

# SPECA WEEK 2023



## SESSION III: GREEN ENERGY CONNECTIVITY IN THE SPECA REGION FOR RESILIENT AND CARBON NEUTRAL ENERGY SYSTEMS

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Sustainable Energy Division,  
UNECE**

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Specialist, Energy Division, ESCAP**

# SPECA WEEK 2023

## Keynote speech

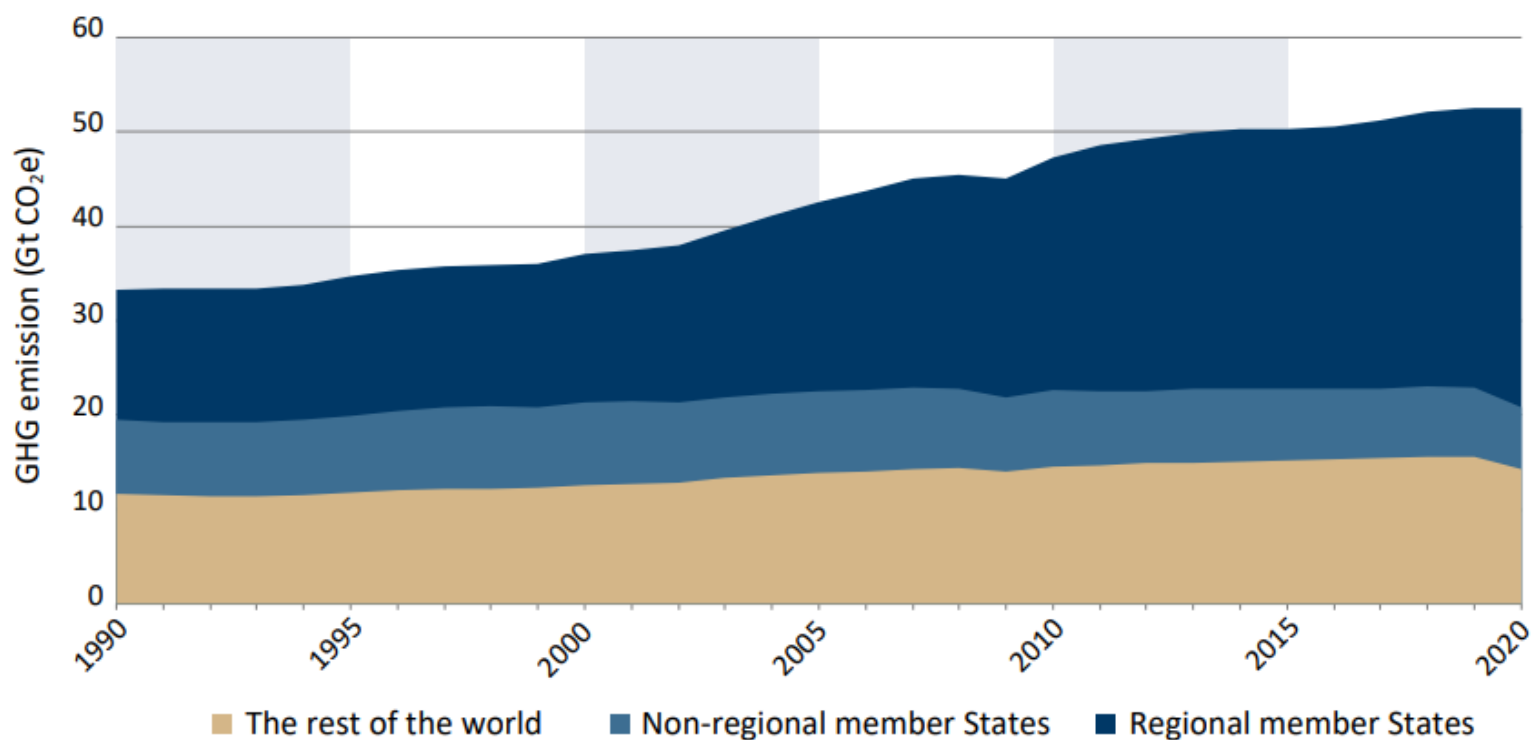
**Mr Samir Valiyev**

**Deputy Minister of  
Energy of the Republic  
of Azerbaijan**



# Asia-Pacific is a main driver of global GHG emissions

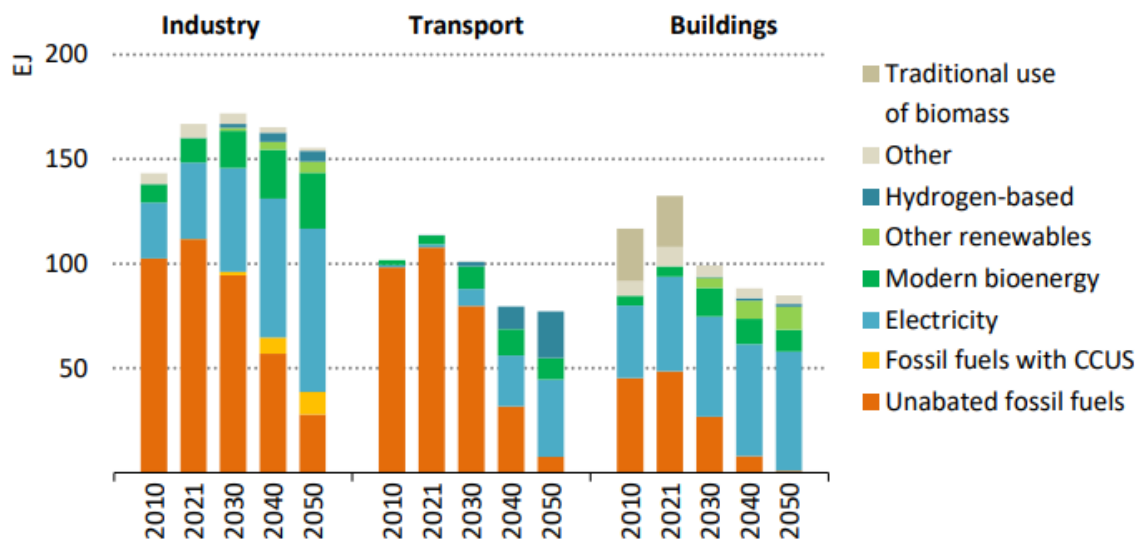
Greenhouse gas emissions trends in the Asia-Pacific region compared to the rest of the world, 1990–2020 (GtCO<sub>2</sub>e)



Sources: Intergovernmental Panel on Climate Change, AR6 Synthesis Report: Climate Change 2023 (2022). Available at [www.ipcc.ch/report/sixth-assessment-report-cycle/](http://www.ipcc.ch/report/sixth-assessment-report-cycle/); and European Commission, "Historical emissions data", Emissions Database for Global Atmospheric Research. Available at <https://zenodo.org/record/5566761#.ZABspXZBzIW>.

# Electrification is a critical tool for achieving NZE

**Figure 3.4** ▶ Total final consumption by source in the NZE Scenario, 2010-2050



IEA. CC BY 4.0.

*End-use sectors come to be dominated by electricity, which provides more than half of total final consumption by 2050*

Note: Other renewables include solar thermal and geothermal used directly in end-use sectors.

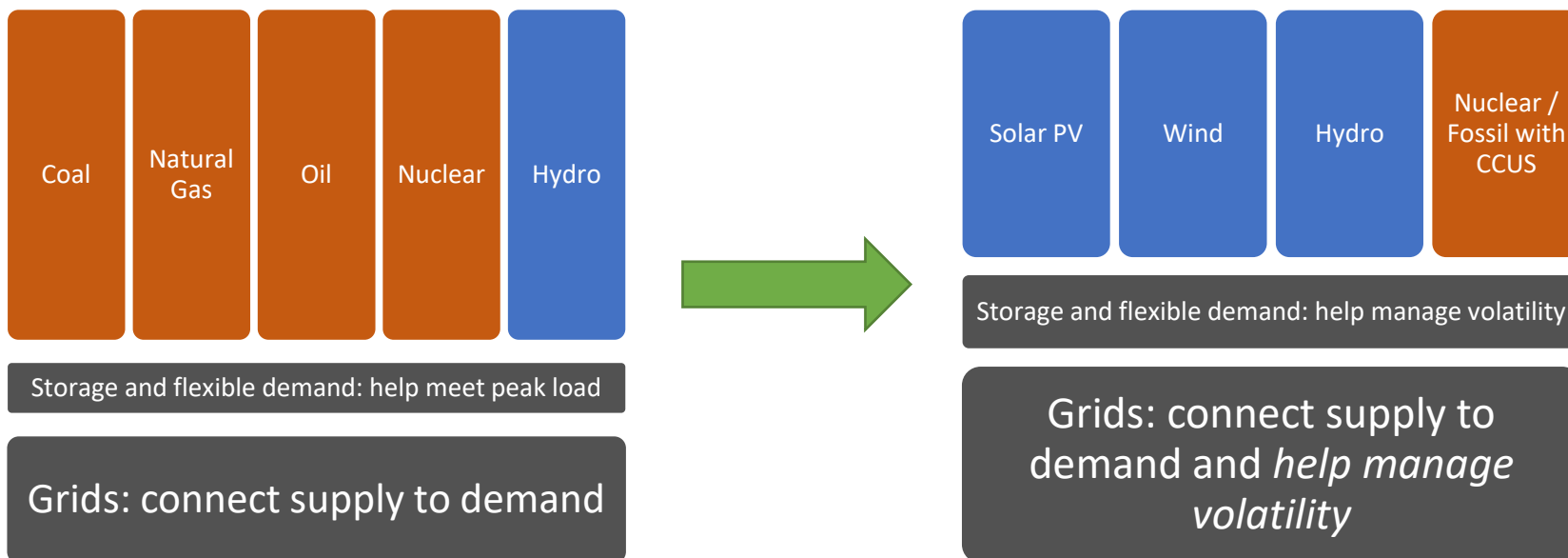
Achieving NZE requires:

- Decarbonization of the power sector through increased deployment of RE and zero-emission technologies
- Increased end-use electrification

At the same time, the energy transition must ensure the secure and affordable provision of electricity to all

# The evolving role of grids and storage

Energy transition implies a shift from *fuel-* to *weather-dependent* power systems



## Growing Loads and Performance Expectations as Economy is Electricified



### **NO/LOW CARBON ENERGY RESOURCES**

Ensure sufficient amounts of no/low carbon energy to achieve decarbonization goals



### **TRANSMISSION**

Develop adequate transmission to integrate renewables and transmit/distribute energy



### **BALANCING RESOURCES**

Maintain a robust fleet of balancing resources needed to serve energy along with integrated renewables



### **ENERGY SUPPLY CHAIN**

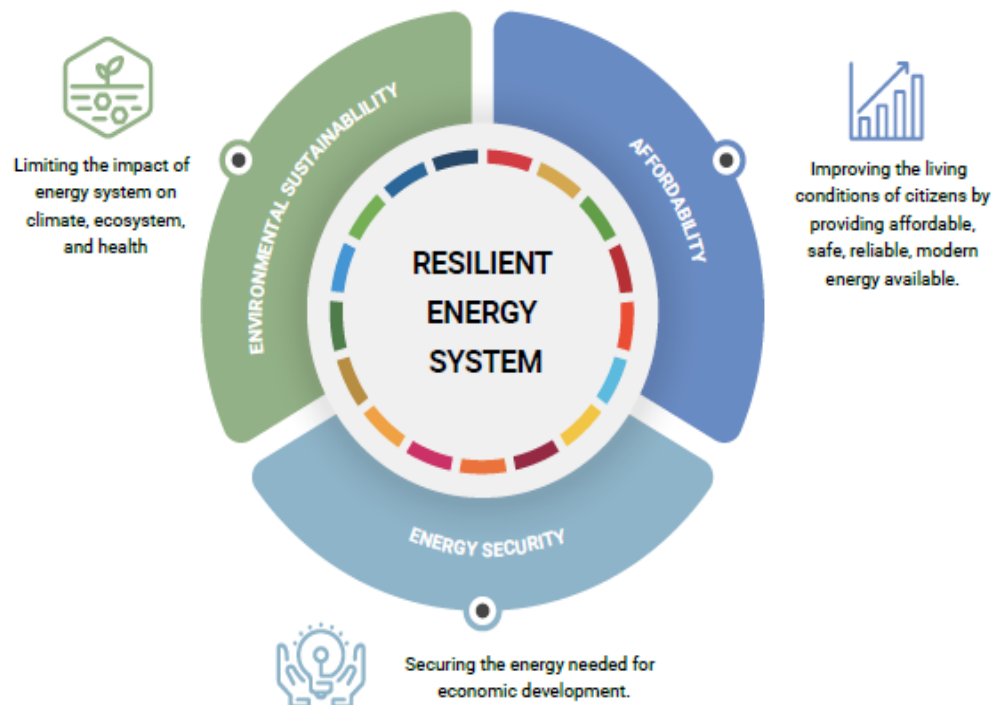
Ensure healthy energy supply chains for balancing resources, with sufficient access to stored energy to withstand long-duration, widespread extreme weather events

# Building resilient Energy Systems

## Technical Considerations and Actions for Achieving Energy Security, Affordability, and Sustainability Net-Zero for Europe, North American and Central Asia

### What is a resilient energy system?

- A **resilient energy system** ensures that energy makes an optimal contribution to a country's **social, economic, and environmental** development.
- **Energy security** strengthens energy independence through interconnectivity and trade.
- **Affordability** reduces costs of electricity, heating, cooling, and transport.
- **Environmental sustainability** lowers the carbon footprint and enhances efficiency across the energy supply chain.





# UNECE Framework for building resilient energy systems

UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE

## Building Resilient Energy Systems: Actions for Achieving Greater Energy Security, Affordability and Net-zero in the UNECE Region



### Recommendations for Policymakers

The Expert Groups have aligned on five important recommendations to build a resilient energy system and achieve balance among affordability, energy security, and environmental sustainability:

1. **Prioritize and maximize the implementation of energy efficiency solutions** to drive down primary energy consumed while meeting economic and societal needs.
2. **Digitalize the energy system** and take advantage of increasing consumer digital literacy capturing the enormous optimization opportunity in the value chain.
3. **Accelerate fuel switching** to optimize the carbon footprint of end use energy and replace carbon intensive fuels where practical with low- and zero-carbon options.
4. **Manage resources effectively, sustainably, and with circular economy considerations**, using the UN framework Classification (UNFC) and UN Resource Management System (UMRMS).
5. **Accelerate the deployment of low- and zero-carbon technologies** by scaling renewable energy, nuclear power and advanced fossil fuels with carbon capture, use and storage.



### Key Considerations for Policymakers

As policymakers look across the options included and assess what will be best for their circumstances, it is important to bear in mind the following key considerations:

1. **Recognize that there is not a one-size-fits-all approach.**
2. **Consider long term goals as they design policies today.**
3. **Address behavioural barriers to unlock innovation and digitalization potential.**
4. **Build a workforce to deliver on a just energy transition and address the skills shortage.**
5. **Integrate resiliency concerns into existing and related planning efforts.**
6. **Consider climate change impacts on supply and demand.**



# UNECE Carbon Neutrality Toolkit

## Building Resilient Energy Systems

A photograph of several wind turbines on rolling green hills under a cloudy sky. The image is framed by a blue border with green accents at the top and bottom.

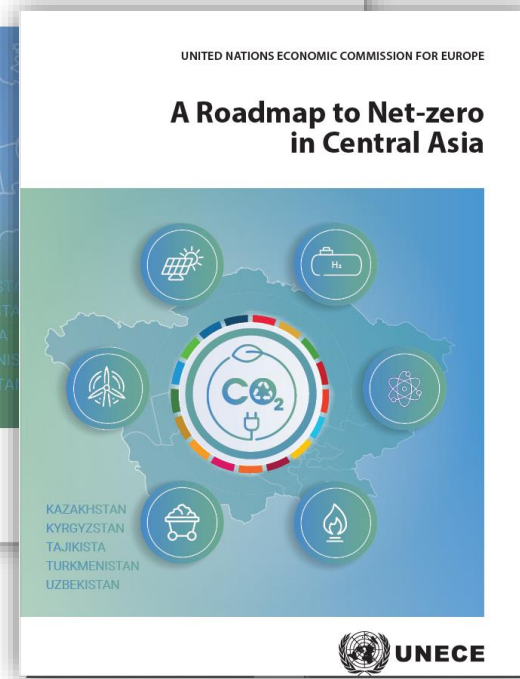
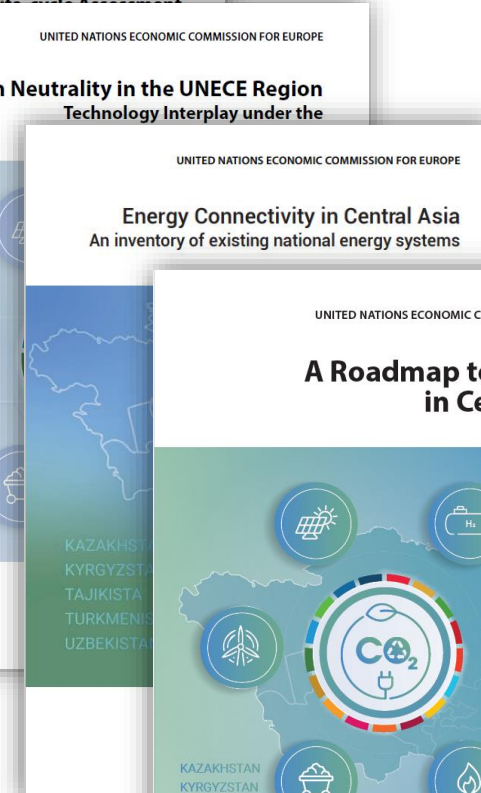
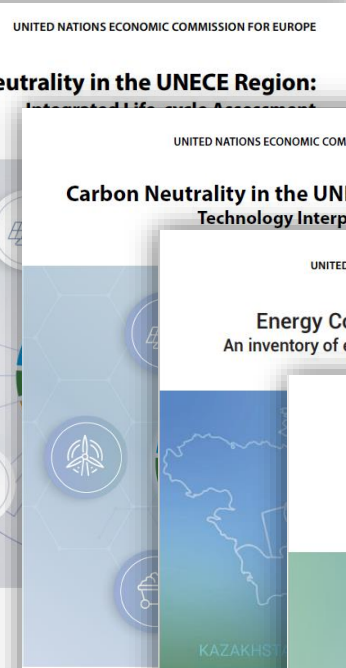
**Carbon Neutrality Toolkit**

Supporting policymakers to make informed decisions towards the implementation of the 2030 Agenda for Sustainable Development and the Paris Agreement.

The logo for the 75th anniversary of the United Nations, featuring the number "75" in a colorful, stylized font, followed by the UNECE logo and the acronym "UNECE".

# UNECE Carbon Neutrality Toolkit

## Building Resilient Energy Systems



# Carbon Neutral Energy System of the Future

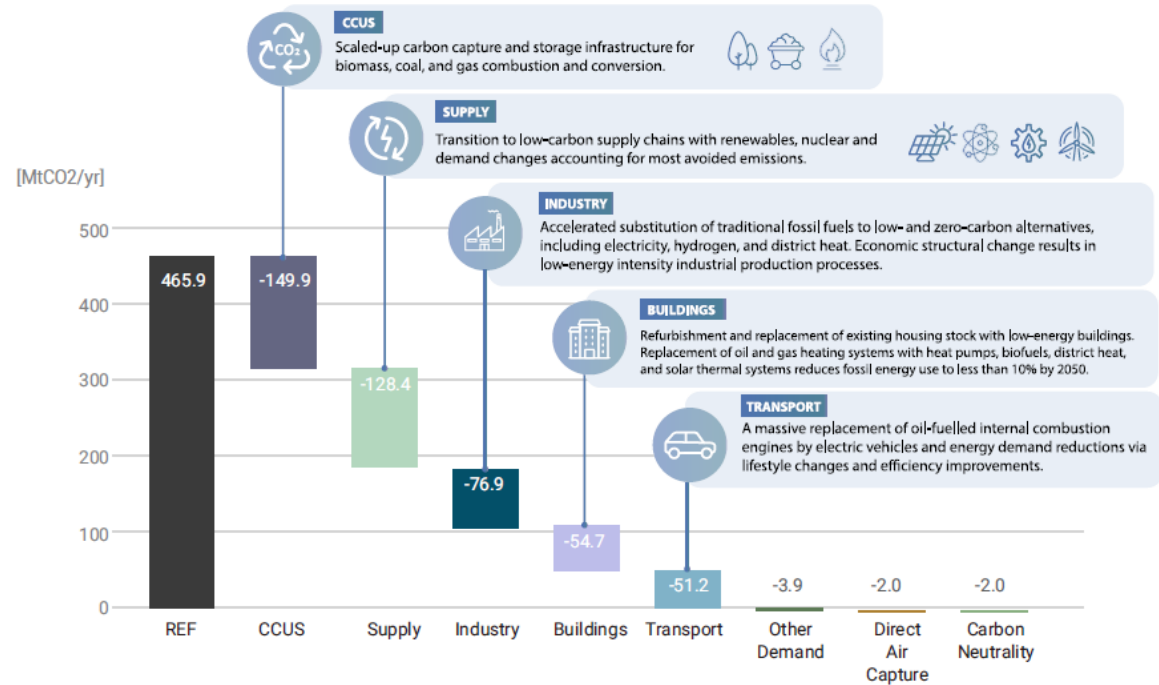
## Building Resilient Energy Systems



# Carbon neutrality requires comprehensive energy system transformation involving all economic sectors and society at large

## How different sectors may contribute to Carbon Neutrality?

Technology interplay – supply side and demand side plus lifestyle changes

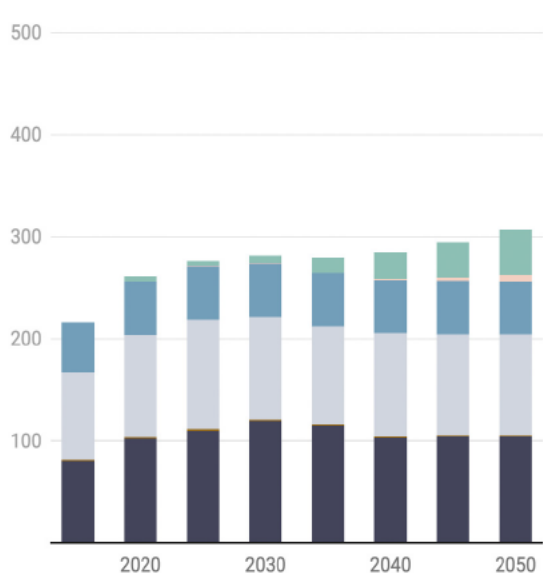


CO<sub>2</sub> mitigation in 2050 - Central Asia from Reference (REF) to Carbon Neutrality Innovation (CNI)

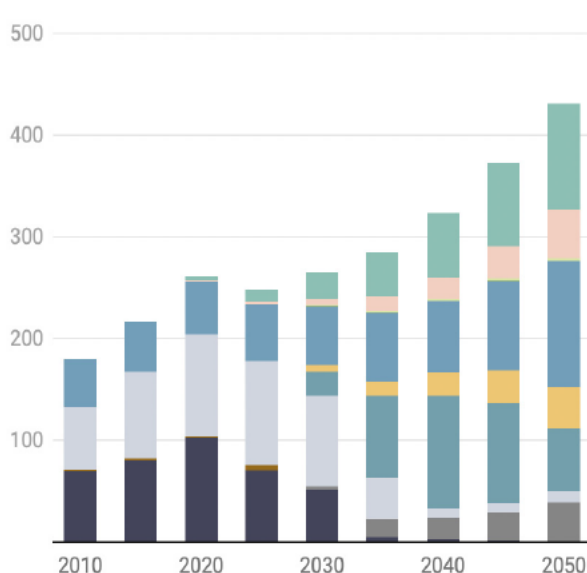


# Electricity generation [TWh], Central Asia (CAS)

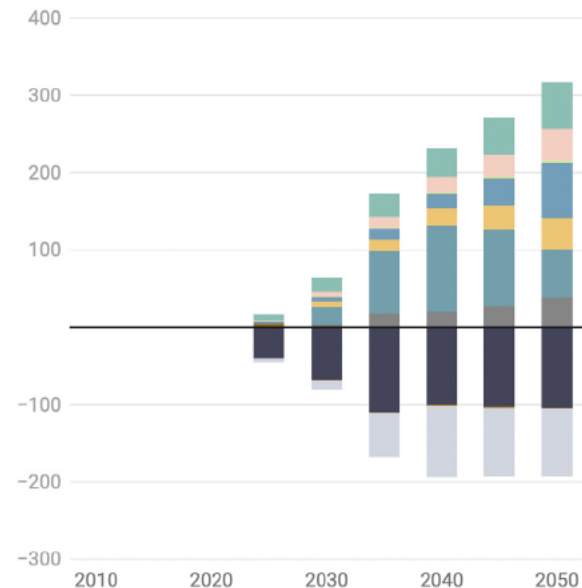
Coal, Coal CCS, Oil, Oil CCS, Gas, Gas CCS, Nuclear, Hydro, Biomass, Biomass CCS, Geothermal, PV, CSP, Wind Onshore, Wind Offshore, Other



Electricity generating mix [TWh]  
Reference (REF)



Electricity generating mix [TWh]  
Carbon Neutrality Innovation (CNI)



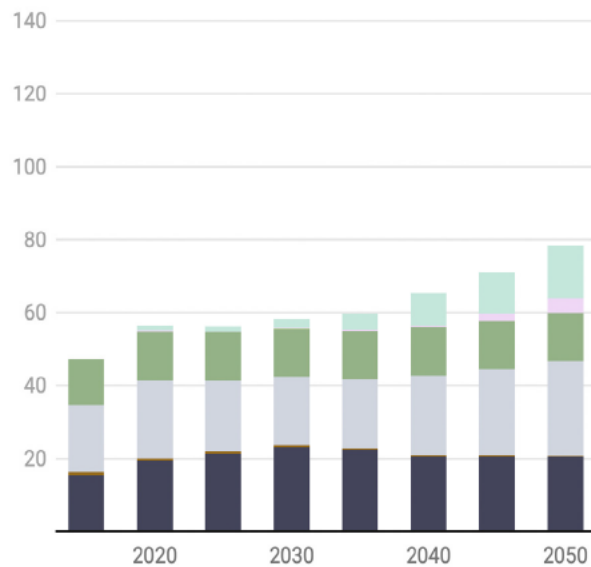
Transition in Electricity generating mix [TWh]  
Reference (REF) vs. Carbon Neutrality (CNI)



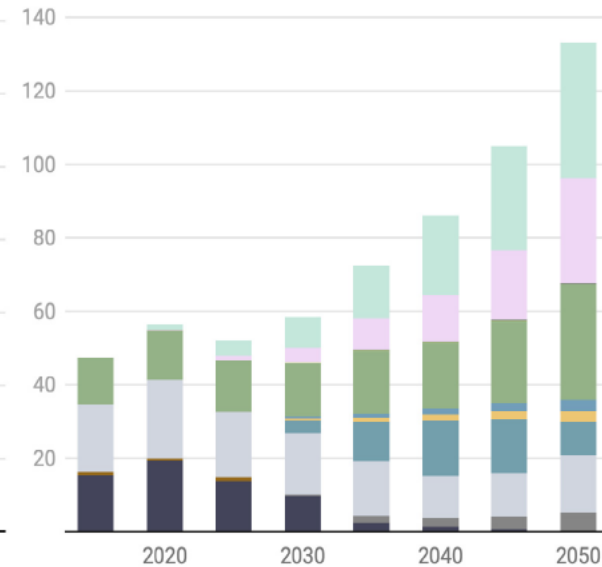


# Electricity generating capacities [GWe], Central Asia (CAS)

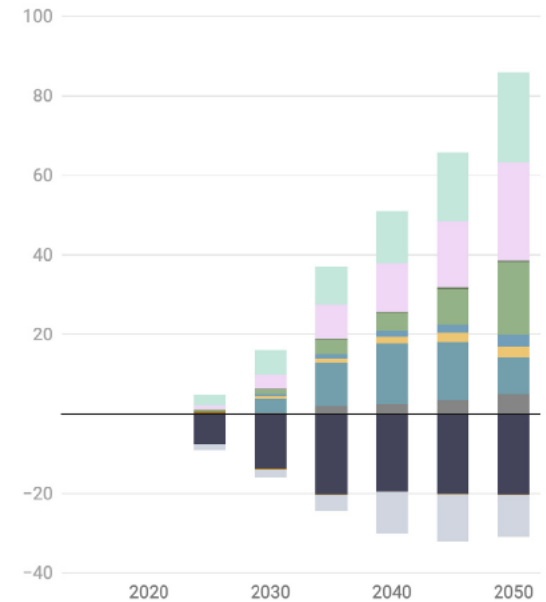
■ Coal ■ Coal CCS ■ Oil ■ Oil CCS ■ Gas ■ Gas CCS ■ Nuclear L ■ Nuclear S ■ Hydro ■ Biomass ■ Biomass CCS  
 ■ Geothermal ■ PV ■ CSP ■ Wind Onshore ■ Wind Offshore



Electricity generation capacity [GWe] Reference (REF)



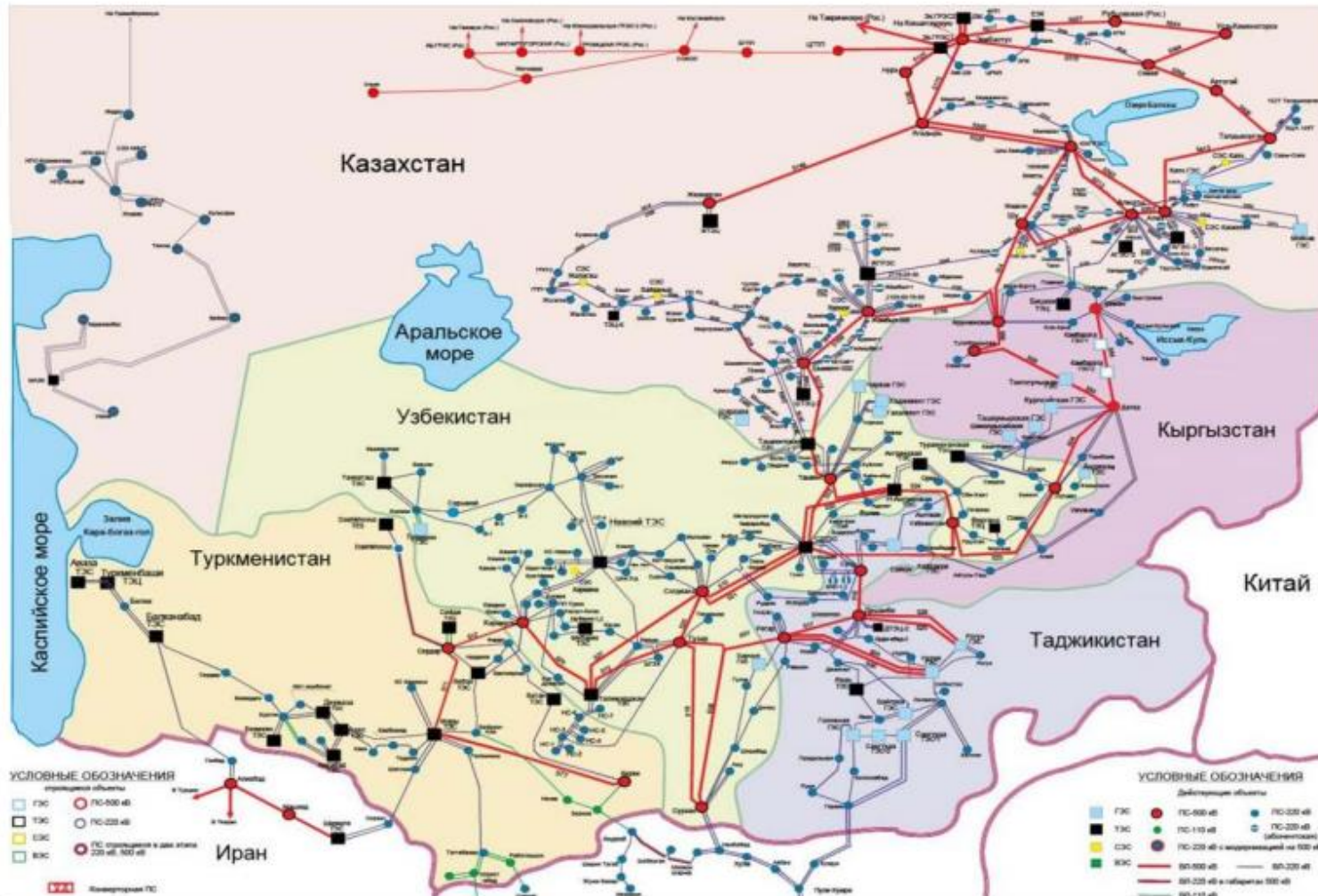
Electricity generation capacity [GWe] Carbon Neutrality Innovation (CNI)



Transition in Electricity generation capacity [GWe] Reference (REF) vs. Carbon Neutrality (CNI)

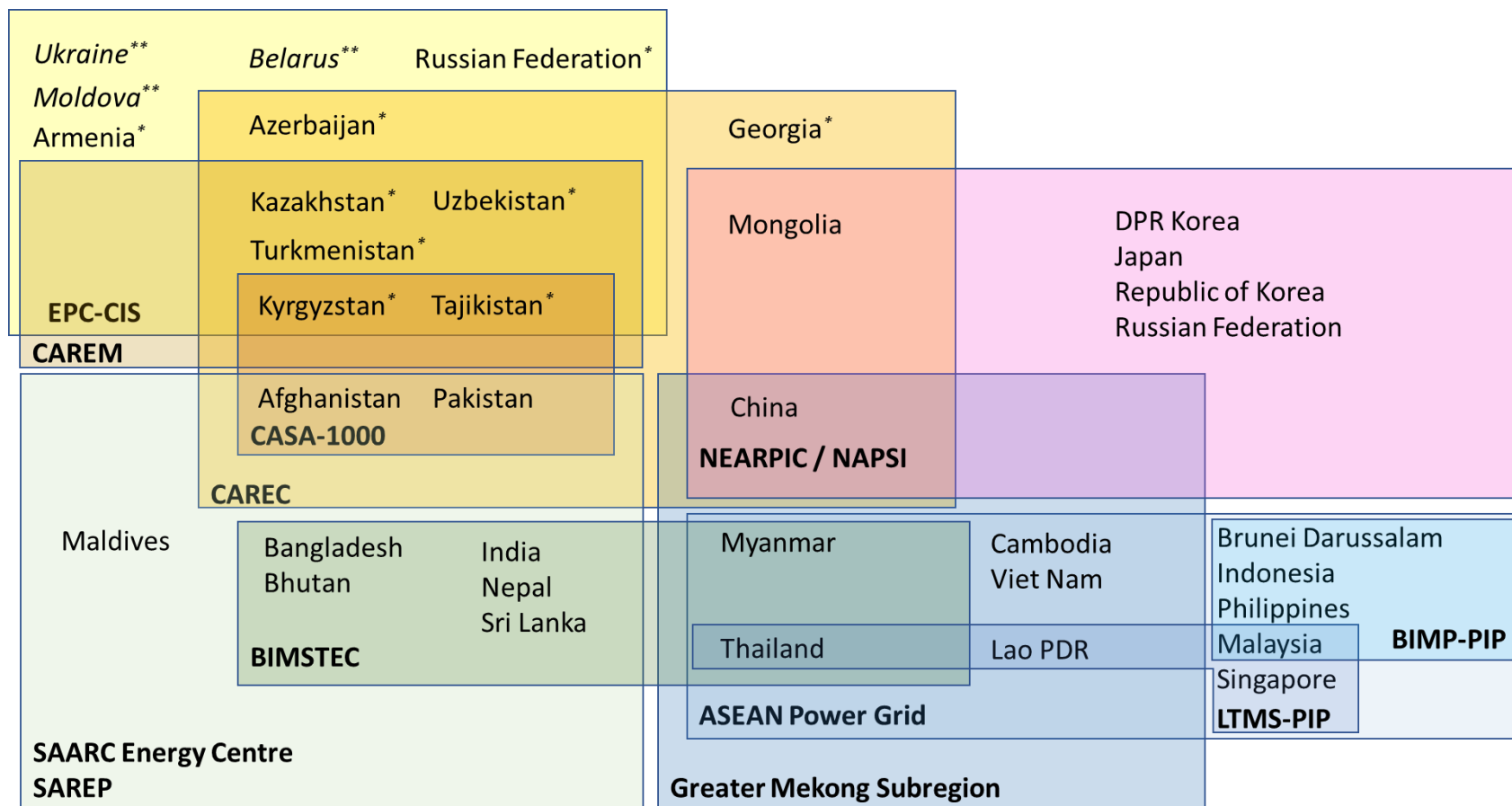


# Energy System in Central Asia





# Multilateral connectivity initiatives in the region



\* Member of UN ESCAP and UN ECE

\*\* Member of UN ECE only

# Regional Roadmap on Power System Connectivity



Vision, principles and **nine strategies** to enable sustainable connectivity

## Planning

- Develop a regional master plan (Strategy 2)
- Coordinate cross-border transmission planning (Strategy 6)

## Financing and development

- Mobilize investment in cross-border infrastructure (Strategy 7)

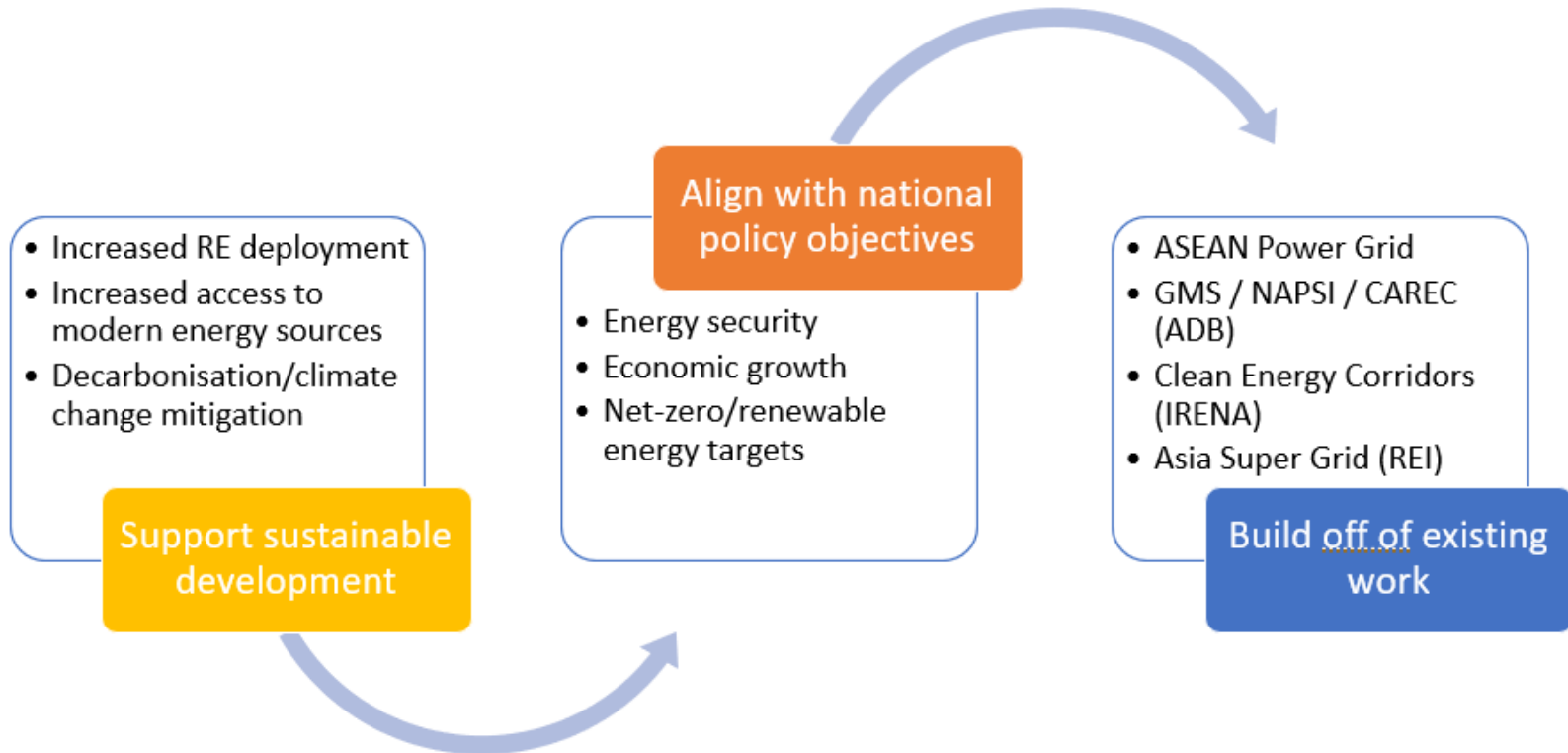
## Operations

- Move toward multilateral trading and competitive markets (Strategy 5)
- Co-ordinate cross-border system operations (Strategy 6)

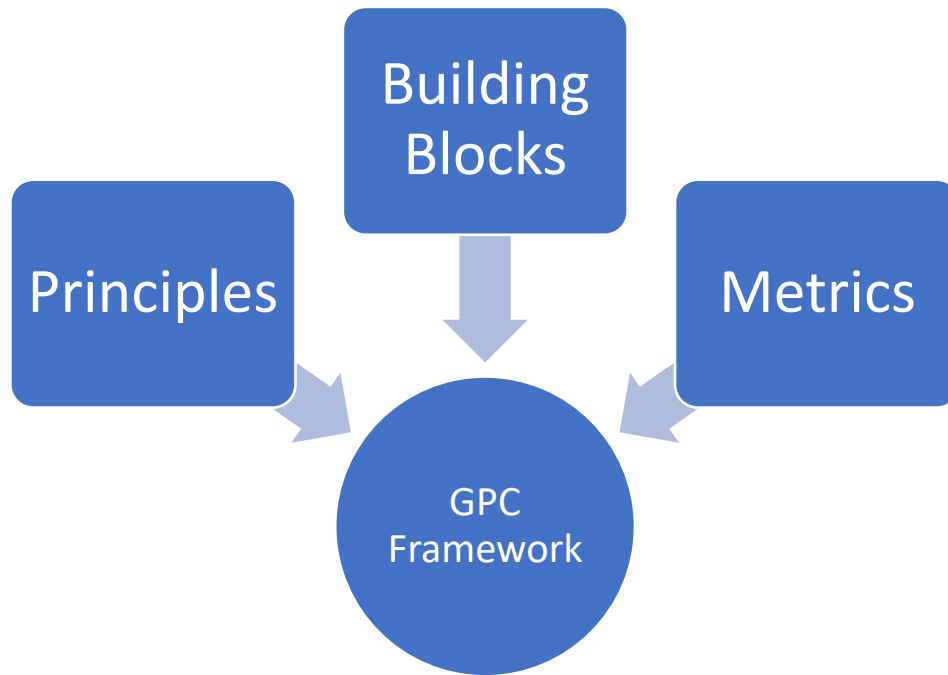
## Cross-cutting

- Build trust and political consensus (Strategy 1)
- Develop intergovernmental agreements (Strategy 3)
- Coordinate, harmonize, and institutionalize policy and reg frameworks (Strategy 4)
- Build capacity and share information, data, best practices (strategy 8)
- Ensure coherence of connectivity with the SDGs (Strategy 9)

# Green Power Corridors: a vision for sustainable power system connectivity



# Green Power Corridor Framework: Guiding sustainable power system connectivity

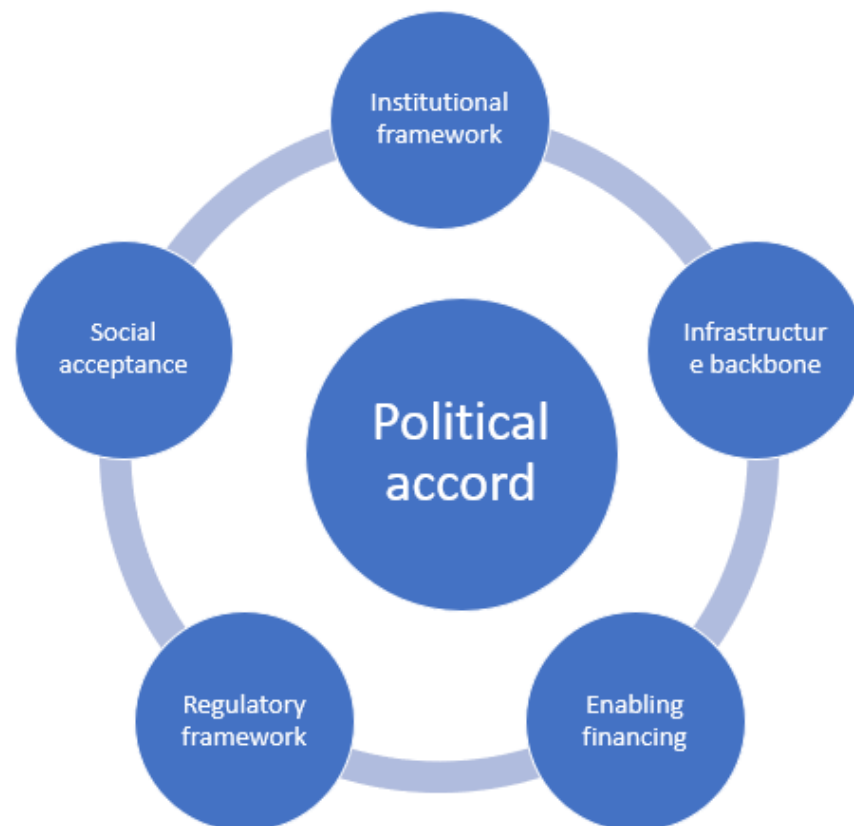


## The GPC Framework aims to provide

- Practical and relevant **principles** to guide the development of connectivity initiatives
- **Building blocks** to structure and orient connectivity initiatives
- A set of **metrics** to enable the measurement of connectivity projects against relevant criteria (in development)

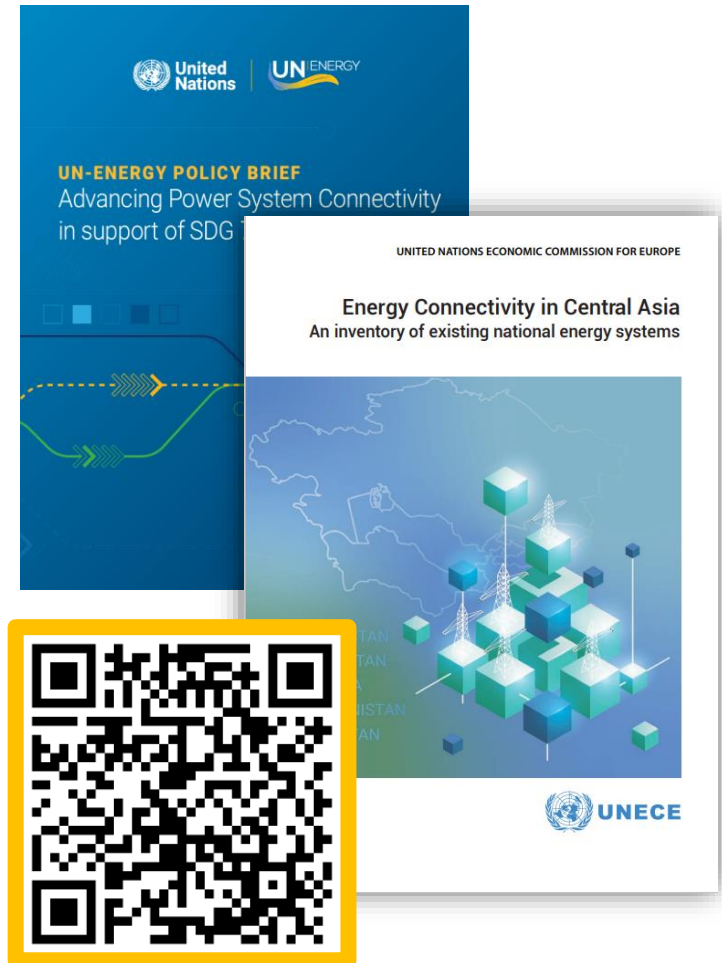
# Green Power Corridor Framework: Building Blocks

- **Political accord:** fundamental enabler of successful connectivity initiatives
- **Institutional framework:** To guide and monitor development
- **Enabling financing:** secure participation of all available sources of capital
- **Infrastructure backbone:** strengthen national and cross-border grid infrastructure to enable RE integration
- **Regulatory framework:** to enable secure, flexible and efficient operations
- **Social acceptance :** ensure public support, boost capacity, and maximize inclusion of relevant populations



# Strategic collaboration between ESCAP and UNECE on Energy Connectivity in Central Asia

- **Recent joint UNECE and ESCAP activities on Energy Connectivity**
  - Brief on Power System Connectivity at HLPF 2023
  - Project on Energy Connectivity in Central Asia
  - Stocktaking analysis on energy infrastructure in Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan
  - Joint regional workshops with regional energy experts, energy regulators and policymakers at 3<sup>rd</sup> Almaty Energy Forum





3<sup>rd</sup> Almaty  
Energy Forum



Enhance energy connectivity and regional cooperation across the region



Create favorable conditions for water-energy nexus regional projects



Explore and develop critical raw materials sustainably



Cut and manage methane emissions across the fossil fuel value chains



Scaling financing into low- and zero-carbon solutions



Invest in human capital and foster the next generation of energy experts



# Strategic collaboration between ESCAP and UNECE on Energy Connectivity in Central Asia

- **Planned joint UNECE and ESCAP activities on Energy Connectivity**
  - **Project on energy connectivity for sustainable development** – Enabling renewable energy resource sharing across borders (ECO-REM)
    - develop a subregional road map to inform multilateral power trading linked to sustainable cross-border trade of renewable energy resources
  - **Project on Energy Connectivity in Central Asia next steps:**
    - to develop scenarios and a roadmap for a regionally interconnected energy system in Central Asia
  - **UNDA project on enhancing energy security and energy system resilience through energy connectivity**
    - to organize technical workshops on building policy design capacity for resilient and connected energy systems in Kazakhstan and Uzbekistan

# SPECA WEEK 2023



Panel discussion



**Mr. Sergey Katyshev**, Independent Consultant, ex-Head of Projects Management Department, Kazakhstan Electricity Grid Operation Company (“KEGOC”), Kazakhstan

**Mr. Furugzod Usmonov**, Vice-Chair, Group of Expert on Cleaner Electricity Systems, Tajikistan

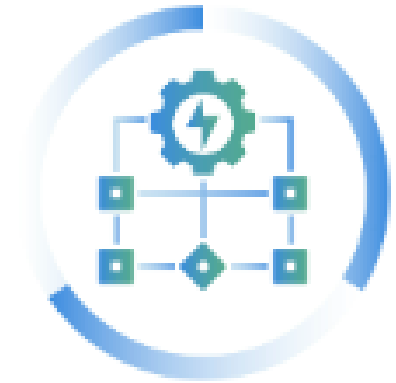
**Mr. Kamran Huseynov**, Deputy Director of Azerbaijan Renewable Energy Agency (AREA)

**Mr. Qing He**, Head of Technology & Innovation, GEIDCO

# Actions for enhancing energy connectivity in Central Asia

## Actions to unlock opportunities and build infrastructure

- Promote renewable energy growth
- Invest in and promote integrated planning
- Address interconnection challenges
- Improve grid stability and storage
- Balance power flows



## Actions to create a regional market

- Incentivize development of renewable energy and its integration
- Set standards and requirements
- Promote market development
- Facilitate fair competition framework
- Engage regional stakeholders
- Create investment friendly environment

# SPECA WEEK 2023



**Thank you!**

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