

# Green Power Corridor Framework

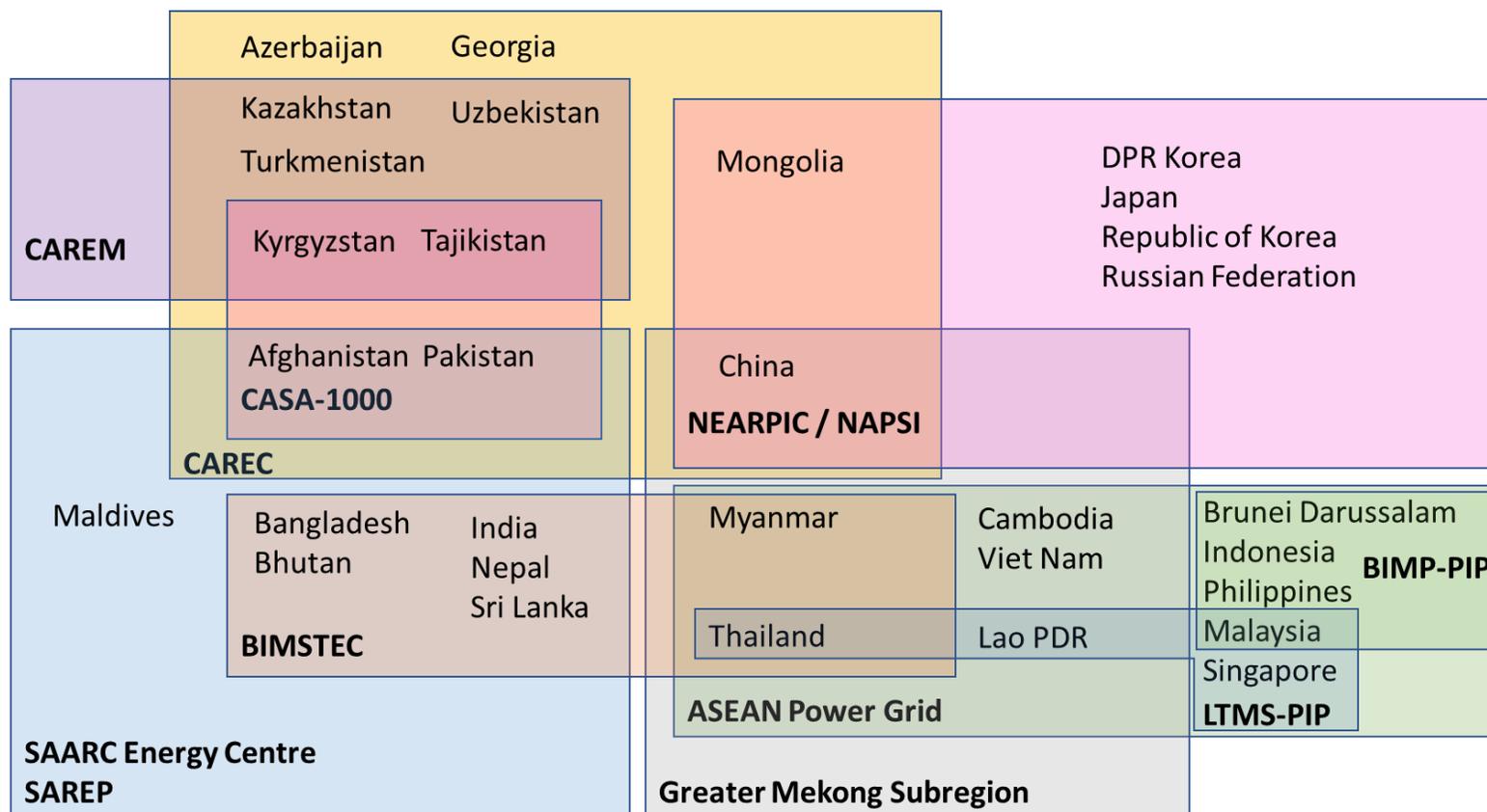
## Accelerating Progress on the ASEAN Power Grid 2.0: Lessons from the LTMS-PIP and Beyond

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# Cross-border energy connectivity initiatives in APAC

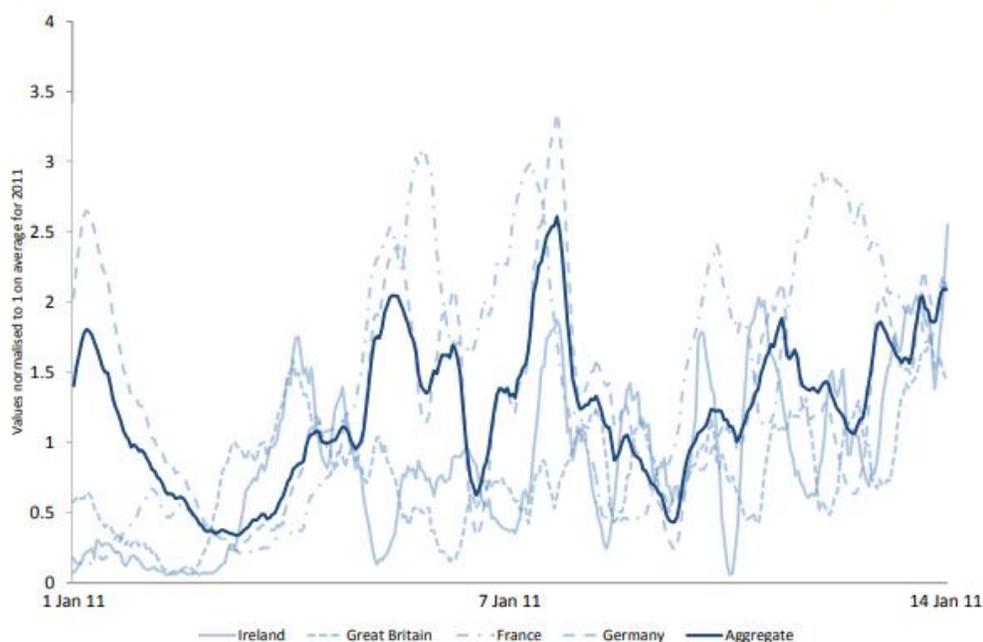


- Many power system connectivity initiatives in Asia-Pacific, mostly subregional.
- Grid infrastructure development and power trading mainly bilateral.
- Political will and enabling institutions are the key drivers of connectivity initiatives at subregional level
- No common approach to grid planning or system operations at regional level

# The need for larger, more integrated power systems

Power system connectivity is a tool that can **lower costs, improve energy security, and enable decarbonization**

Figure 11. Variability of wind output for four European countries, 1 January to 14 January 2011



Source: Seamless Power Markets (IEA, 2014)

## ESCAP's Regional Roadmap on Power System 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)

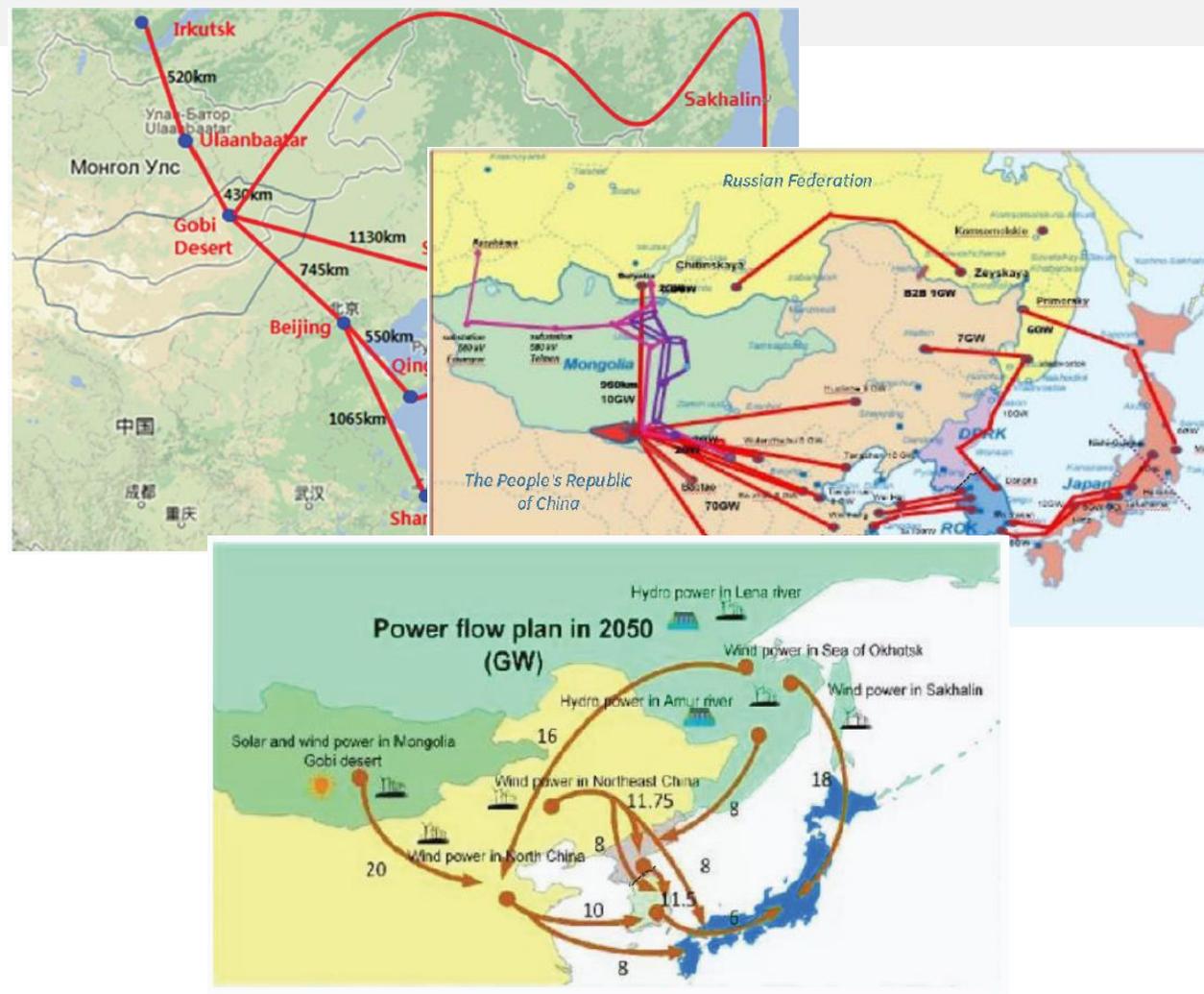
### Cross-cutting

- 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)**

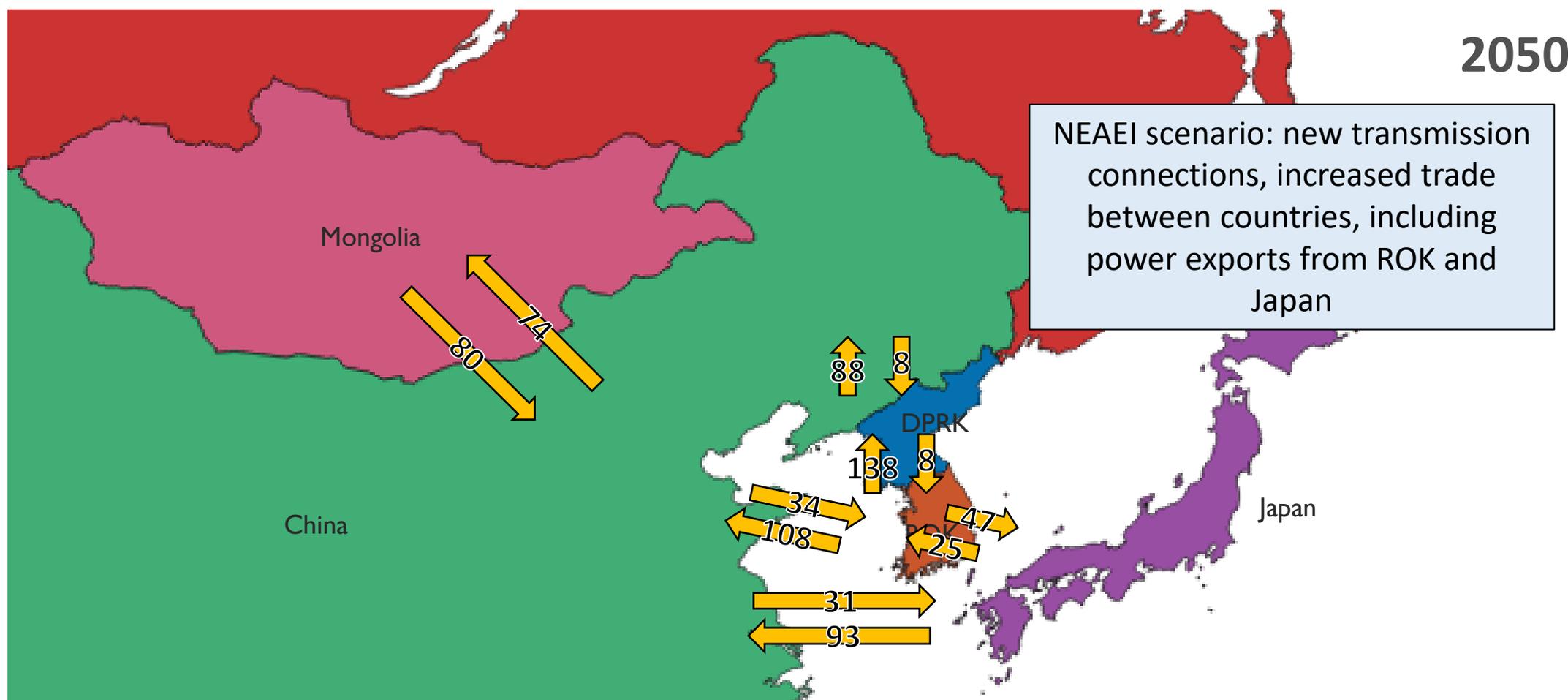
# Multilateral power trade is a tool for decarbonization

## Case Study: Green Power Corridor Roadmap for North-East Asia

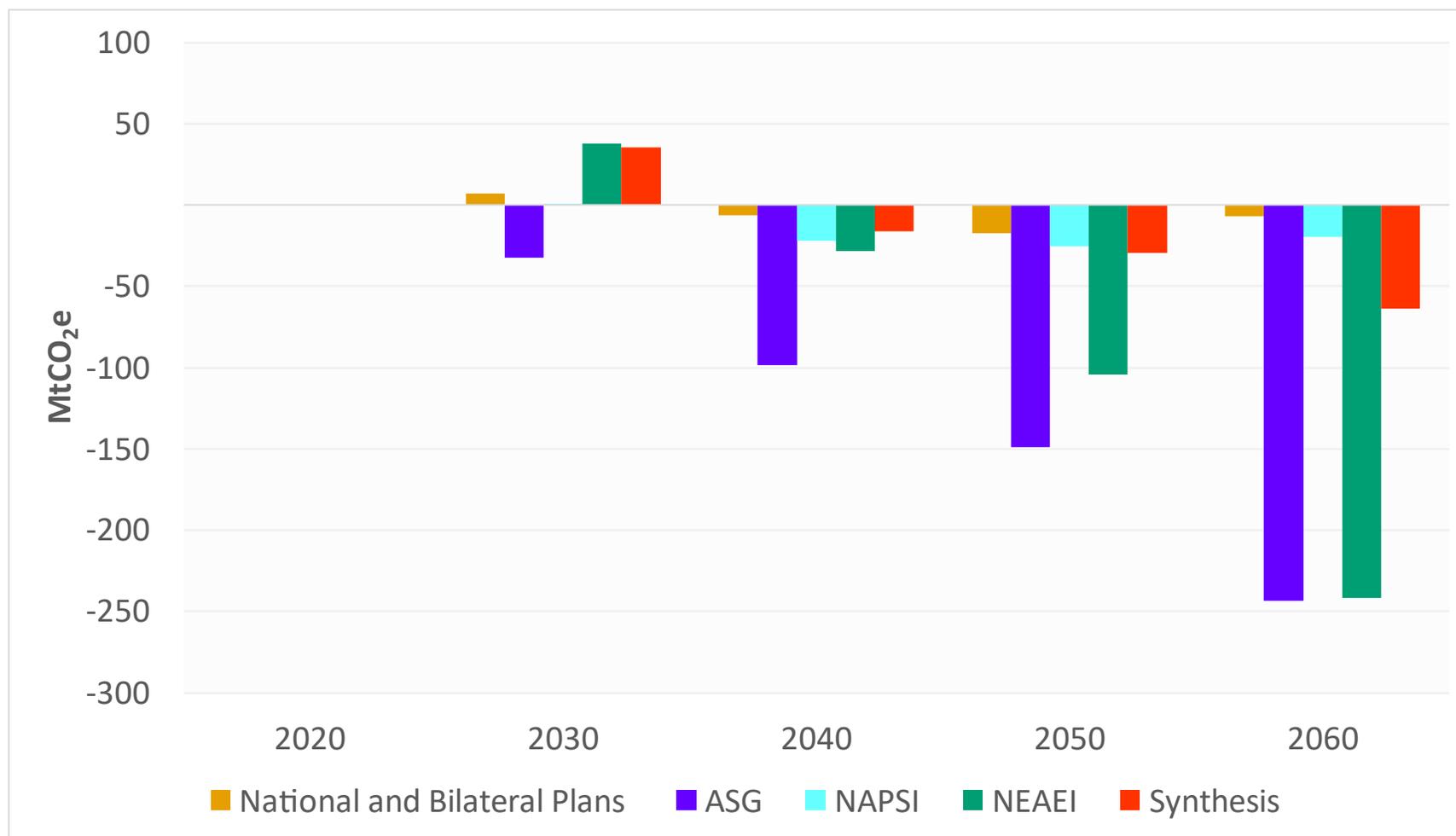
- Assumed RE deployment and decarbonization goals are met (e.g. net-zero emissions in Japan and Korea by 2050, in China by 2060)
- Modelled impact of different connectivity scenarios (Asian Super-Grid, NAPSI, NEAEI, plus a synthesis case) on decarbonization efforts



# Multilateral power trade is a tool for decarbonization



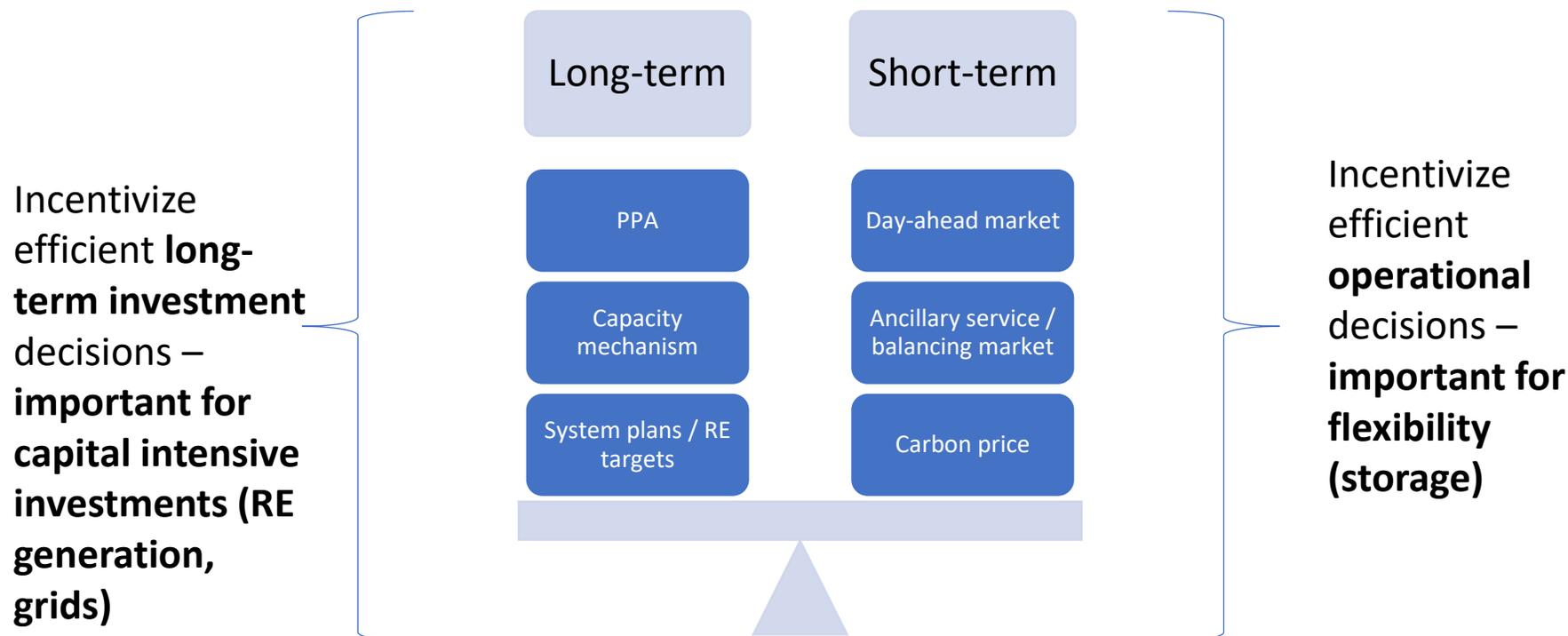
# Multilateral power trade is a tool for decarbonization



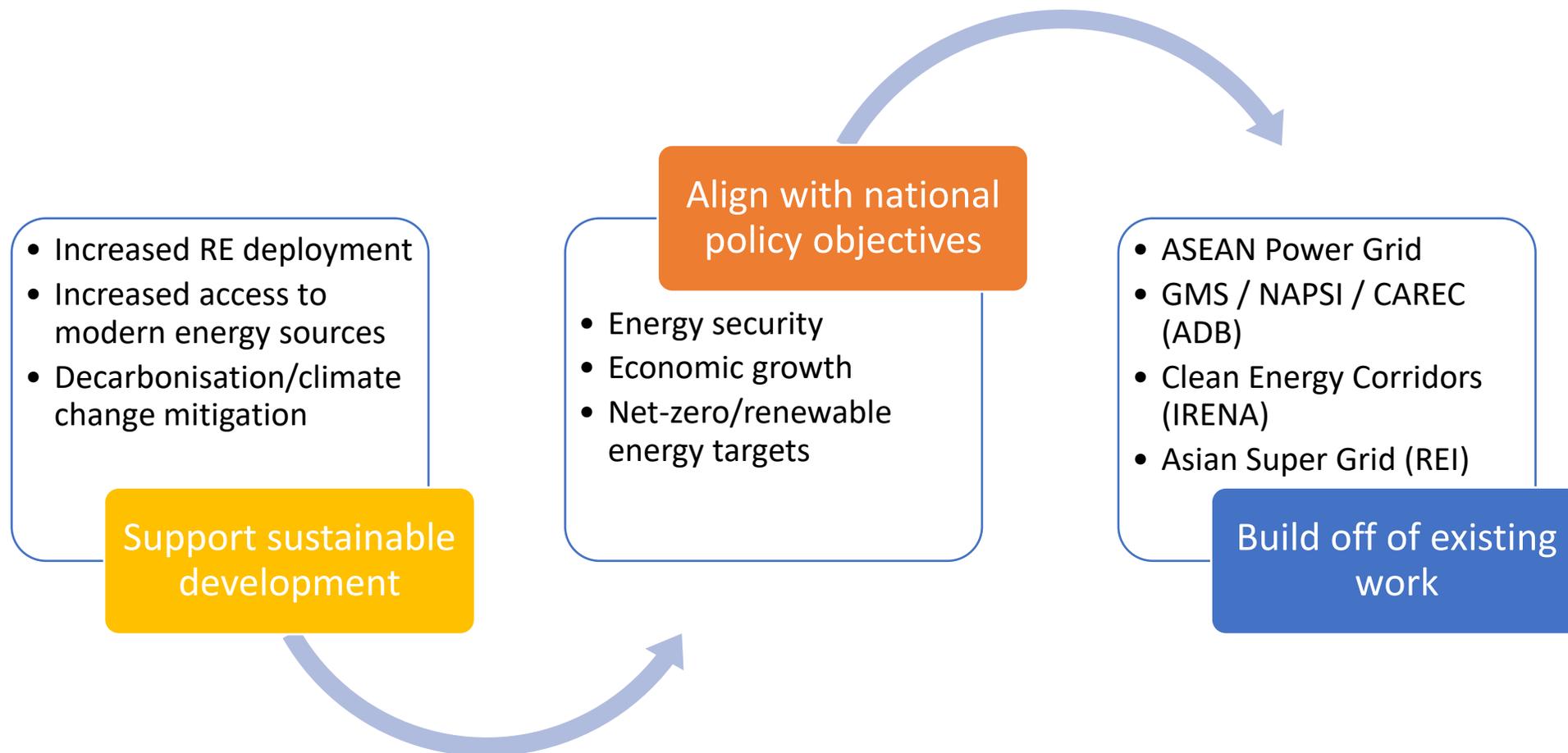
- Significant emission reductions due principally to avoided coal generation
- Benefits increase with time as new wind and solar are deployed

# MPT: the role of market signals

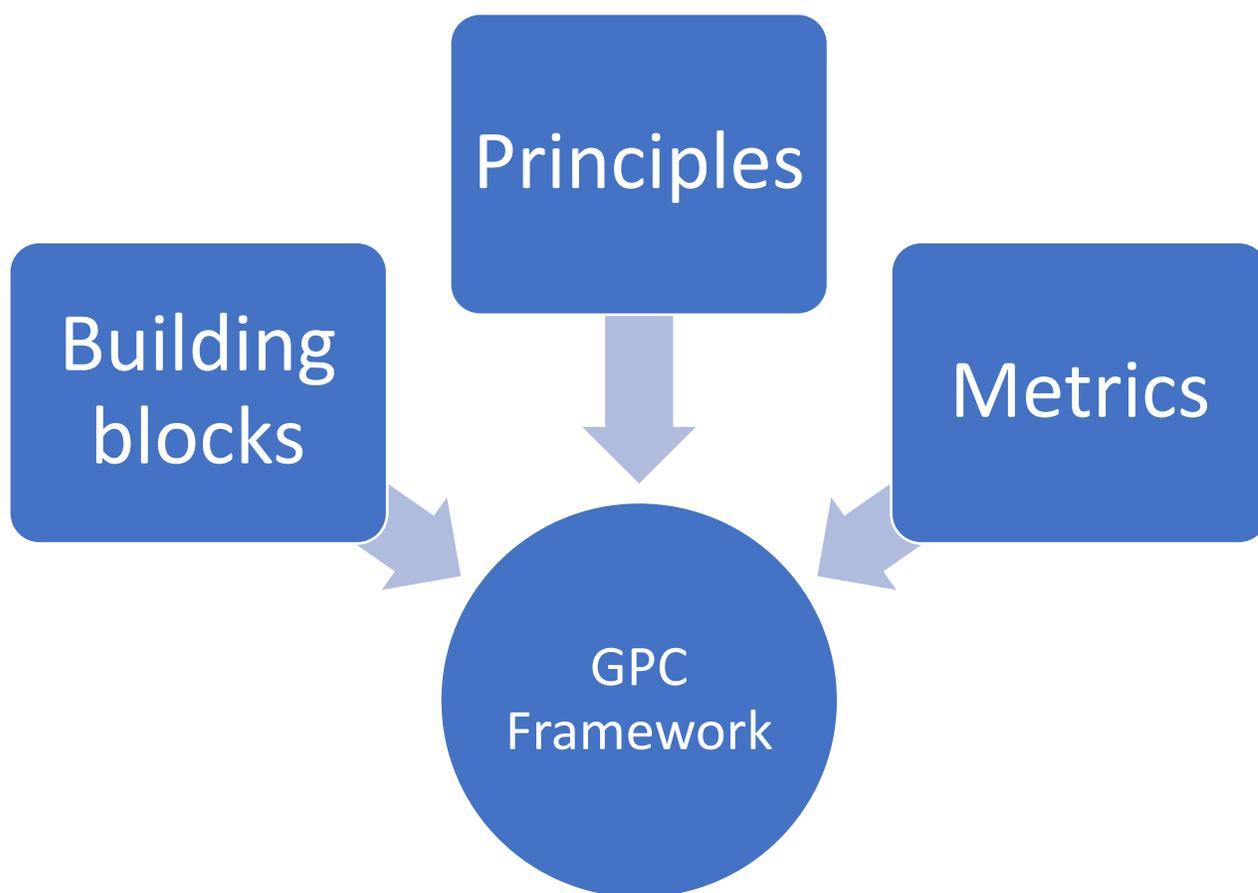
- Encouraging investments in low-carbon technologies requires an appropriate balance of *long-term* and *short-term* market signals



# Green Power Corridors



# Green Power Corridor Framework: Components

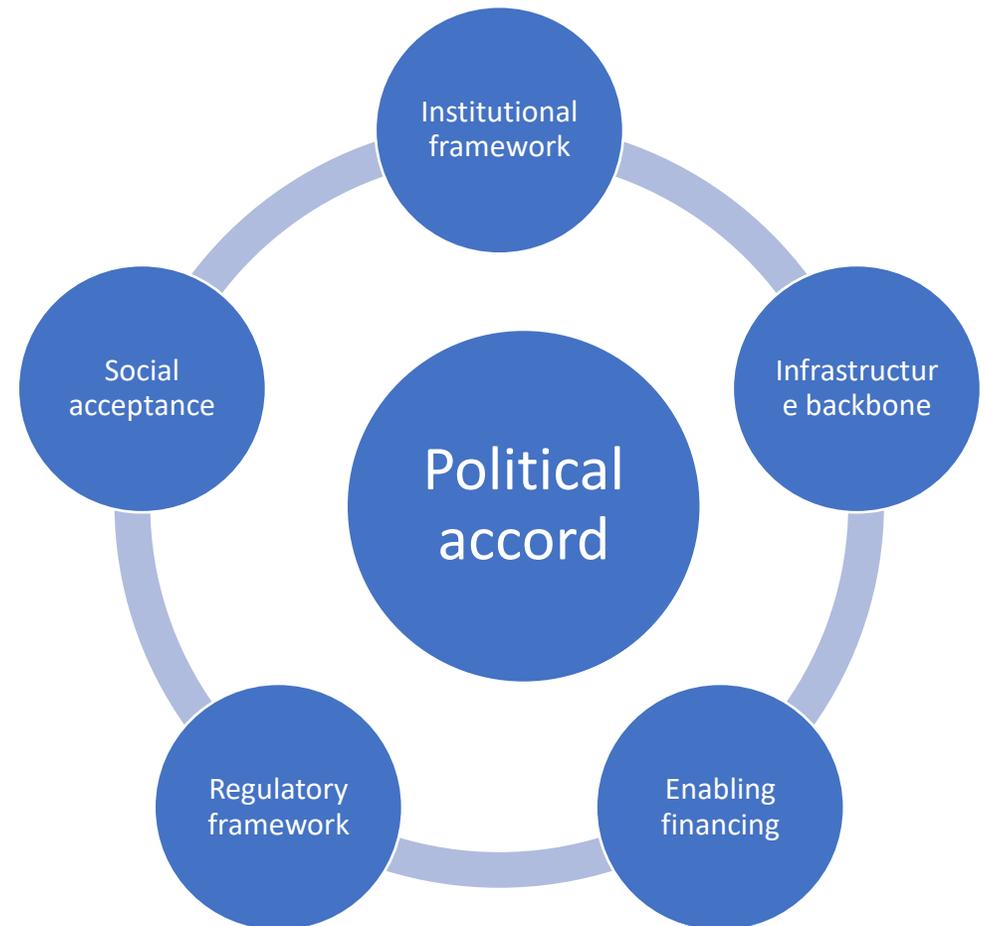


## The GPC Framework includes:

- Building blocks to structure and orient connectivity initiatives.
- Practical and relevant principles to guide the development of connectivity initiatives, backed by case studies and suggested tools.
- A set of metrics to enable the measurement of connectivity projects against relevant criteria (under 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.



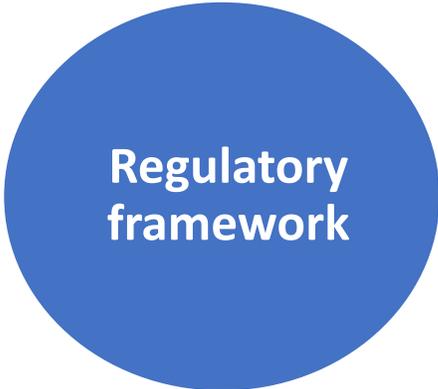
# Example Building Block: Regulatory framework

- Develop harmonized grid codes that enable secure and flexible operations;
- Enable bilateral cross-border power trading arrangements through harmonized and coordinated procedures;
- Establish multilateral trading arrangements that emphasize flexible and lowest-cost trading of electricity backed by a transparent pricing mechanism, including power, transmission tariffs and losses;
- Develop appropriate and consistent cost-sharing and cost recovery mechanisms.

## Models of power system integration and trading arrangements

Nascent	Bilateral, unidirectional power trade	<ul style="list-style-type: none"> <li>• Sichuan exports to eastern coastal regions</li> </ul>
Nascent	Bilateral, bidirectional power trade	<ul style="list-style-type: none"> <li>• Seasonal exchanges between Sichuan→Shaanxi, Qinghai ↔Tibet, China→Lao</li> </ul>
Secondary	Multilateral, unidirectional power trade with intermediary	<ul style="list-style-type: none"> <li>• Lao People's Democratic Republic-Thailand-Malaysia-Singapore (LTMS) Power Integration Project</li> </ul>
Secondary	Multilateral, multidirectional trade among differentiated markets	<ul style="list-style-type: none"> <li>• Southern African Power Pool (SAPP)</li> <li>• Central American Electrical Interconnection System (SIEPAC)</li> </ul>
Primary	Unified market structure, differentiated operations	<ul style="list-style-type: none"> <li>• EU Internal Electricity Market</li> </ul>
Primary	Unified market and operations	<ul style="list-style-type: none"> <li>• PJM (Northeastern United States)</li> </ul>

Source: <https://www.iea.org/reports/building-a-unified-national-power-market-system-in-china>



Regulatory framework

# Relevant ESCAP reports



**Enhancing cross-border power system connectivity to enable increased energy security and net-zero emissions: note by the secretariat**



(Includes draft GPC Framework)



Regional Power Grid  
**Connectivity for Sustainable Development**  
in North-East Asia

Policies and Strategies





# ESCAP

Economic and Social Commission  
for Asia and the Pacific