

Evolution of EU low-carbon policy/vision – and prospects of Russia-EU cooperation within GAC WS2: challenges & bifurcations (introductory remarks of the WS2 co- chair)

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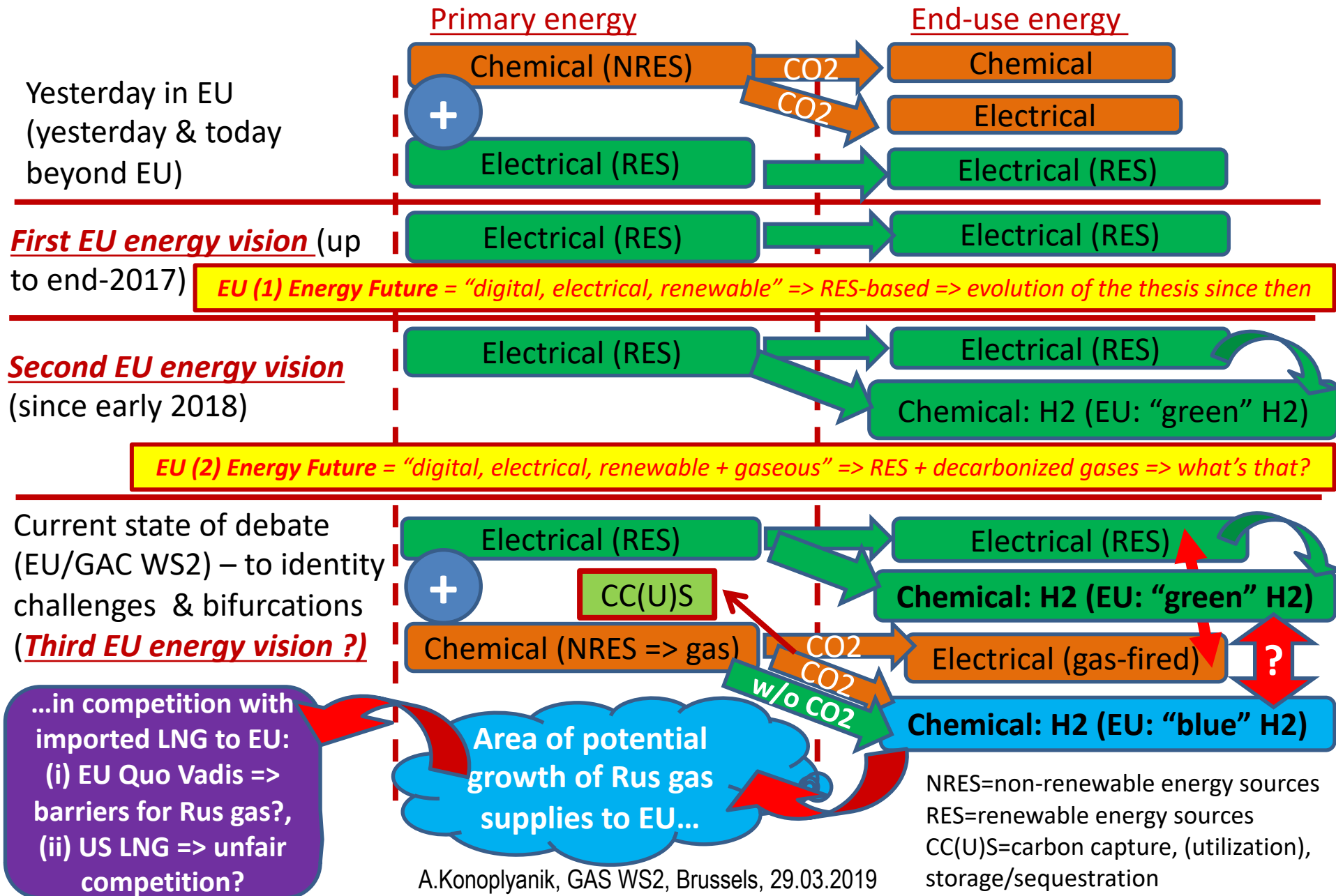
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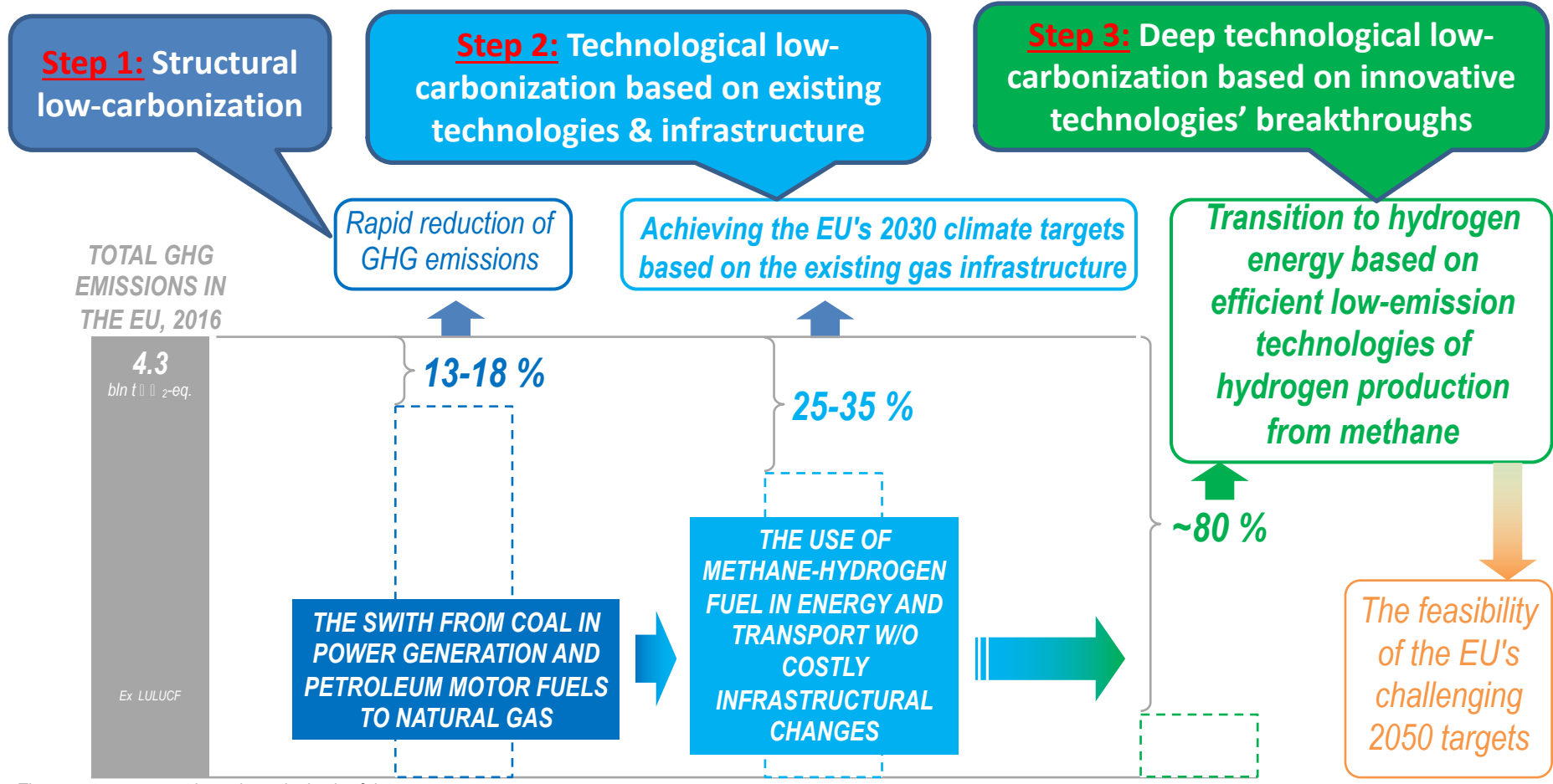
Russian State Gubkin Oil and Gas University

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Innovative low-emission methane-hydrogen scenario for the low-carbon EU energy future within its argued "Third EU energy vision": three-steps of Gazprom's/Aksyutin's path



The expert assessment is made on the basis of data on:

- Carbon intensity from different fuels (U.S. Energy Information Administration estimates);
- Carbon footprint of various motor fuels (European Natural gas Vehicle Association report, 2014-2015);
- EU GHG emissions (1990 – 2016 National report on the inventory of anthropogenic emissions by sources and GHG removals by sinks not controlled by the Montreal Protocol, IEA)

Source: O.Aksyutin. Future role of gas in the EU: Gazprom's vision of low-carbon energy future. // 26th meeting of GAC WS2, Saint-Petersburg, 10.07.2018 (www.fief.ru/GAC); PJSC Gazprom's feedback on Strategy for long-term EU greenhouse gas emissions reduction to 2050 // https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2018-3742094/feedback/F13767_en?p_id=265612

Low-carbon EU energy future & Russia-EU challenges & bifurcations: agenda for GAC WS2

- 1) All-electric (RES-based) **vs.** electric + gaseous (RES + decarbonised gases) EU energy future
- 2) RES + decarbonised gases: “RES (electricity) + RES (renewable gases)? [(H2 = P2G = green H2 only) + biogases] **vs.** RES (electricity) + RES (renewable gases) + non-renewable gases
 - a. Green H2 = RES electricity (available tech, but small & not-bankable), or
 - b. “Green” H2 = electricity from the grid (available tech, but not green)
- 3) RES + Decarbonised (renewable & non-renewable) gases: green H2 + blue H2 with CO2 **vs.** green H2 + blue H2 with/without CO2 => what “blue” H2 is?:
 - a. Blue H2 **with** CO2 => CC(U)S needed => available tech, but more costly, less bankable (Norway’s path)
 - b. Blue H2 **without** CO2 => no need in CC(U)S => not yet commercialized tech for H2(*), but can be less costly (since no CC(U)S), more bankable => Russia’s/Gazprom’s path (three-steps “Aksyutin’s path” - A.K.) => but in the common interests of both EU & Russia => to jointly commercialize (once again, now for H2) from current R&D?
- 4) Where to decarbonize within cross-border gas value chain?: upstream **vs.** downstream
 - a. **Upstream** (in Russia) – not in multilateral interests
 - b. **Downstream** (within the EU) – within multilateral interests

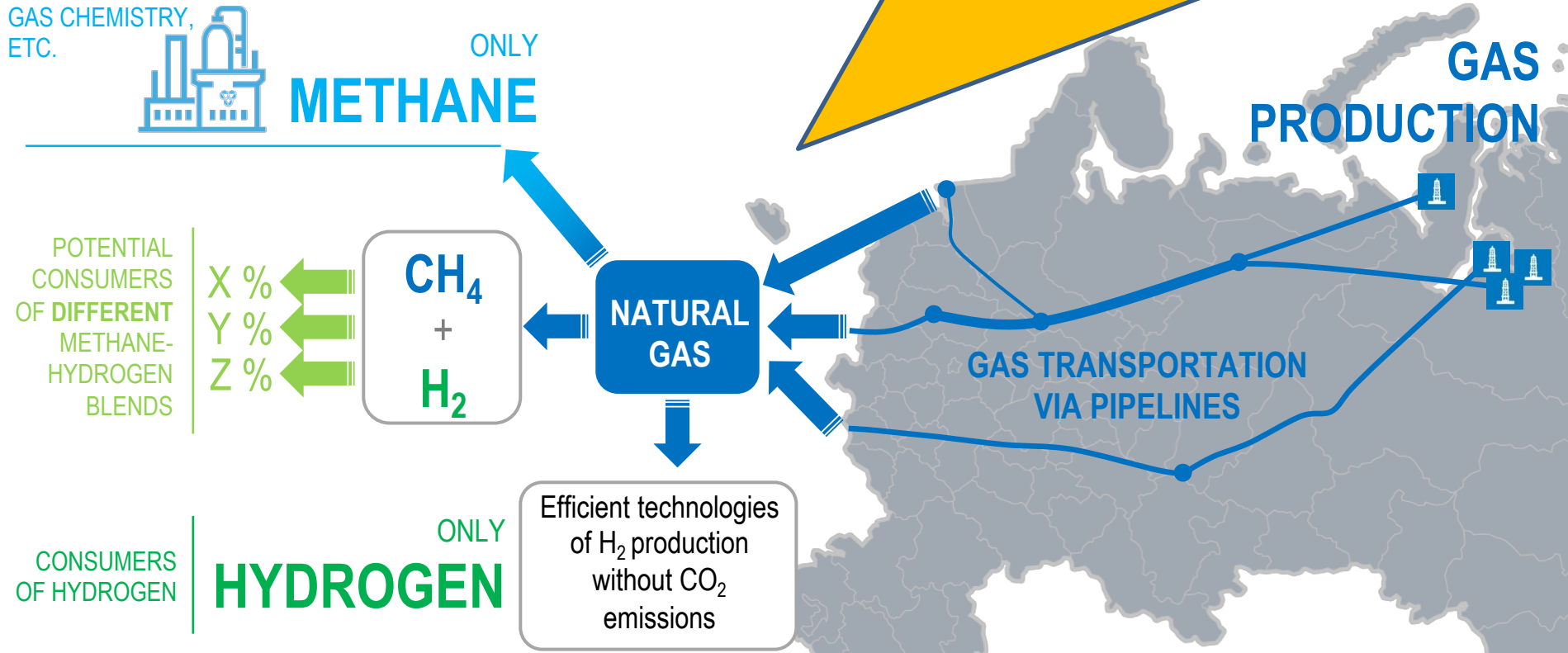
Green H2 (EU/CertifHy): generated by RES (Bio/Hydro/Wind/Solar) with carbon emissions 60% below the benchmark emissions intensity threshold (= GHG emissions of the hydrogen produced by steam reforming of natural gas representing 95% of current merchant market).

Blue H2 (EU/CertifHy): created by NRES (Nuclear electricity/Fossil with CC(U)S i.e. with to-be-utilized CO2) with emissions below the same threshold => **NOT considering Blue H2 without CO2 i.e. without CC(U)S !!! (seems to be general understanding within the EU)**

In both cases emissions shall be less 60% of medium industry levels (under steam reforming), so both green & blue H2 under EU definitions have the same limit of GHG emissions and same influence on climate (*) except 1998-2001 in Canada for black carbon

SELECTION OF LOCATION FOR HYDROGEN PRODUCTION

80% CO₂ emissions within Russia-EU cross-border gas value chain are downstream, at consumer end, within EU => low-carbonization downstream (at end-use, within EU) based on Russian gas export & (export of Russian, if commercialized & competitive) no-CO₂ technologies of H₂ production => fair competition, technological neutrality, mutual complementarity of “blue H₂” technologies with (Norway/Equinor path => incl. CCS) & without (Russia/Gazprom path => no CCS) CO₂ emission



Source: O.Aksyutin, A.Ishkov, K.Romanov. Potential of natural gas decarbonization: Russian view of the cross-border gas value chain. // 27th meeting of GAC WS2, Brussels, 07.12.2018 (www.fief.ru/GAC)

Thank you for your attention!

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