

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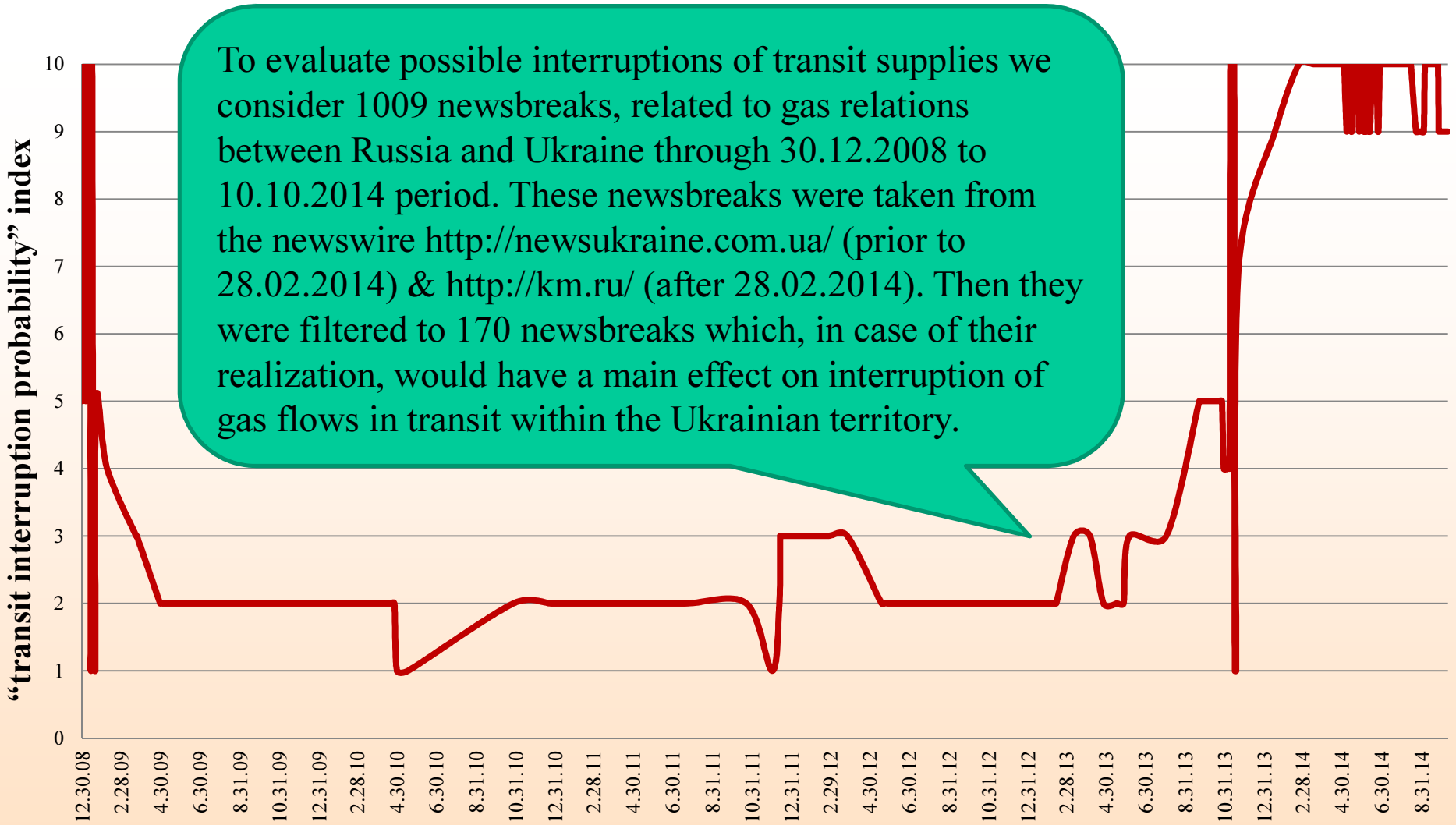
Ukraine: “transit interruption probability” index (2009–2014)



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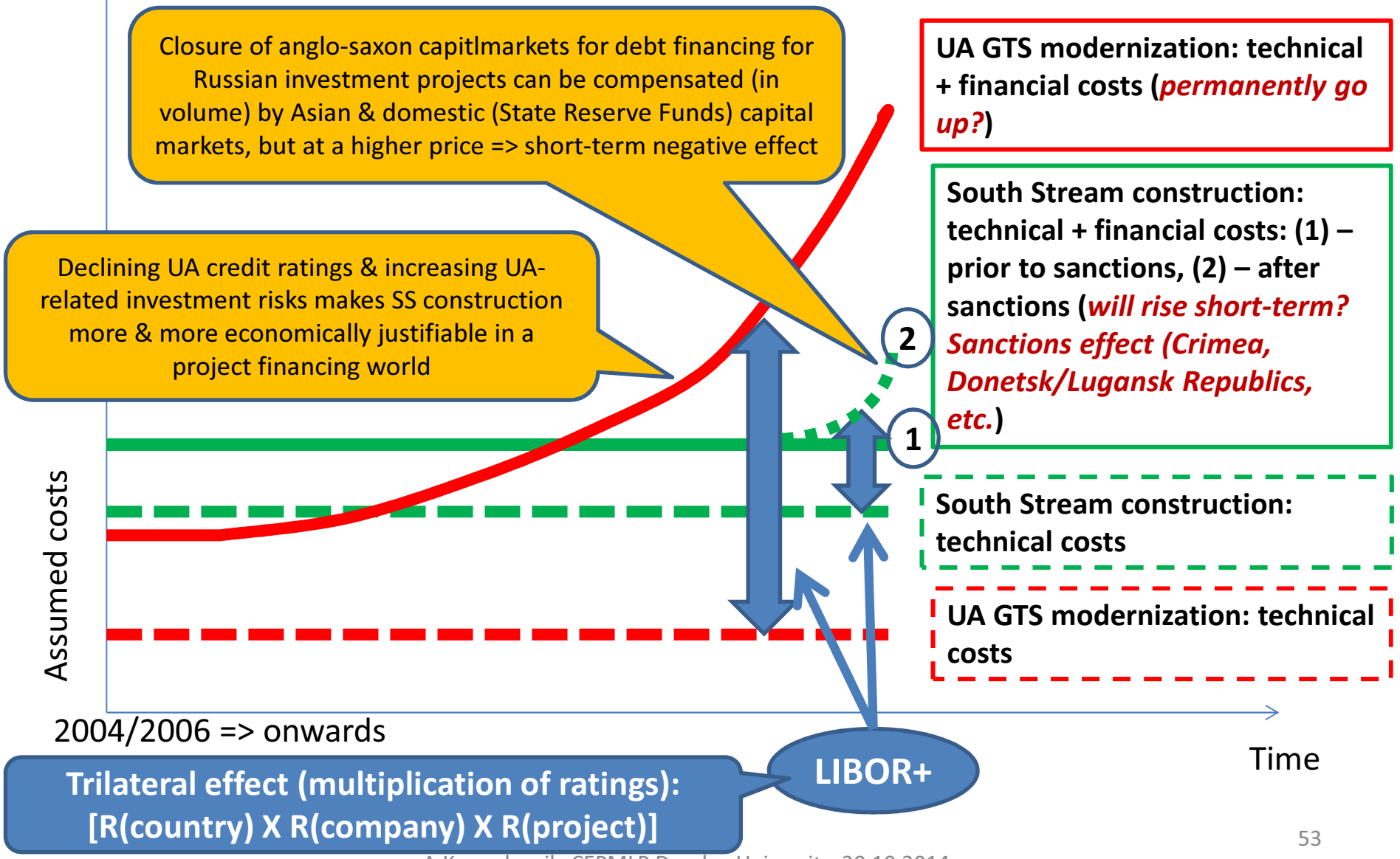
A.Konoplyanik, CEPMLP Dundee University, 30.10.2014

‘South Stream’ construction vs UA GTS modernization: illustrative example of ‘project financing’ cost comparison, if incl. comparative risks & credit ratings within time frame (*prior to* and *after* US, EU, etc. sanctions on Russia)



Thank you for your attention!

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