Training on Long-Term Energy Strategy development using modelling approaches (Azerbaijan) – Lecture 3

The Paris Reinforce Project: understanding regional aspects in the Central Asian and Caspian region (and hints about Azerbaijan)

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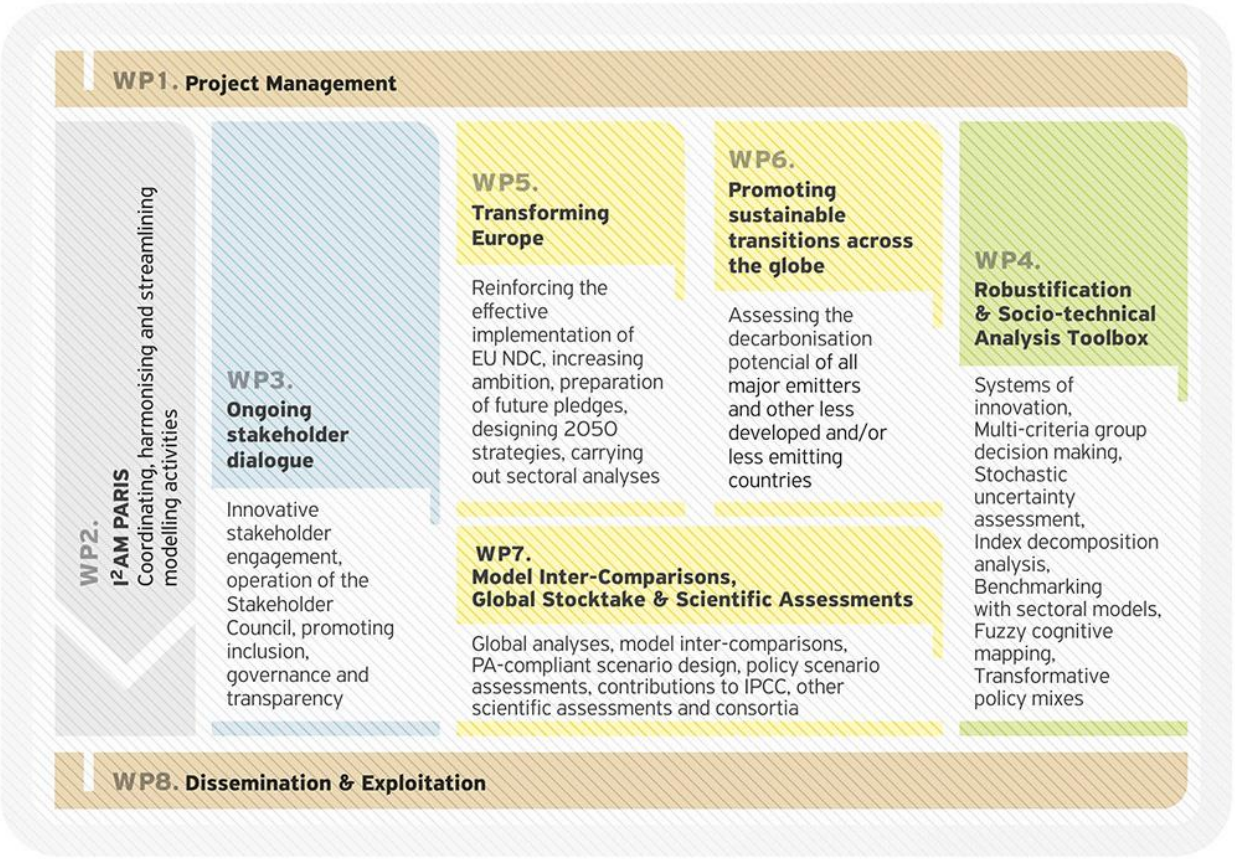
www.paris-reinforce.eu

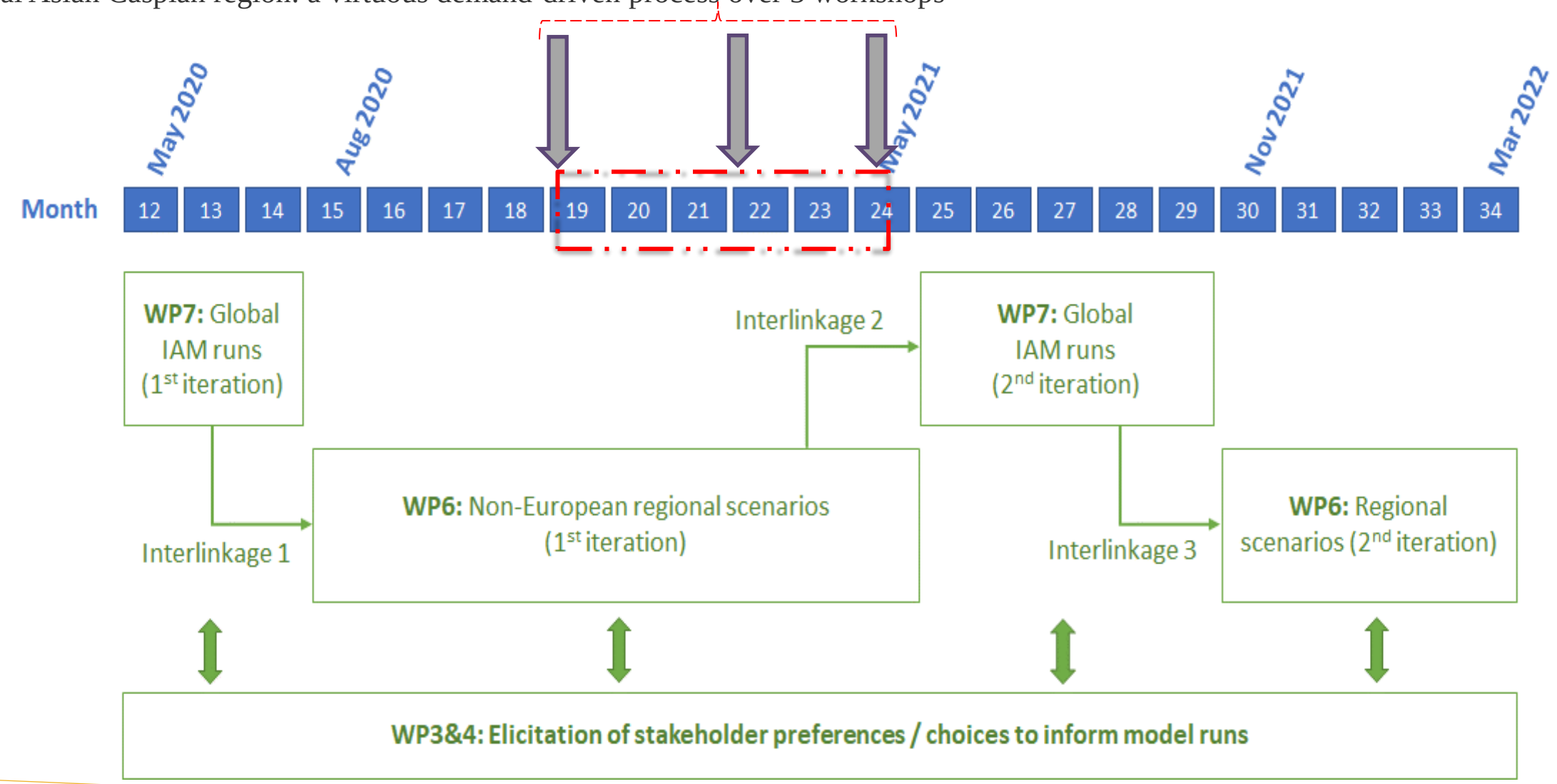
PARIS REINFORCE



Paris Reinforce Project

- Aims to develop a novel, demand-driven, integrated assessment model-oriented framework.
- Aims to engage stakeholders and policy-makers to analyse climate policies in the European Union as well as in other major emitters and selected less emitting countries (wrt Paris Agreement).
- Aims to support the effective implementation of Nationally Determined Contributions (NDCs), the preparation of future action pledges, **the development of 2050 decarbonisation strategies**.
- Diverse methodologies and tools in order to address the multiplicity of challenges.

The Central Asian Caspian region: a virtuous demand-driven process over 3 workshops



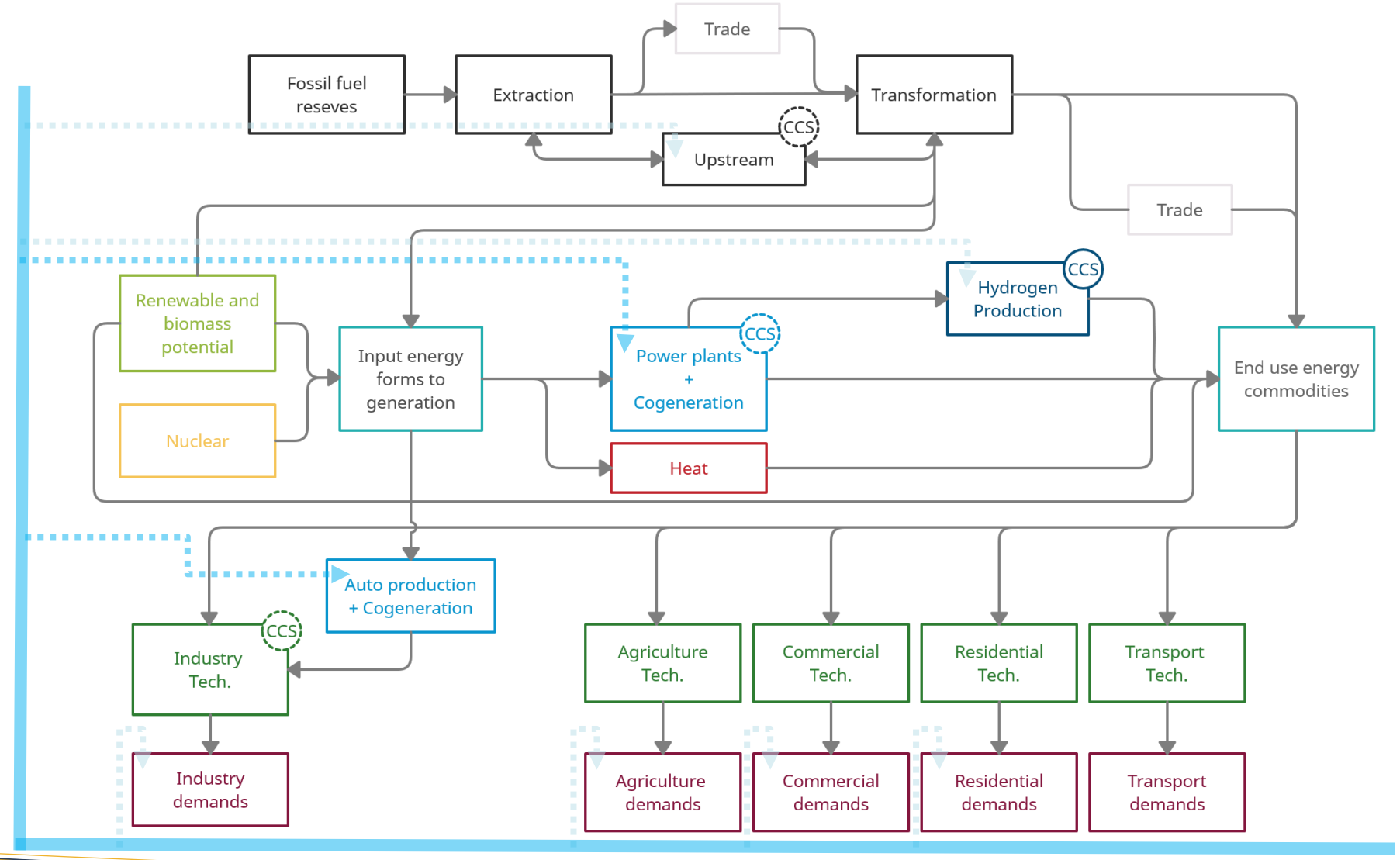
TIMES-CAC

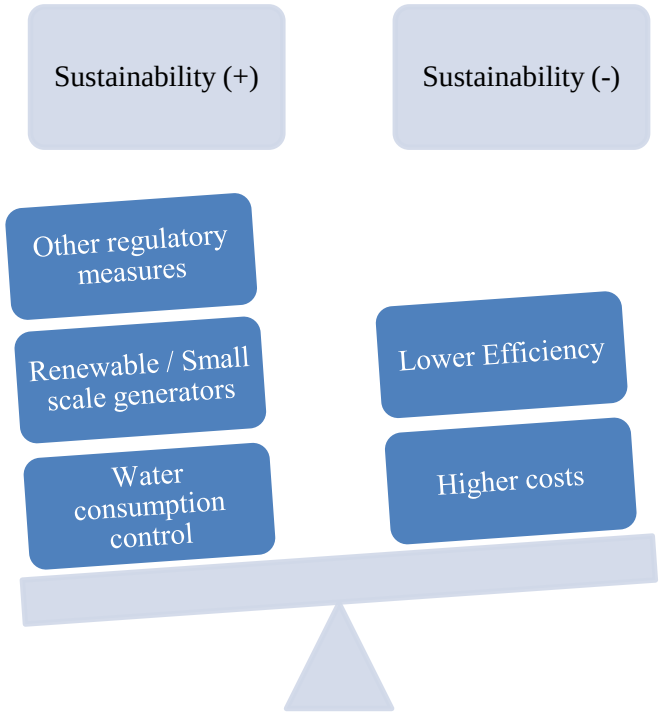
(Azerbaijan, Kazakhstan, Turkmenistan, Uzbekistan)

(Implicit: Kyrgyzstan and Tajikistan)

- 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 as a first proposal (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-CAC: Reference Energy System and water module





Trade-offs must be considered !!!

Key dimensions of the explorations and co-creation

National Climate ambitions (2030 and beyond)

Regional Climate ambitions (long-term)

International energy prices

Technology standards

Water consumption (power sector)

H2 market (I/E)

Promotion of H2 domestic use

Regional integration - cooperation

- Water availability
- H2 market
- Trades / Trading schemes

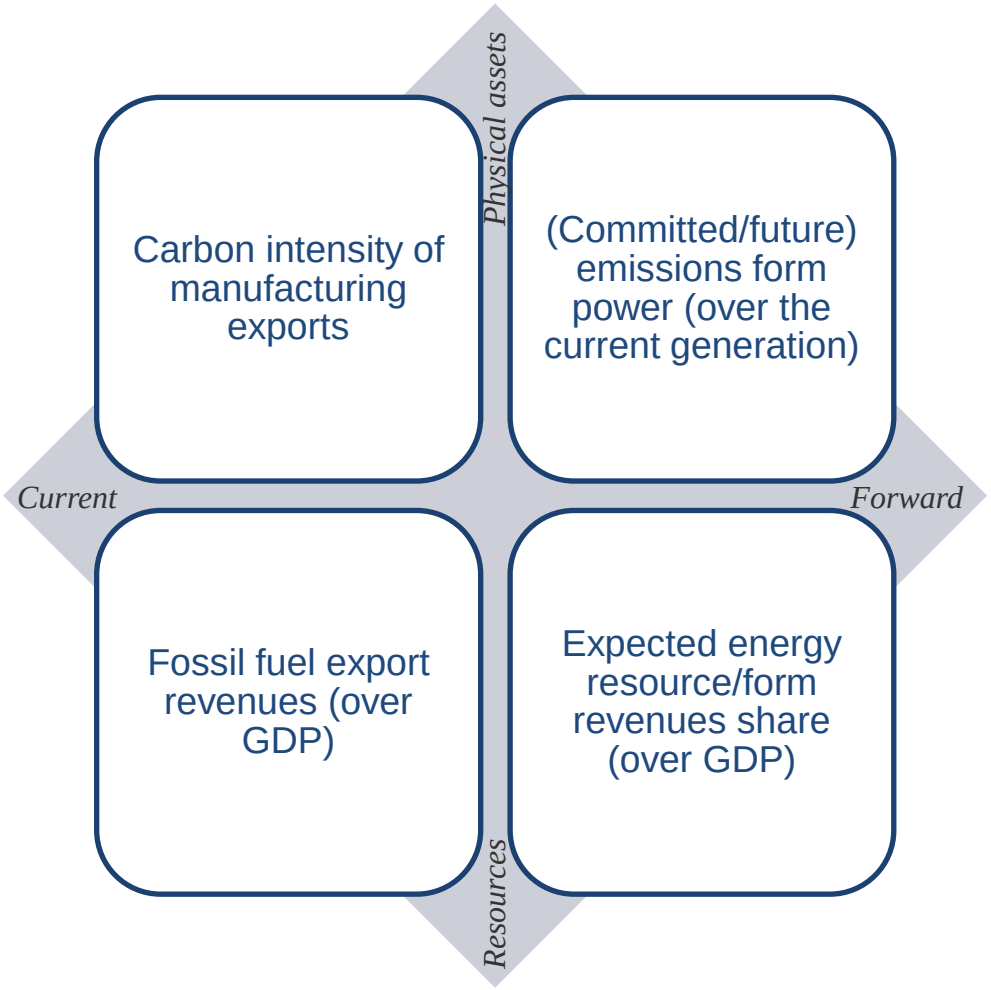
Belt and Road Initiative

Other international funds (allocation)

Tariffs (energy subsidies)

Variants/Uncertainties (prices, technologies, targets)

“Exposure” of the country (region) to world low-carbon transition



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

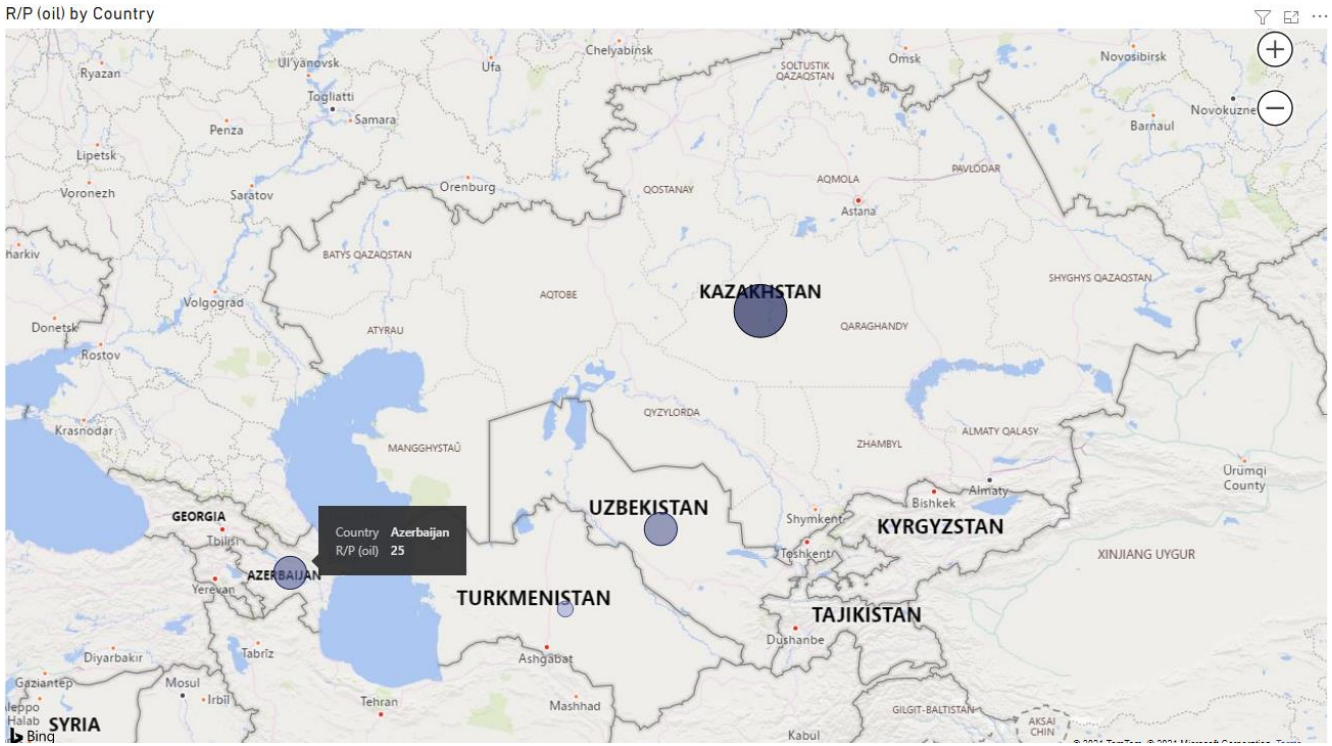
“*High*” exposure of the country (region)

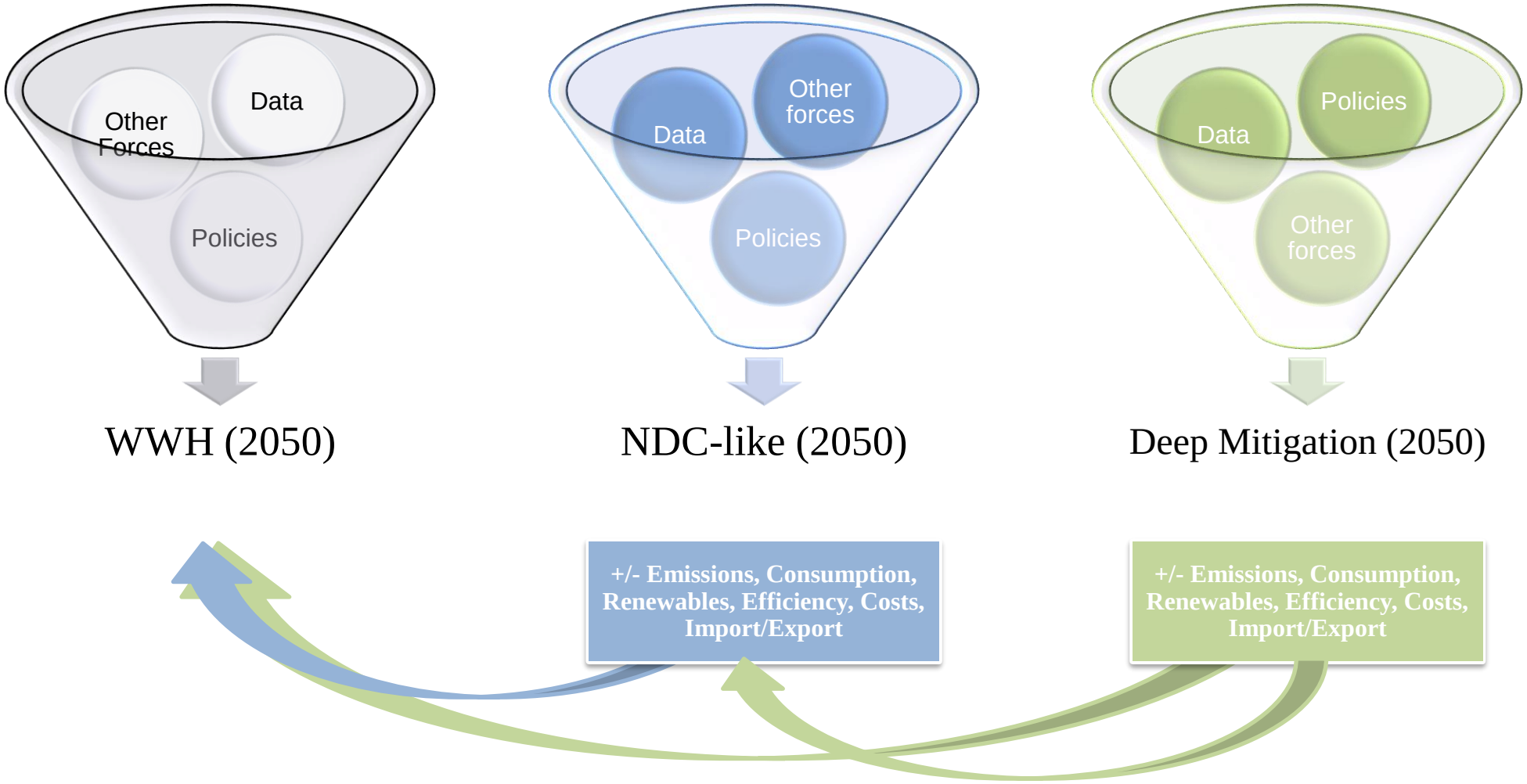
Pillars to tackle the risk:

→ “Rational” management of the existing resources/assets (and a strategic vision for new assets!)

→ “Structural” changes of the economy and technology transition

→ Cooperative (energy-climate) policies




Other Forces
Data
Policies
WWH (2050)
Data
Other forces
Policies
NDC-like (2050)
Data
Policies
Other forces
Deep Mitigation (2050)
+/- Emissions, Consumption, Renewables, Efficiency, Costs, Import/Export
+/- Emissions, Consumption, Renewables, Efficiency, Costs, Import/Export

2030 fossil fuel prices (PR): Oil: 93$/barrel Natural gas W dir.: 8.4 $/Mbtu Natural gas E dir.: 7.2 $/Mbtu Coal: 70 $/ton	International energy prices	Fossil fuel prices after 2030. Oil 2040 Low: 56 $/barrel; Coal price decreasing over time.
Water consumption (power sector)	Water consumption module: - Enabled with no upper limit - Enabled with upper limit (equivalent to current water consumption) --- "Phase-out" of energy subsidies (*variant*)	
Commodity tariffs: Electricity: 4.0 – 5.5 UScents/kWh Natural gas: 2.5 – 3.5 US/GJ Gasoline: 0.42 – 0.67 US/liter DH (heating services): 3 – 4.50 USD/GJ	Tariffs (energy subsidies)	Variants/Uncertainties (prices, technologies, targets)

National Climate ambitions

Targets 2030, and “stabilization” after 2030:

AZ: **-35%** by 2030 / **-40%** by 2050 (wrt 1990)

Water consumption (power sector)

No upper limit / low water consumption (*variant*)

“Regional” scheme (common carbon price for power sector emissions): up to 50$/t CO2e in 2050

Regional integration - cooperation

(Delayed) conditional 2030 targets - Higher long-term ambitions by 2030

AZ: **-60%** by 2050 (wrt 1990)

Variants/Uncertainties (prices, technologies, targets)

National Climate ambitions

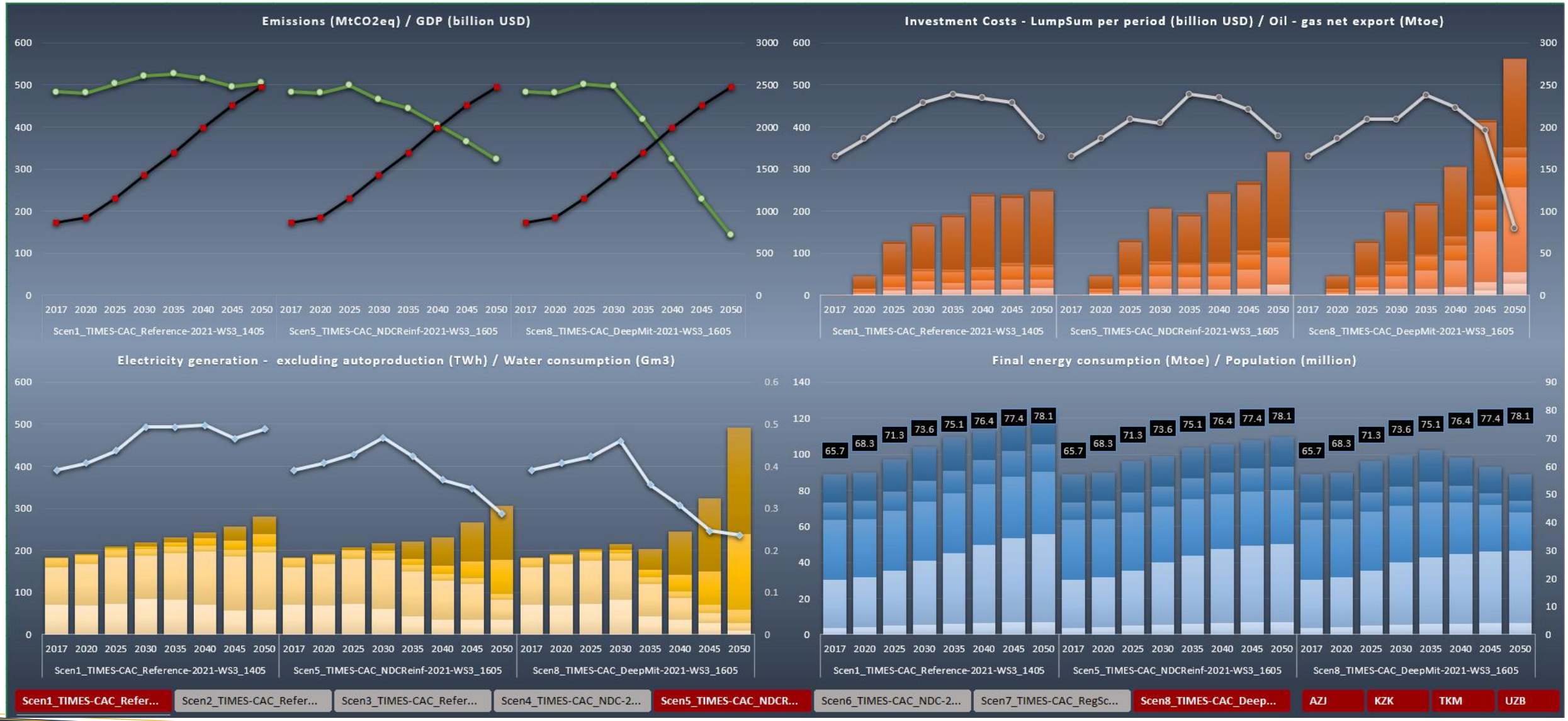
Deep mitigation targets beyond 2030:

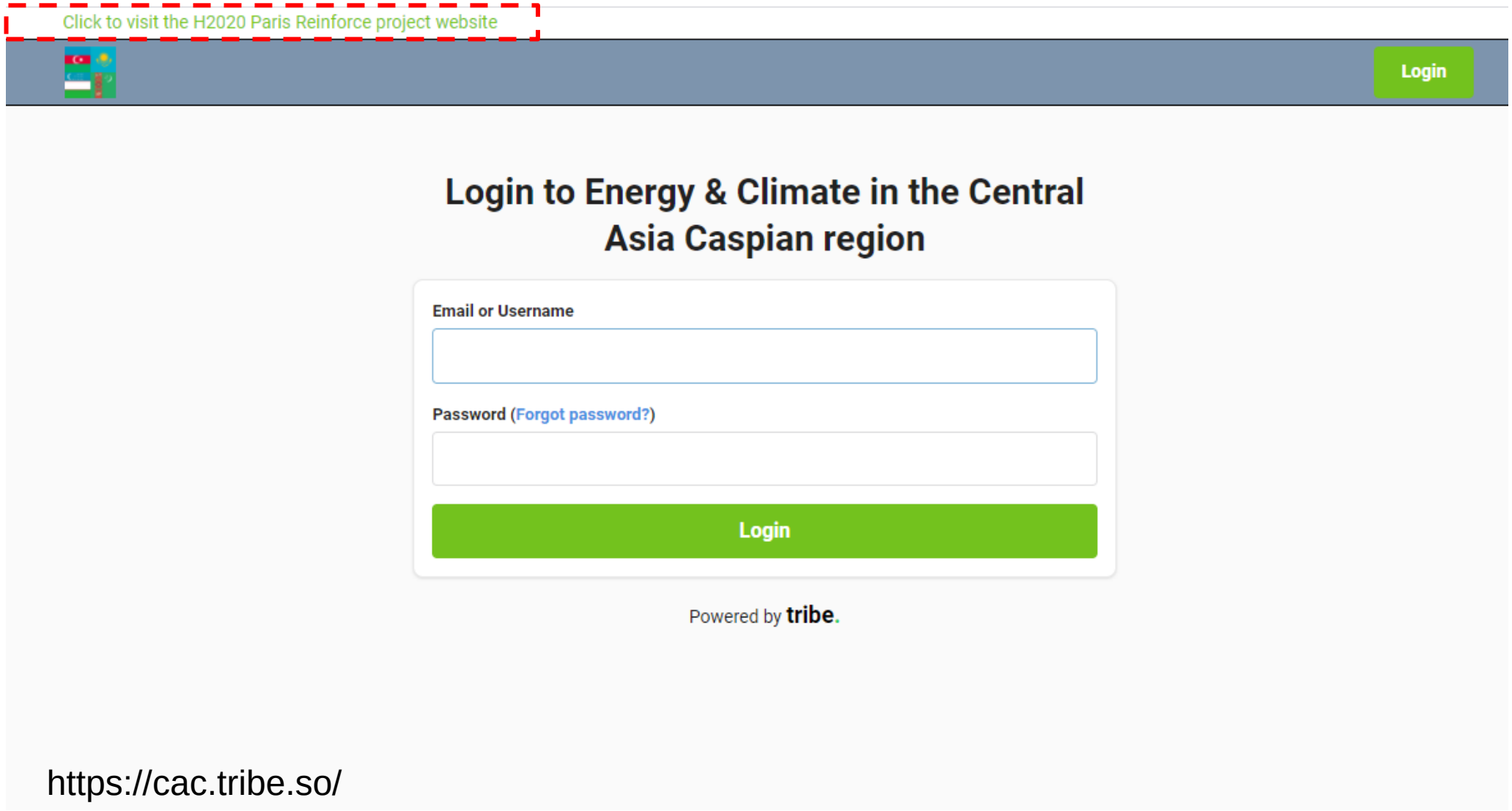
AZ: -35% by 2030 (wrt 1990), **-80%** by 2050 (wrt 1990)

Key principle: 2060 (and beyond) "net-zero visions"

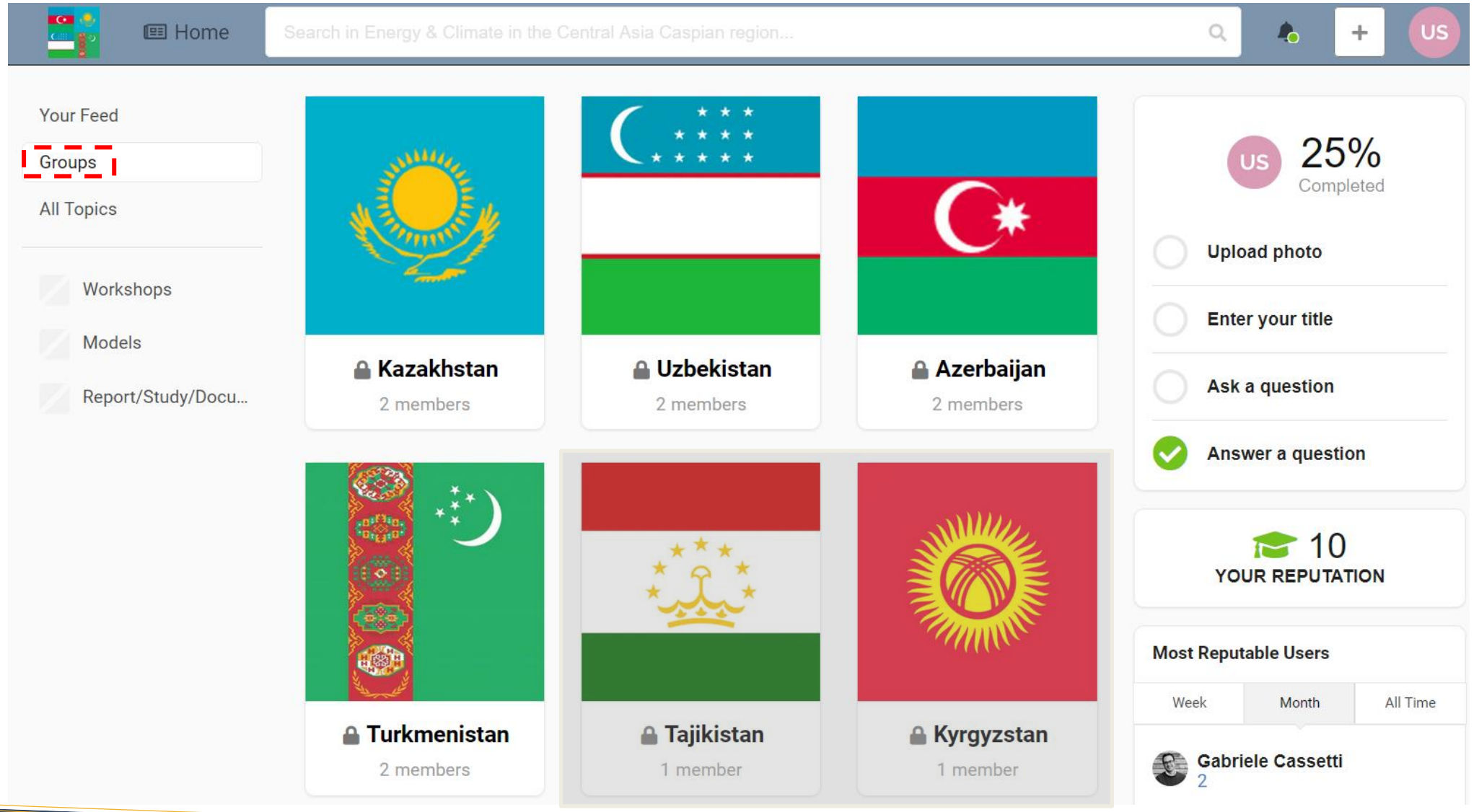
CCS technologies: active (for Azerbaijan)

The CAC dashboard





https://cac.tribe.so/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Gabriele Cassetti
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Azerbaijan - key issues and outcomes

Population (000): 10139 (2020) / # dwelling (000): 2250 (2020), 54% of which in urban areas (urbanization rate included)
Physical production crude steel: 0.35 Mt (2020)
GDP 2020: - 4.5% (COVID-19 year), recovery in 2021

Total “proven reserves” oil (R/P) = 25 years
Total “proven reserves” gas (R/P) = >100 years
Trans-Caspian gas pipeline (YES/**NO**)

Installation of up to 500 MW (wind) by 2030 (triggered by the feed-in-tariffs or subsidies). Gradual phase-out of the incentives (by 2030)
Installation of up to 200 MW (solar) by 2030 (triggered by the feed-in-tariffs or subsidies). Gradual phase-out of the incentives (by 2030)
Additional 250 MW (hydro) by 2030. Gradual phase-out of the incentives (by 2030)

Carbon capture and storage is considered as a viable option in the medium-long term (petrol-chemical industry and other upstream processes).
Program to refurbish the natural gas transportation network (short-term): significant reduction of losses (already in the WWH!)
Continued electrification of the railways.

- → WWH ~ NDC (interpretation of the NDC post-2030)
- → NDC vs DM (cap pushes for significant changes in the system after 2040 only).
- → WWH vs DM (+15 / +25 B$, extra investments required! – Cumulative value over the time horizon)
  - → High share of RES in electricity generation
  - → Significant reduction (> 50% by 2050) of emissions from the upstream/supply (including the gas chain)
  - → H2 (blue + CCS) from 2035 (industrial uses) – Transportation sector remains the largest contributor to the 2050 emissions

Thank you!

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Questions?