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U.S. Chamber of Commerce

Chevron

Elements of regional and international cooperation for a net-zero vision of Kazakhstan

by Eng. Rocco De Miglio

5 November 2021
Central Asian pavilion

COP 26: Kazakhstan's Way to Carbon Neutral Future

"National Conservation Initiative" Corporate Fund

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Definitions and approach

Regional/International cooperation (in the energy and climate field) as a multifaceted concept that can potentially be translated into “co-design of policies”, “co-development of technologies/solutions”, “co-financing of projects and measures”, “rational exchanges of surpluses”, “sharing experiences, practices or lesson learned”, and “dialogue”, to find and strengthen common interests.

Kazakhstan as the centroid of the “game”

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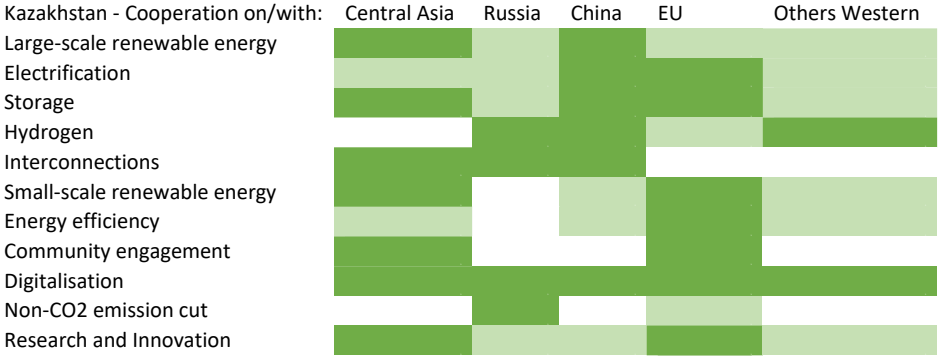
Keywords and actors

Message to G20 energy and climate leaders (23 July, Napoli, Italy): *"A new global energy economy is emerging! We already have many of the technologies we need to reach net-zero and we know innovation can help to finish the job. International cooperation is key to succeed"*. Mr. Fatih Birol, IEA Executive Director.



Qualitative (indicative) color-gradient scale

Searching for direct/indirect areas of cooperation

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Kazakhstan and Central Asia

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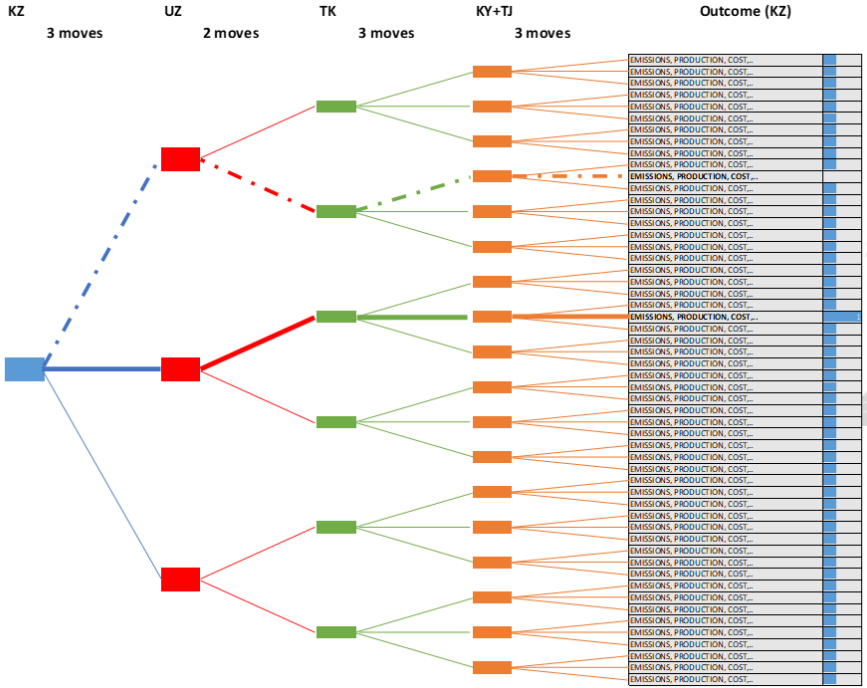

Key moves/strategies: “watergy”; renewable energy; infrastructures; hydrogen value-chain.

Forum: Cac.tribe.so

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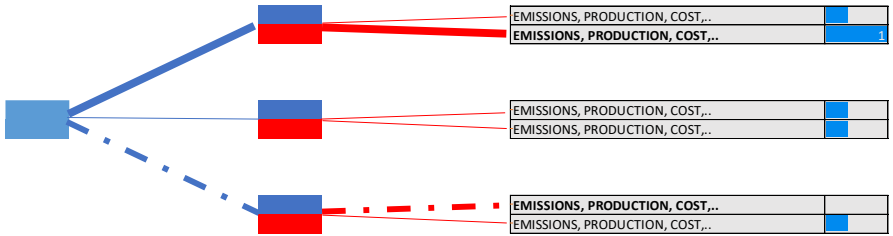
Kazakhstan and Russia

Current lines of priorities: carbon sequestration and nuclear energy – hydrogen (in view of the CBA).

Second order: renewable (HV transmission lines), hydrogen production clusters and export (a “Southern” cluster can be developed!).



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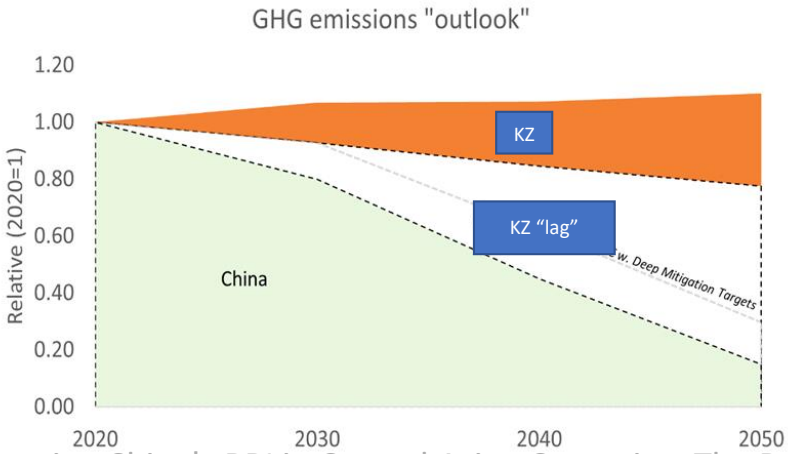
Kazakhstan and China

Green BRI; surplus of hydrogen; free-riding



Greening China's BRI in Central Asian Countries: The Role of Hydrogen Towards Net-Zero Future. Available at SSRN: https://ssrn.com/abstract=3858058

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Kazakhstan and other (Western) players

EU-Highlights (potential lessons / food for thoughts for Kazakhstan and other players):

-massive investments/penetration of renewable, electrification of the end-uses;

- phase-out of solid fuels, nearly-zero oil products use in transport;

- exploitation of e-fuels (for hard-to-electrify services);

- development of carbon removal technologies (hard-to-abate emissions, eg non-CO2 agriculture)

The new EU programme "SECCA" – EU Support to Sustainable Energy Connectivity in Central Asia' (SECCA).

Recent G7 initiative called "Build Back Better World" ("B3W"): global infrastructure development for a "green growth" (climate-, digital-, equality-, transparency- related values and criteria).

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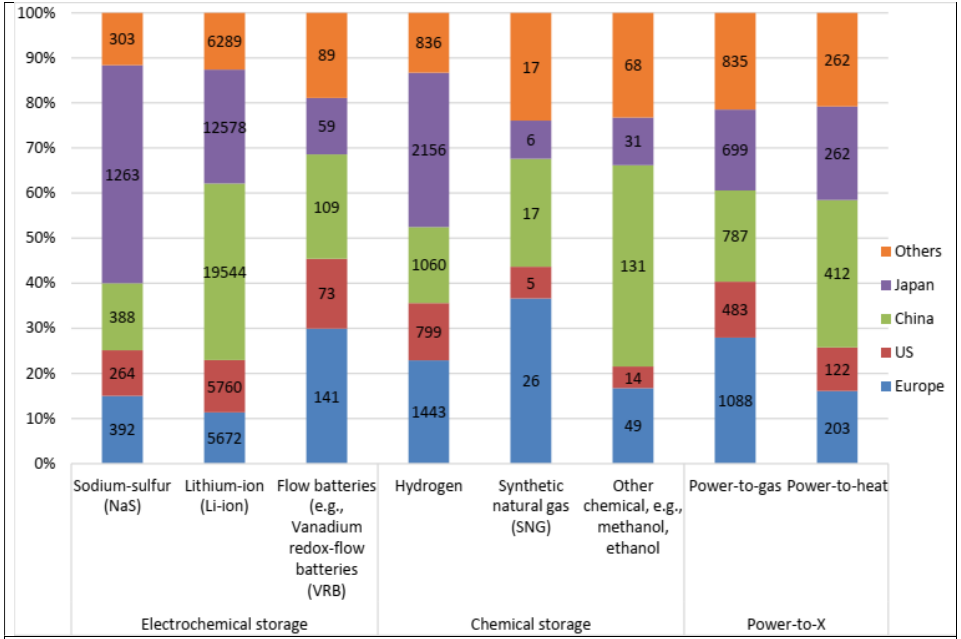
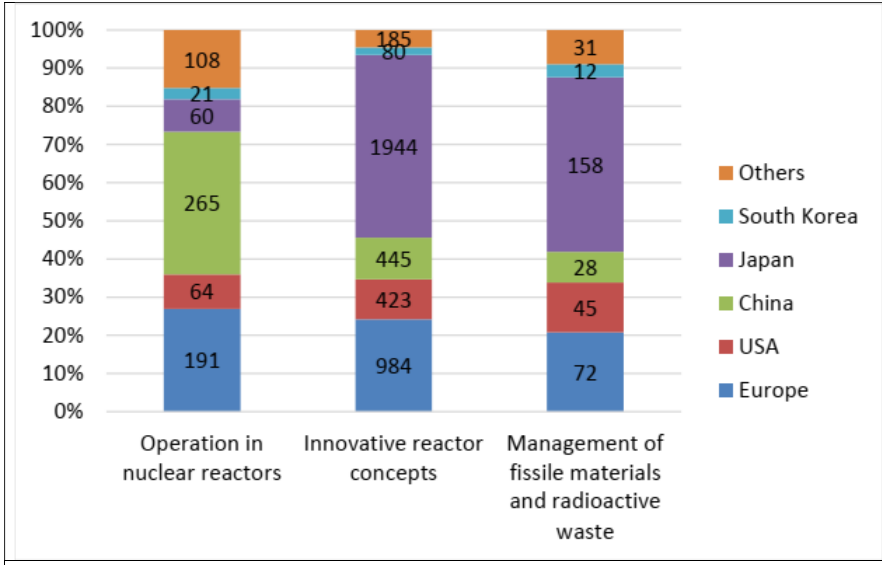
Innovation potential on strategic technologies (1)



In the large-scale energy storage field, it is Japan who comes first in the ranking by number of patents (Figure III-IX) for large-scale batteries and hydrogen, due to the activity of its two leading companies: Panasonic and Hitachi the pioneer of lithium ion batteries for automobile use. China published the most patents about compressed air.



Top 3 industrial players (by number of patents): *Nuclear reactors*
1. Areva Europe
2. Westinghouse –GE US
3. Atomstroyexport Russia

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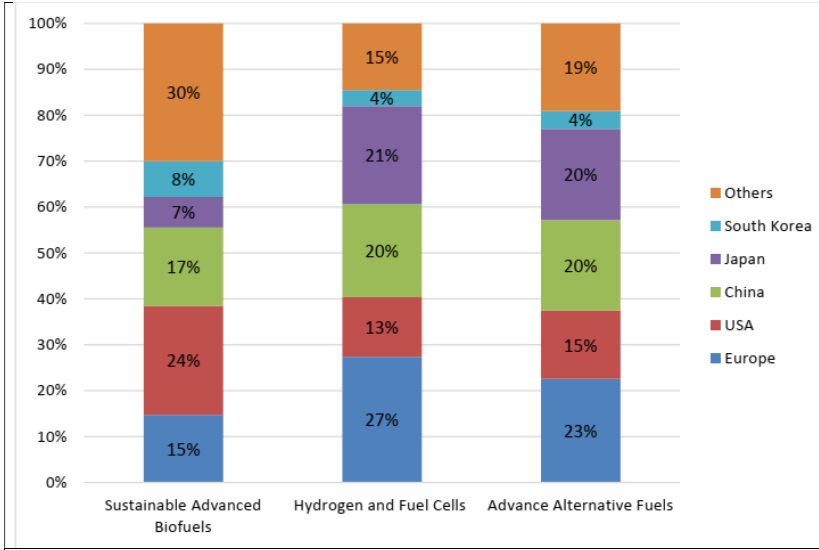
Innovation potential on strategic technologies (2)



Top 3 industrial players (by number of patents): *Hydrogen and Fuel Cells*
1. MATSUSHITA ELECTRIC IND CO LTD Japan
2. SIEMENS AG EU
3. HITACHI LTD Japan

Top 3 industrial players (by number of patents): *Advanced Alternative Fuels*
1. ALSTOM TECHNOLOGY LTD EU
2. ASHLAND OIL INC USA
3. SNAM PROGETTI EU

European Patent Office: Global Patent Index (EPO GPI)

Exploring the strengths and weaknesses of European innovation capacity within the Strategic Energy Technologies (SET) Plan.

Available at: http://www.insightenergy.org/static_pages/publications#?publication=24

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Thank you!

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Special thanks to Dr. GianCarloTosato for inspiring the work on Central Asia

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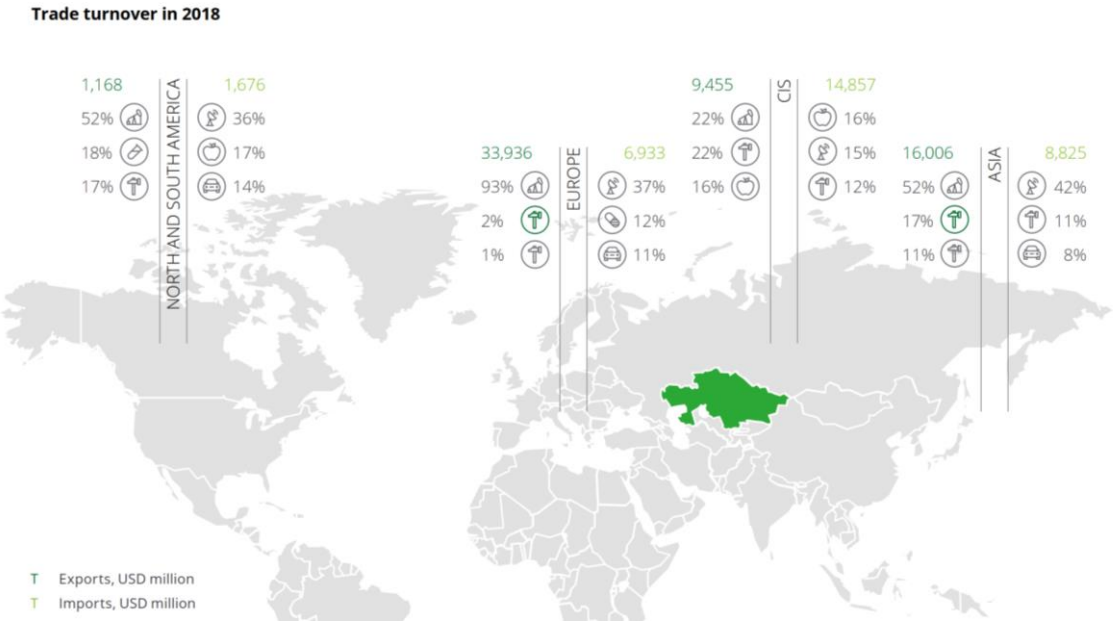
Modern Industry (Sectoral Transformation)



Ministry of Finance of the Republic of Kazakhstan
(Deloitte – Business Outlook)

- Mineral fuels, oil and oil products
- Inorganic chemical products
- Ferrous metals and products
- Nonferrous metals and products
- Machinery and equipment
- Transport
- Pharmaceutical products
- Plant products

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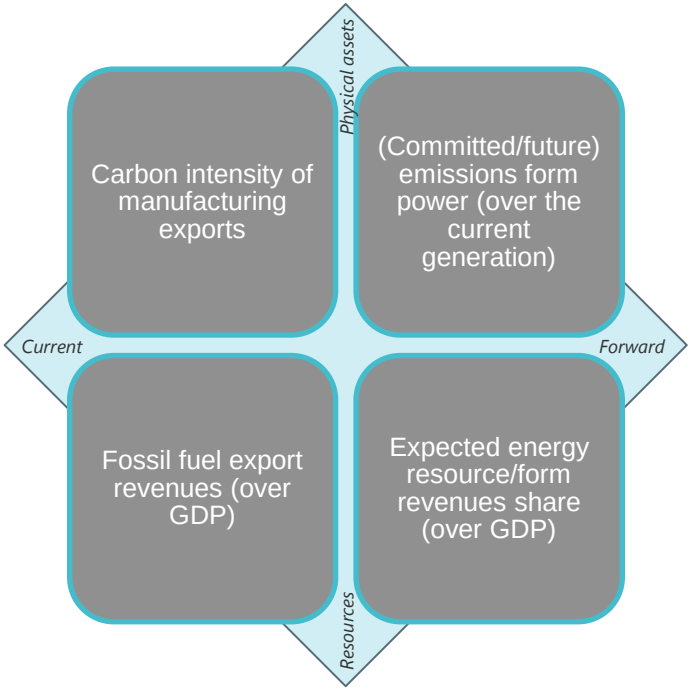
“Exposure” to world low-carbon transition: “high”



Author’s elaboration, adjusted from World Bank. doi:10.1596/978-1-4648-1340-5

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Co-creation and engagement

Climate ambitions (NDCs and beyond)	CO2 taxation / energy subsidies	Regulatory policies / Standards (e.g. buildings, vehicles)	Capacity expansion / refurbishment projects
Incentives for green technologies	ETS-like instruments • National • Supranational	H2 / nuclear / CCS / "watergy"	Regional integration - cooperation • Energy-economic corridors • …
Heavy industries (physical outputs)	Transport demand	…	LEDS, LTES, NECP, NCs/BR, …, COP26

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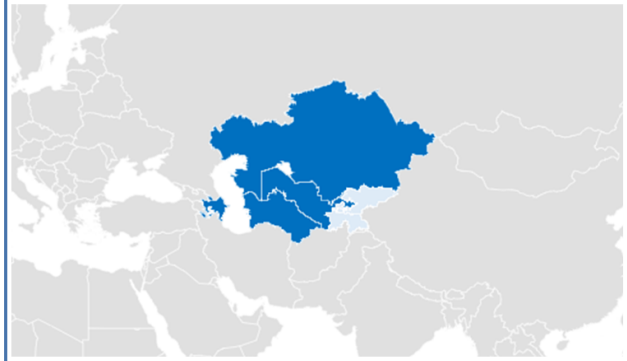
The Central Asia Caspian model

Integrated energy system model

(Azerbaijan, Kazakhstan, Turkmenistan, Uzbekistan) + trades



http://paris-reinforce.epu.ntua.gr/detailed_model_doc/times_cac

- BaseYear: 2017- Horizon: until 2050 (2017, 2018, 2020, 2025, 2030, 2035, 2040, 2045, 2050)
- Built based on "bottom-up reconstructed" National Energy Balances
- (Intra-annual) timeslots: up to 24 slices (4 seasons * 6 intraday slots)
- Sectors: mining/upstream; secondary transformation and generation, demand sectors (residential, tertiary, industry, agriculture, transport)
- High level of technology/activity explicitness (supply and demand side)
- Trades with RoW (particular attention to the trades with Kyrgyzstan and Tajikistan)
- Emissions coverage: GHGs (Fuel combustion activities A1-A4, Fugitive emissions from fuels)
- Dynamic Partial Equilibrium model formulated in MILP (TIMES-based)

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“Dashboard” for Central Asia scenarios

Click and view (scenario-specific KPIs) – Multiple selection allowed

Click and view (country-specific KPIs)