To new paradigm of international energy development, Russia, EU and ECT

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Inaugural presentation on the occasion of Honorary Professor's graduation, Centre for Energy Law, University of Aberdeen, Scotland, UK, February 16, 2018 **Disclaimer:** Views expressed in this presentation do not necessarily reflect (may/should reflect) and/or coincide (may/should be consistent) with official position of Gazprom Group (incl. Gazprom JSC and/or Gazprom export LLC), its stockholders and/or its/their affiliated persons, or any Russian official authority, and **are within full personal responsibility of the author of this presentation**.

Development of international energy markets and of mechanisms of investment-trade protection & stimulation



Current Paradigm of International Energy Development

- Possible, though in a rather distant future (at least post 2 global invest cycles), if any at all, supply side limitations due to dominant nonrenewable character of energy resource base =>
 - "Hubbert's curve" (1949) => bell-type production curve for non-renewable resource extraction => "peak oil" theory,
 - "Hotelling rule" (1931) => the future value of fossil fuel in-situ increases by the value of the current interest rate within the time-frame,
 - **<u>BUT</u>**: both theories:
 - did not consider possible demand-side limitations (f.i. due to environmental considerations), => First (alarmist) report to the "Club of Rome" (1972) => respond of Sh. A.Z.Yamani "Stone age came to an end not because end of stones..."
 - works for increasing future cost & value of in-situ non-renewable energy resource within time-frame, at least during post-"Chevalier's breaking point" period (since early 1970-ies)

World Energy: The Change of Paradigm?

Supply	Demand	Supply	Demand
- Hubbert peak (curve) - Hotelling rent (theorem) - Chevalier turning point	Economic growth(industrial-type)Population growth	 Technological progress, incl. US shale revolution => => Hotelling anti-theorem 	 Four steps in departure from oil Energy efficiency (delinking energy demand & economic growth, post-industrial-type)
Future energy resources more costly & limited (depletion			- COP-21 (upper limit/emissions)

rent) => low-cost win more rent, high-cost delayed

Future energy supply less costly & plentiful (partly not in demand?) => competition among suppliers increases => low-cost win, high-cost cut-off



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Marion King Hubbert (1903-1989) and his curve



Источник: https://en.wikipedia.org/wiki/M._King_Hubbert

Economic interpretation of Hubbert's curves (acc. to A.Konoplyanik)



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

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Deep horizons, deep offshore, Arctic, *shale gas*, CBM, CSM, CMM, biogas, gas hydrates, etc. ...

> Deep horizons, deep offshore, Arctic, heavy oil, *shale oil*, tar sands, GTL, CTL, XTL, ...

> > Primary source (basic figure (*)): A.Konoplyanik. Energy Security and the Development of International Energy Markets (pp. 47-84), p.49. – in: *Energy security: Managing Risk in a Dynamic Legal and Regulatory Environment.* /Ed. by B.Barton, C.Redgwell, A.Ronne, D.N.Zillman. – International Bar Association / Oxford University Press, 2004, 490p. (*) later reproduced in "Putting a Price on Energy..." (ECS, 2007, p.53), where this particular basic picture is taken from

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

Harold Hotelling (1895-1973) and his economic rule regarding natural resource rent

Price



Hotelling, Harold (April 1931). "The economics of exhaustible resources" Journal of Political Economy. The University of Chicago Press via JSTOR. **39** (2): 137–175.

Price P of oil rises, enabling more expensive substitutes (backstops) to come on-stream Hotelling Ricardian rent rent P_b^t tar sands biofuels electric transpor hotelling rule fischer-tropsch $P_{nr}^0 e^{rt}$ $P_{nr}^t =$ P_{nr}^0 Market supplied by Market supplied by non-renewable resource backstop *Production capacity = Proved* Time Tnr Recoverable Reserves

Source (basic graph): Neha Khanna, On the economics of non-renewable resources. – in: Economics Interactions With Other Disciplines (http://www.eolss.net/ebooks/Sample%20Chapters/C13/E6-29-03-01.pdf)

Pricing of Non-Renewable Energy Resources: Ricardian vs. Hotelling Rents



Source: A.Konoplyanik.The EU, Russia & Central Asia: new pricing mechanisms within FSU & prospects for alternative gas supplies to the EU // Lecture at the Center for Energy, Petroleum & Mineral Law & Policy (CEPMLP), University of Dundee, Dundee, Scotland, UK, October 14, 2009

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Corridor of cut-off (affordable) prices for producer & consumer



Mechanism of defining replacement fuel and upper investment price within under- and oversupply expectations

Expectation of "peak supply"

- Demand for energy resource ABOVE its supply =>
- Under-supply of given energy resource =>
- Replacement value (upper investment price) – in competition BETWEEN different energy resources (with suppliers of different energies)
- Indexation «given energy resource vs OTHER energy resource" (RFO vs coal; gas vs crude oil/petroleum products)

Expectation of "peak demand"

- Demand for energy resource
 BELOW its supply =>
- Over-supply of given energy resource =>
- Replacement value (upper investment price) - in competition
 WITHIN supplies of given energy resource (between suppliers of given energy resource)
- Indexation "given energy resource vs same energy resource FROM ANOTHER supplier" (gas vs gas)

J.M.Chevalier about turning point of the trends



Jean-Marie Chevalier. Le nouvel enjeu petrolier, Paris, 1973 Ж.-М. Шевалье, Нефтяной Кризис. – М.. Мысль, 1975

"In the fundament of our analysis we laid out the central hypothesis that in 1970-1971 the earlier trend of diminishing marginal production costs in petroleum industry has changed to their growth, at least in exploration of new fields and oil production. ... it is too early to prove this theory through the quantitative analysis. In the given research we have tried to provide its general assessment only." (1972) (Ж.-М.Шевалье, Нефтяной Кризис. – М.. Мысль, 1975, с.196)

Adjusted dynamics of E&P costs for hydrocarbons internationally in the second half of XX century (quantitative assessment of J.-M.Chevalier central hypothesis)



Source: Ю.Куренков, А.Конопляник. Динамика издержек производства, цен и рентабельности в мировой нефтяной промышленности. -"Мировая экономика и международные отношения", 1985, № 2, с. 59-73

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Evolutionary & Revolutionary STP effects on E&P costs of conventional hydrocarbons within the time frame after "Chevalier turning point"



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"Learning curves" & the role of State



Role of US state financing in stimulating "US shale gas revolution" (based on MIT study)



Conventional gas reserves vs shale gas resources



China, Argentina, Mexico, South Africa, Canada, Australia, etc. => New players at the world gas map? New gas infrastructure worldwide? When & at what cost?

Based on: "Financial Times" shale gas series, 22-25 April 2012

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Technology advances will change the relative cost competitiveness of resource types

Cost per barrel of oil equivalent (\$/boe)



Technology improvements to 2050 will enable us to recover more resources than we can today.

Technology innovation will enable us to access resources more cost effectively and they will have a major impact on unconventional resources that today are high cost and complex to recover.

Source:

http://www.bp.com/content/dam/bp/en/co rporate/pdf/bp-technology-outlook.pdf

Estimates of technically recoverable resources and cumulative oil demand



According to BP, world technically recoverable oil resources exceeds cumulative future forecasted oil demand for 2015-2035 by 3.7 times and for 2015-2050 – by 2 times; proved recoverable reserves – by 2.4 and 1.3 times correspondingly

> Source of base graph: **Spencer Dale,** Group chief economist. **BP Energy Outlook,** 2017 edition (http://imemo.ru/files/File/ru/conf/2017/0 7022017/07022017-PRZ-EO17-Presentation-Spencer%20short.pdf)

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2017 Energy Outlook

What is COP-21 & what it's future role?

- COP-21 the Paris agreement within UN Framework Convention on Climate Change, was prepared within climate conference in Paris,
- regulates the measures on diminishing CO2 emissions post-2020,
- adopted by consensus on 12 December 2015,
- signed on 22 April 2016, came in force 4 November 2016
- 179 signatory states, account for 95% of emissions
- From my view: Major factor of uncertainty in international oil & gas, accelerating shift to new paradigm of international energy development

COP-21 & New Limits to Growth

- IEA (2012): to limit global warming by 2°C without large-scale implementation of carbon capture & storage (CCS) = not be able to consume (*) MORE THAN ONE THIRD of global proven recoverable reserves (PRR) of hydrocarbons (HC) up to 2050
- OR: cumulative future CO2 emissions from *current* PRR HC volumes are **THREE TIMES HIGHER** than the upper limits of such emissions which are agreed upon in Paris bearing in mind sustainable global development.
- IEA: 2/3 of such potential emissions will come from coal, 22% from oil and products, and 15% from gas.

(*) through technological chains from production to end-use of each fossil fuel (coal, petroleum products, gas) in each energy/non-energy use of energy resources

COP-21 & New Paradigm of Energy Development

- COP-21 might radically change paradigm of future energy development !!!
- <u>FUTURE</u>: possible limitations on the demand side of global energy induced by the climatic-based restrictions on emissions (COP-21) - ???:
 - not all today's CPRR might be demanded by global economy
 - decreasing (NOT increasing) value of oil in place due to its staying potentially unclaimed (an opposite to Hotelling rule)
 - stimuli for quicker extraction and utilization of the current PRR hydrocarbons
 - this will accelerate expectations of the "cheap oil" era ("cheap" means not because of decreasing production costs but because of diminishing price that the society will be ready to pay for it)
 - future possible oversupply artificially created by climate change agenda ???







Energy (non-renewables, hydrocarbons): OPEC, USA, Russia => the only <u>current competitive niche for Russia (?)</u>

4. Non-energy materials (in non-energy use of energies) => (STP)

Energy paradigm => international law priorities => areas for international governance / cooperation: PAST -> TODAY

- International energy economy based on:
 - Mostly non-renewable energies (NRE)
 - Mostly centralized commercial (industrial-type) cross-border energy value chains
 - Physical energy markets (till mid-1980s), physical & paper afterwards
 - energy as commodity (commoditization of energy markets)
- Sovereignty over natural resources
 - UN GA Res. 1803, Dec'1962; ECT Art.18, 1994/98 role of national state
 - Fight for internationalization of supply (national supply vs international demand)
- Natural resource-rent generation & collection:
 - Geology risks
 - Monetization of nonrenewable resource rent
 - Cost plus (self financing) = minimum long-term price
 - NBRV + indexation (maximization of *marketable* resource rent) = maximum long-term price
 - Fight for resource rent: "resource nationalism" vs "optimization of natural resource rent collection"
- Primary attention: Access to resources (primary energy) => political risks (incl. nationalization, expropriation) & instruments of its mitigation:
 - Investor-host Gov't agreements (concessions, PSAs, risk-service, etc.)
 - International law instruments: DTTs, BITs, ... MITs
- Secondary attention: Access to capital, technologies, innovation within mostly non-competitive & non-transparent energy & other markets

Energy paradigm => international law priorities => areas for international governance / cooperation: TODAY -> FUTURE?

- International energy economy based on:
 - NRE & RES (climate change, import dependence, SoS)
 - Centralized (industrial-type) cross-border (NRE) & decentralized (rural + post-industrial: RES?) energy value chains
 - Physical & paper energy markets
 - Energy as financial asset (financialization of energy markets)
- Natural resource rent + technological rent generation & collection
- Access to capital, technologies, innovations in the more-and-more competitive & transparent energy & other markets
- Fight against energy poverty (access to end-use energy)
- Environmental considerations (pollutant pays) => "climate change" as new "production factor" (limitation/trigger)
- Transition risks => financial stability/risk mitigation:
 - Re-pricing of fossil fuels due to technological change demanded by world decision to limit fossil fuels emission (COP-21) =>
 - "Unburnable carbon" => huge drop of energy assets values? => how to exclude financial risk & shock
 - Financial Stability Board (FSB), the international body set up by the G20 in 2009 to monitor risks to the financial system
 - NB: G-20 accounts for 85% of the global emissions

Quo Vadis 2017: continued long-term liberalization of EU energy legislation – OR factual deviation from liberalization trends (i.e. same rules for all?) to protectionism and discrimination of (selective preferences for) some players? (in the narrowing relative demand niche for fossil fuel within changing paradigm of world energy development



Suggestion of expected directivity of Quo Vadis:

(i) this comes from the logic of prior 60Y+ historical development of common EU economic space, incl. in energy;
 (ii) it is expected to be the project for efficiency evaluation of the gas regulatory system of the still emerging internal EU energy market;
 (iii) the latter has been teleologically developed through the past 60Y based on provisions of the Treaty of Rome and progressively liberal instruments of their implementation

Organization of internal domestic EU gas market according to Third Energy Package



Source: 17th Madrid Forum (January 2010); ACER Gas Target Model, 30th Madrid Forum (October 2017)

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Whether 3rd EU Energy Package has overcome investmentrelated inefficiencies of 2nd EU Energy Package?

- 2nd EU Energy Package (2003):
 - Unbundling => separation of commodities & capacities markets => risk of "contractual mismatch"
 - MTPA => risk for Project Financing (risk for pay-back of CAPEX)
 - 2nd Gas Directive Art.21-22 => derogation from core EU rules as a mainstream for investing in infrastructure => about 40 major EU infrastructure projects (pipelines + LNG terminals) developed on the basis of Art.21-22

• <u>3rd EU Energy Package (2009)</u>:

- Investors expectation: 3rd package will establish regulatory rules which will enable to develop infrastructure projects WITHOUT any derogations, BUT
- Real life: concentration on derogations from the rules (3rd Gas Directive Art.35-36) as mainstream of investor-friendly EU regulatory development =>
- Demand for CAM NC INC (based on market-based Art.13.2 Third Gas Directive)

Evolution of EU gas market organization & pricing

Producer does influence both on transport. cost & on selling price

Producer does influence on transport. cost, but does not on selling price

Oil-indexed

Producer does not influence nor on transport. cost (TSO establishes tariffs), nor on selling price

Oil-indexed price + spot (gas-to-gas competition)

Gas-indexed price (gas-to-gas competition) at physical market + futures-based financial derivatives at paper market



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Russian Gas Supplies to Europe: Zones of New Risks for Existing Supplies Within Russia's Area of Responsibility



Italic – non-EU countries; New EU accession states: <u>underlined</u> – since 01.05.2004, <u>underlined + italic</u> – since 1.01.2007; **Bold** – FSU states members of ECOMT; A, B, C – points of change of ownership for Russian gas and/or pipeline on its way to Europe

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Contractual Mismatch Problem



Mismatch between duration/volumes (D/V) of long term supply (delivery) contract & transit/transportation contract as integral part to fulfill delivery contract => risk of non-renewal of transit/transportation contract at **existing** capacity *or* non-creation of adequate **new** capacity => risk of non-delivery for existing/new **supply** contract (incl. arbitration consequences).

Core issue: to guarantee access to/creation of adequate transportation capacity for volume/duration of long term contracts; **shipper's contracts (booking guarantees) best financial security for debt/project financing**

EU acquis' international expansion instruments (energy industry)



ECT & EU acquis in their comparative development



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ECT IS BUSINESS-ORIENTED TREATY (how it works)

ECT/Legislation $\rightarrow \downarrow$ risks $\rightarrow \downarrow$ financial costs (cost of capital) = 1 \rightarrow \uparrow inflow of investments (i.e. \uparrow FDI, \downarrow capital flight) $\rightarrow \uparrow$ CAPEX $\rightarrow \downarrow$ technical costs = 2 \rightarrow 1 + 2 = 3 $\rightarrow \uparrow$ pre-tax profit $\rightarrow \uparrow$ IRR (if adequate tax system) $\rightarrow \uparrow$ competitiveness \rightarrow \uparrow market share $\rightarrow \uparrow$ sales volumes $\rightarrow \uparrow$ revenue volumes

ECT provides multiplier legal effect in diminishing risks with consequential economic results in cost reduction and increase of revenues and profits



Key reasons for Russia to withdraw from ECT provisional application (Konoplyanik's personal vision)

- Transit related concerns:
 - of documentary character:
 - In ECT: (i) Art.7.3 (domestic vs transit tariffs); (ii) Art.7.7 (conciliator & interim transit tariffs)
 - In draft Transit Protocol: (i) definition of available capacity, (ii) competitive procedures of access to transportation capacities: Right of First Refusal; (iii) REIO clause (existence of transit within EU)
 - of practical application:
 - 2006 & 2009 Russia-Ukraine gas transit disputes: perceived role of ECS
- Investment-related issues:
 - Yukos case (2004 onwards)

• Some misinterpreted (A) vs lost (B) benefits by Russia and its energy companies:

- (A) Domestically host country investment obligations:
 - No obligations after withdrawal (even retroactively?) vs 20Y obligations to stay after withdrawal under ECT provisional application (Art. 45) => 2009-2029
- (B) Internationally ECT as an instrument against:
 - EU liberalization risks
 - Unilateral introduction of sanctions by ECT CPs => by EU and its MSs

Increasing number of 'investor-state' disputes based on ECT Art.26 from investors of EU Member-States against EU Member-States



For the period since 2001 (since the first 'investor-state' claim based on ECT Art.26) till 21.04.2015 – total of 67 such claims, incl. 33 claims (half of the total) is from investors of the EU Member-States against the EU Member-States, notably, within the EU (internal cases) – de facto against EU "liberalization risks

Source: У.Руснак, А.Конопляник. Эволюция модели энергобезопасности. Россия и ДЭХ: не остаться на обочине. // «Нефтегазовая Вертикаль». 2015, №10, с.4-12 (7). Based on: http://www.energycharter.org/what-we-do/dispute-settlement/all-investment-dispute-settlement-cases/ Russia's existing/new supplies to Europe (to the unbundled EU gas market): (1) resource base moves from Nadym-Pur-Taz to Yamal, (2) Ukrainian transit risks & costs increases, => (3) modernization existing (since end-60's) infrastructure vs new construction transportation route



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Length comparison of different gas routes from Yamal to Germany



Length of the route via Nord Stream is 1885 km shorter than through UA GTS, incl. that within Russian territory the distance is shorter by 1010 km. Route via Ukraine is 45% longer than via Nord Stream.

Five selected Quo Vadis scenarios

1) Tariff reform

- nullification of intra-zone E-E tariffs, compensatory increase of entry (to EU wholesale market) and/or exit (to EU retail market) tariffs, centralized redistribution of compensatory revenues (via newly established TCF)
- 2) Real merger of market zones
- 3) Virtual merger of market zones
 - paving the way for virtual reverse flows to UA
- 4) Shift of delivery points to the external border of EU (area of EU acquis => EU + Energy Community area)
 - Russian gas to be delivered to RF-UA border
- 5) Expansion of pipeline infrastructure to deliver regasified LNG from coastal import terminals to inside EU (the main/Rus delivery points)
 - To substitute their Rus gas shifted to RF-UA border? who will finance? Via TCF?

<u>My final conclusion (devil's advocate/worst-case interpretation)</u>: Quo Vadis in its current structure presents an integral programme of pushing out the (more cheap) Russian pipeline gas supplies to the periphery of the EU/Energy Community area (RF-UA border) and its substitution in the (Eastern EU) area of its historical presence by (more costly) US LNG

Possible application consequences (schematic) of five Quo Vadis scenarios (4+1), selected for quantitative modelling, under their most negative interpretation for Russian side

- Existing key delivery points of Russian gas to the EU New delivery points of Russian gas to the EU as proposed in Quo Vadis report
- Existing LNG terminals
- New LNG terminals
- Development of new pipeline infrastructure from existing LNG terminals to existing delivery points of Russian gas within the EU as proposed in Quo Vadis report
- Shift of existing delivery points of Russian gas inside the EU to their new locations at the external border of the zone of EU acquis application as proposed in Quo Vadis report Transfer of existing transit business of Russian gas to existing delivery point within the EU to the mid-stream companies of the EU as proposed in Quo Vadis report
- New merged regional gas market zones as proposed in Quo Vadis report
 New North-South EU gas pipeline corridor in the Eastern part of the EU to connect new LNG terminals

A.Konoplyanik, Inaugural lecture, Aberdeen, 16.02.2018 Source: A.Konoplyanik. EU Quo Vadis: a theoretical exercise with an anti-Russian Flavour? // *"Natural Gas World - Global Gas Perspectives"*, 19 October 2017; <u>https://www.naturalgasworld.com/gpp-eu-quo-vadis-</u> <u>a-theoretical-exercise-with-an-anti-russian-flavour-56079</u>

Fight against NS2: multilayer task for EU (& other players)

- To force Russia continue large-scale gas transit to EU via UA post-2019 => to pay transit fees instead of supporting UA from EU/US public finance
- Special Third Gas Directive amendments for NS2: to slow down (if not to prevent) its construction/start-up + export EU acquis into Russia (MTPA => competition between Russian companies)
 - Export EU acquis upstream cross-border gas value chains = regular long-standing EU task in favour of EU business
 - Most recent: new concept "upstream-downstream partnership" in Quo Vadis 2nd preliminary report (13.12.2017)
 - Additional (hidden?) aim (?): to provoke further conflict between Gazprom & Rosneft (on Russian gas market "liberalization" issue):
 - Gazprom: state agent (sole pipeline exporter by law) on monetizing Russian pipeline gas (maximize marketable rent) => to escape Rusgas-to-Rusgas competition
 - Rosneft: would like to monetize its large gas resources (preferably internationally), agent agreements
 on gas marketing at external markets: with GPE vs with BP
 - Political consequences: open conflict between two Russian state companies = a blow on prestige of "Putin's regime"?
- Whether ECT can help Russia/Gazprom/NS-2 sponsors to sustain anti-NS-2 legal initiatives of the Commission?
 - ECT Art.13 => Art.26: Investors of EU MSs against the EU (reverse to "Yukos Case")?

Thank you for your attention!

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