

Developing a Regional Roadmap on Energy Connectivity

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Outline

- 1. Current Status of Energy Connectivity**
- 2. Potential Analysis in the Future**
- 3. Challenges**
- 4. Road Map Outlook**

1、 Current Status of Energy Connectivity

1 Current Status of Energy Connectivity

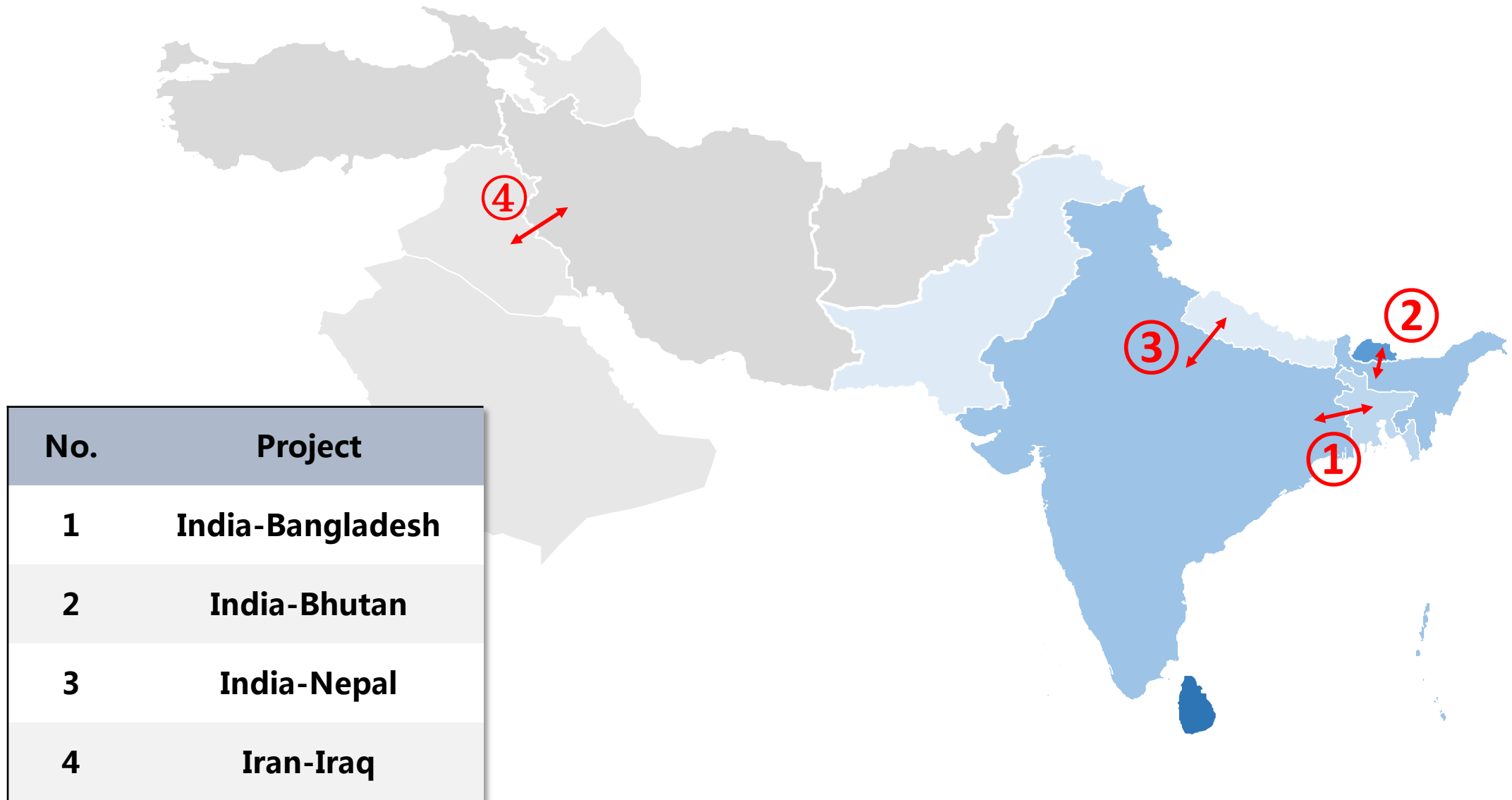
South-East Asia



No.	Project
1	Malaysia-Singapore
2	Thailand-Malaysia
3	Thailand-Lao PDR
4	Lao PDR-Vietnam
5	Vietnam-Cambodia
6	Thailand-Cambodia
7	China-Myanmar
8	China-Lao PDR
9	China-Vietnam

1 Current Status of Energy Connectivity

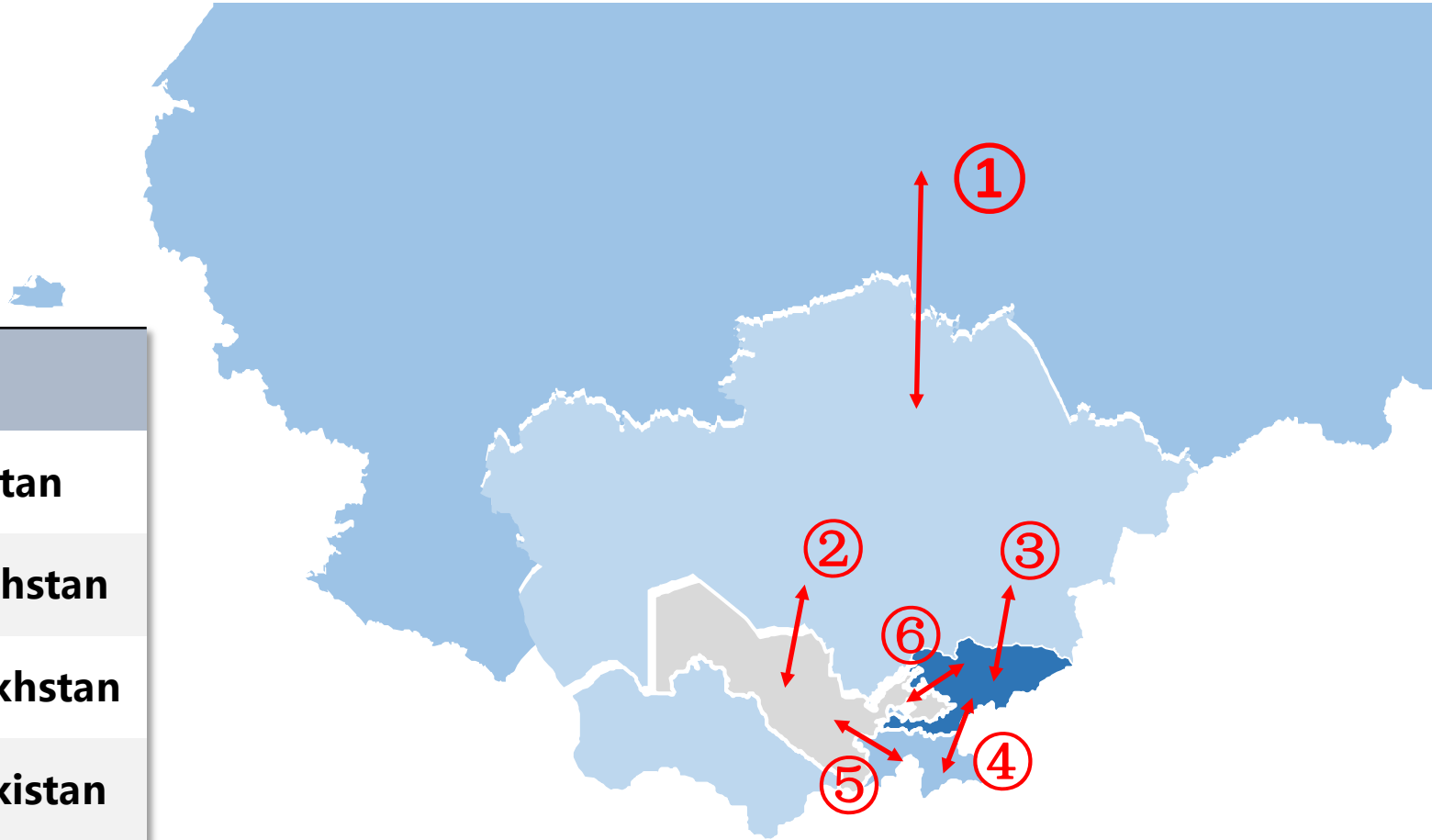
South and South-west Asia



1 Current Status of Energy Connectivity

Central Asia

No.	Project
1	Russia-Kazakhstan
2	Uzbekistan-Kazakhstan
3	Kyrgyzstan-Kazakhstan
4	Kyrgyzstan-Tajikistan
5	Uzbekistan-Tajikistan
6	Uzbekistan-Kyrgyzstan



1 Current Status of Energy Connectivity

East and North-East Asia



Power connectivity has already brought lots of benefits to regional countries, such as optimized resources allocation, fully utilization of clean energy etc.

1 Current Status of Energy Connectivity

- ◆ Beside the power connectivity, energy connectivity also includes oil & gas pipeline connectivity.
- ◆ With consideration of the huge investment, large project amount and complicated political factors in oil & gas pipeline connectivity, we think that energy connectivity in Asia and Pacific could **focus on the power connectivity at first.**

2、 Potential Analysis in the Future

2 Potential Analysis in the Future



Universal access
Energy efficiency
Renewable energy

By 2030— —

**ensure universal access to modern energy services;
double the global rate of improvement in energy efficiency;
double the share of renewable energy in the global energy mix.**

2 Potential Analysis in the Future

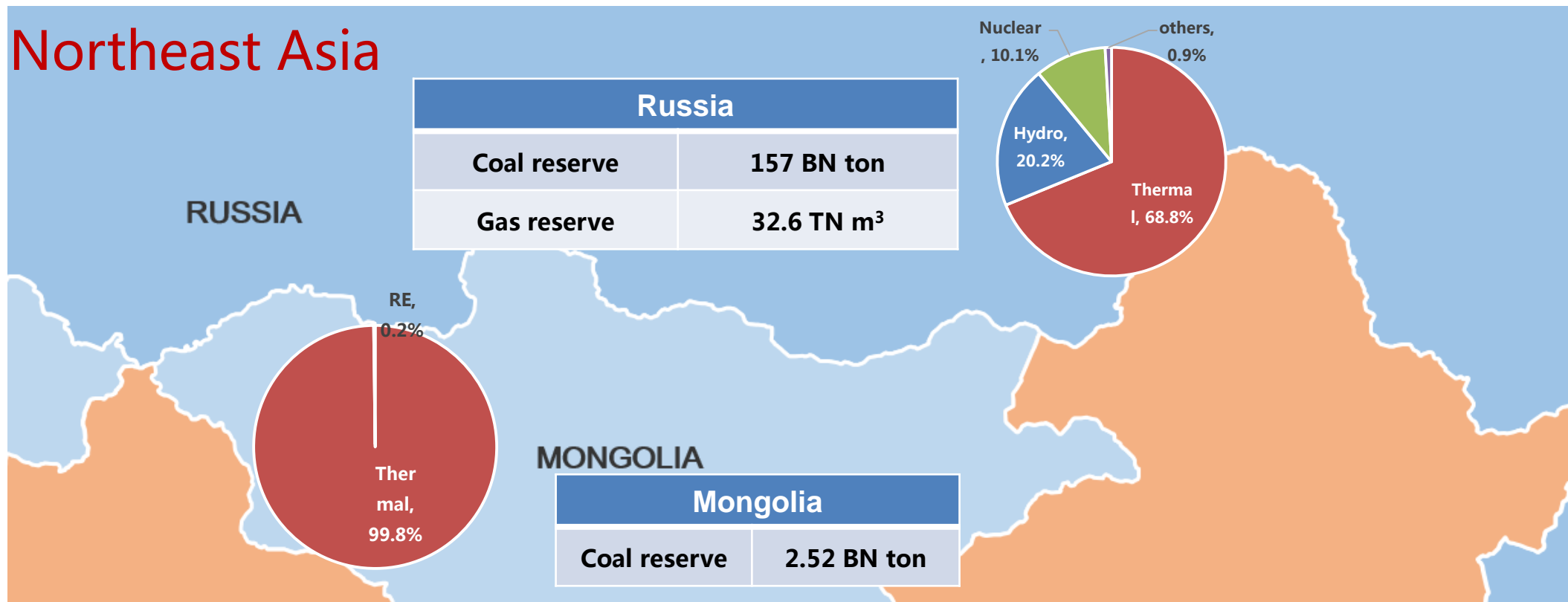


Sustainable Development Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all

By 2030, enhance ***international cooperation*** to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote ***investment in energy infrastructure*** and clean energy technology

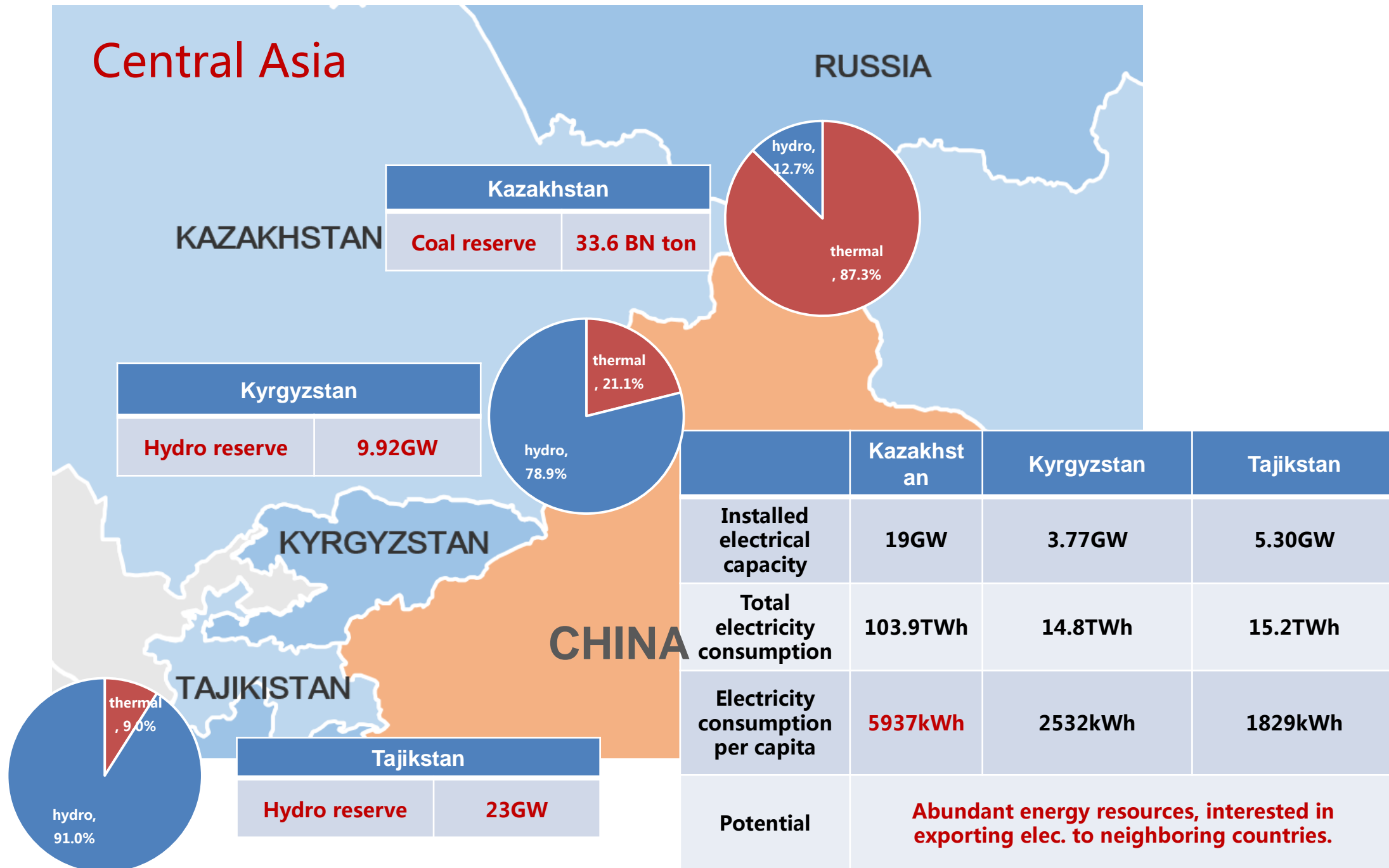
2 Potential Analysis in the Future

Northeast Asia

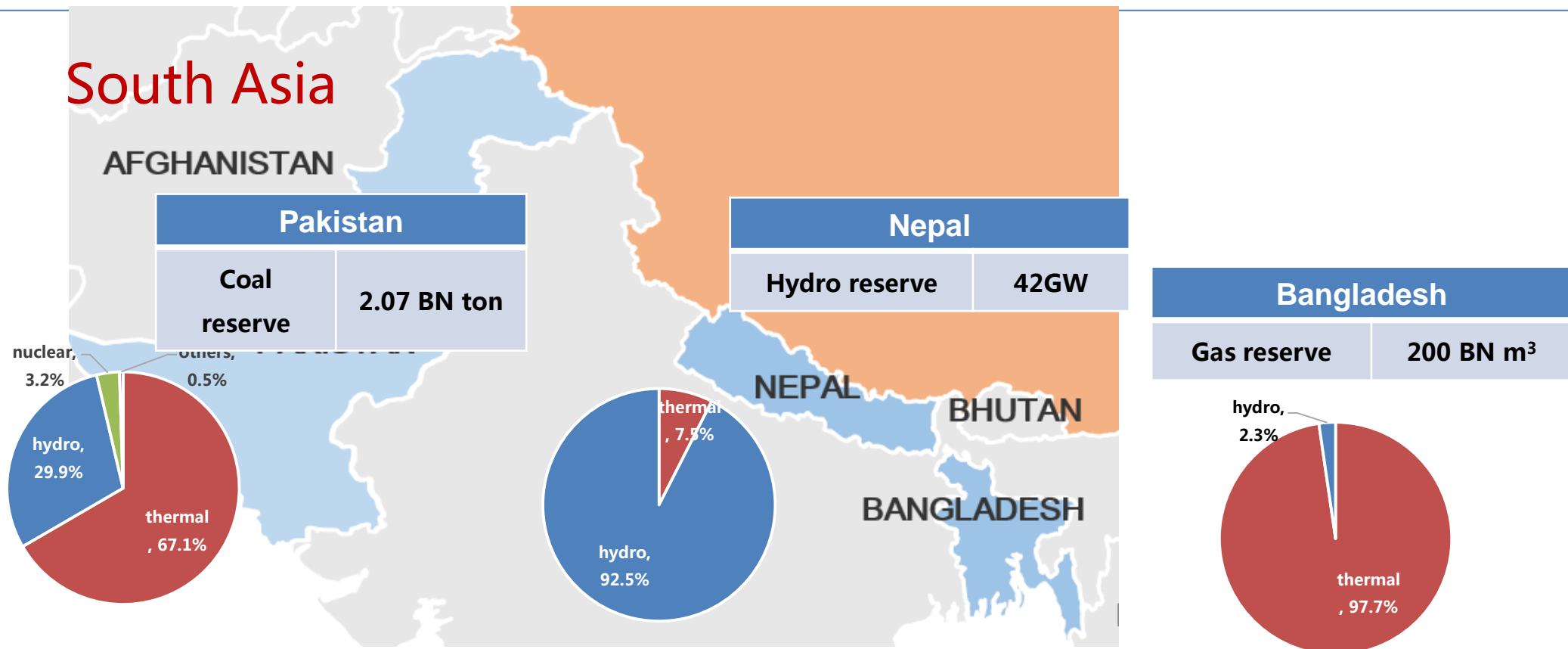


	Russia	Mongolia
Installed electrical capacity	248GW	1.09GW
Total electricity consumption	1060TWh	6.69TWh
Electricity consumption per capita	7344kWh	2300kWh
Potential	Abundant energy resources, low demand in the far-east area, interested in exporting elec. to China, Japan, Korea.	Rich coal mines, Low demand, interested in exporting elec. to China and others.

2 Potential Analysis in the Future



2 Potential Analysis in the Future



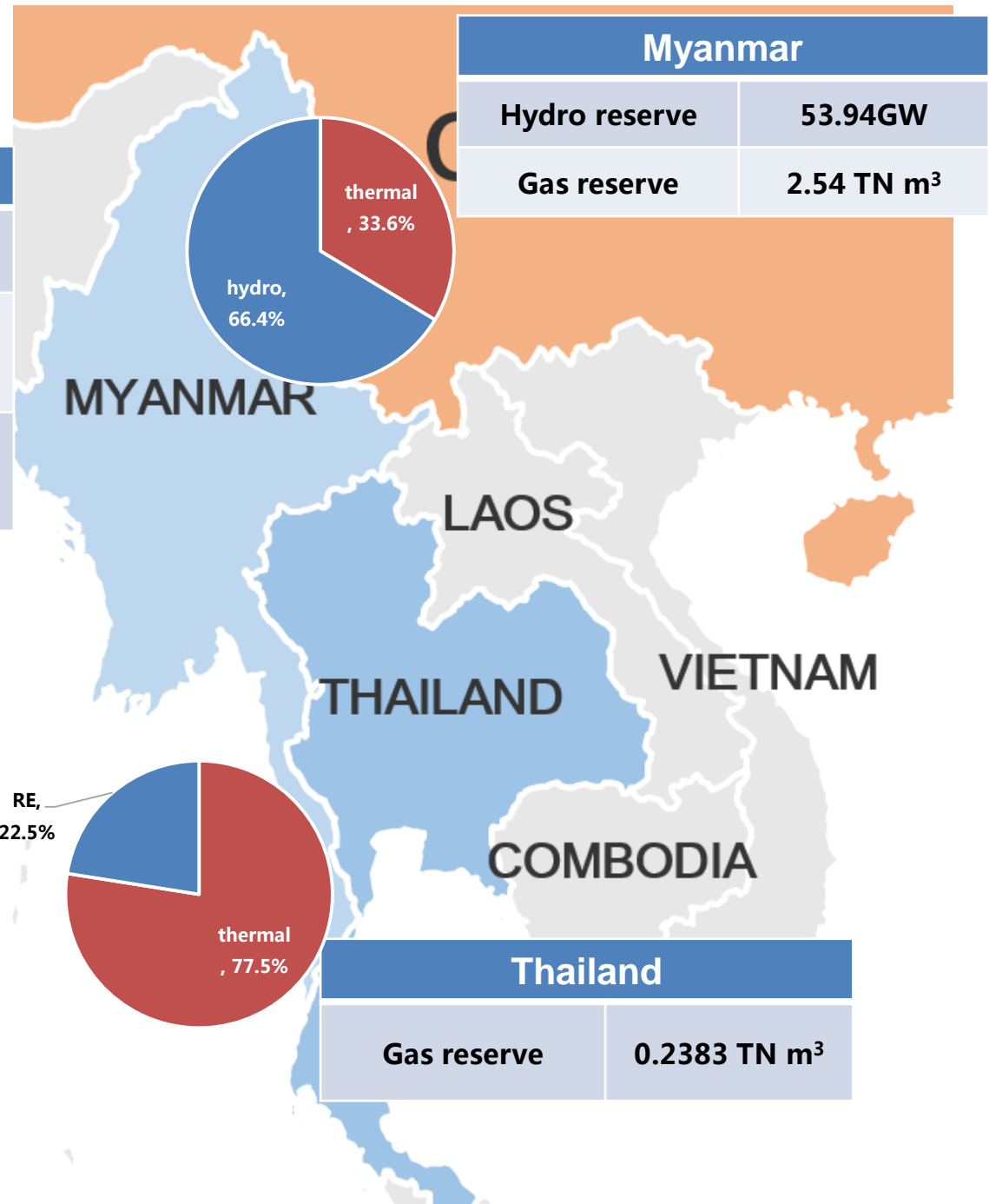
	Pakistan	Bangladesh	Nepal
Installed electrical capacity	24.38GW	8.60GW	0.763GW
Total electricity consumption	105.7TWh	55.8TWh	5.2TWh
Electricity consumption per capita	571kWh	351kWh	185kWh
Potential	Potential elec. Importing countries. Need to strengthen the power grid construction.		Exporting hydro power

2 Potential Analysis in the Future

Southeast Asia

	Myanmar	Thailand
Installed electrical capacity	4.71GW	37.61GW
Total electricity consumption	14.16TWh	184.3TWh
Electricity consumption per capita	265kWh	2721kWh

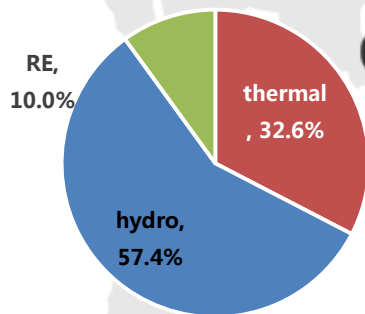
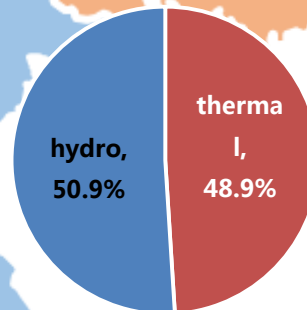
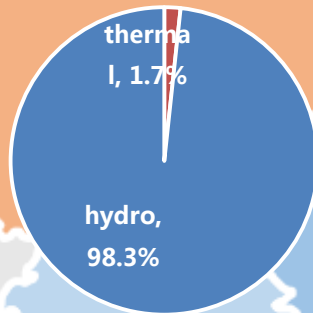
	Potential
Myanmar	Short-term: potential elec. Importing Long-term: potential elec. exporting
Thailand	High demand, potential elec. Importing



2 Potential Analysis in the Future

Southeast Asia

Laos	
Hydro reserve	23.47GW



	Laos	Vietnam	Cambodia
Installed electrical capacity	6.36GW	39.89GW	1.40GW
Total electricity consumption	4.89TWh	143.5TWh	4.86TWh
Electricity consumption per capita	731kWh	1582kWh	311.5kWh

	Potential
Laos	Low demand, Rich hydro power, potential elec. Exporting
Vietnam	High demand, potential elec. Importing
Cambodia	Weak power system. Potential elec. Importing

2 Potential Analysis in the Future

Potential of Cross-border Power Connectivity in Asia and the Pacific

- Many countries have **abundant energy resources**, e.g. hydro power in Southeast Asia, wind power in Northeast Asia, solar power in West Asia, and etc.
- Electricity consumption per capita is still at a low level and many people are **without access to electricity**.
- Power Connectivity could promote better **allocation of energy resources**, meet the needs of **energy quality and quantity for economic development**.
- Promoting and accelerating cross-border power connectivity in Asia is significant to **sustainable development of the region**. It will accelerate the implementation of **SE4ALL and SDG 7**.

3、 Challenges

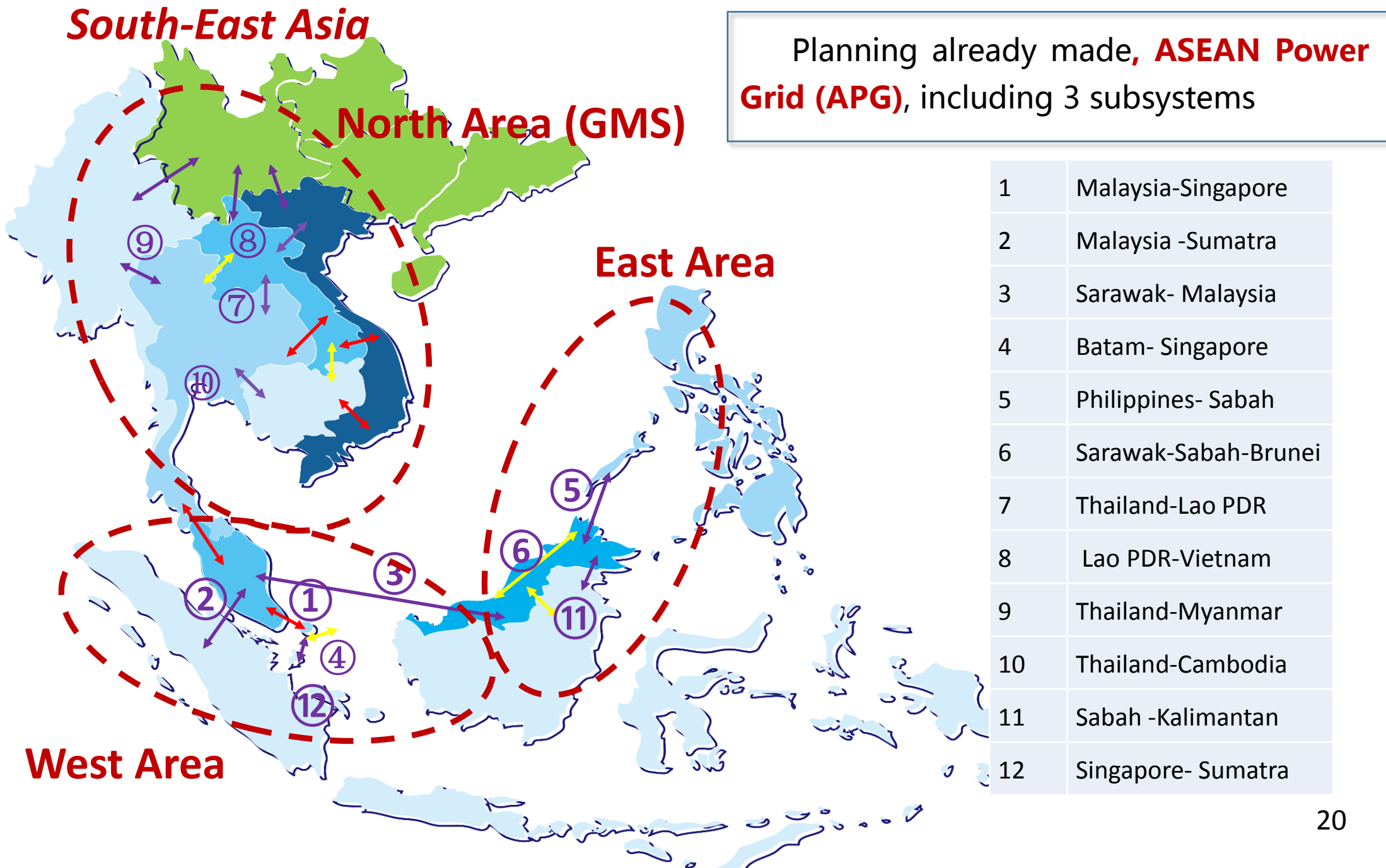
3 Challenges

- **Political factors:** cross-border power connectivity requires relevant countries have **strong political trust**; needs to coordinate the demands of all stakeholders; concerns on degrading of state energy security.
- **Economic and business factors:** **Large investments; Complicated business model.** The payback period is long and uncertain, especially under different legal and national systems.
- **Technical and standards factors:** requires to coordinate the planning and operation of power systems in different countries, including **grid code, electricity market design and dispatching, etc..**

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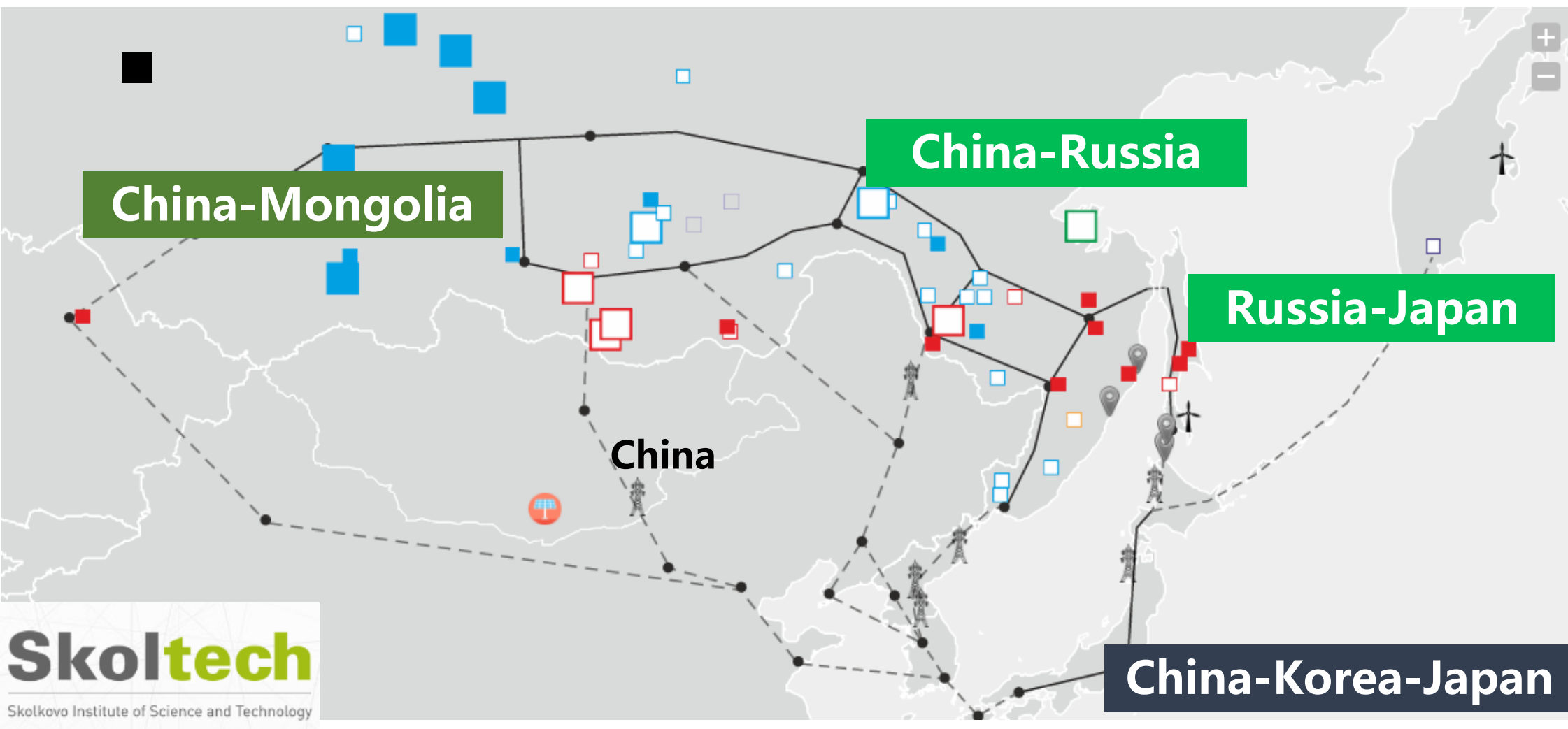
4、 Road Map Outlook

4 Road Map Outlook



4 Road Map Outlook

East and North-East Asia



Interactive scheme of prospective energy interconnections and projects in 2035

4 Road Map Outlook

Asia Power Grid in 2050



4 Road Map Outlook

Overall road map:

■ Step 1 (now-2035):

- Build and strengthen the Power interconnection in sub-regions including Northeast Asia, Southeast Asia, South Asia, Central Asia, and West Asia.
- Unified dispatching/Control centers and electricity markets in each sub-region gradually.

■ Step 2 (2035-2050):

- Build the Power interconnection between sub-region and sub-region, especially between Southeast Asia, South Asia, and Central Asia.
- Larger scale and better capability of energy resource allocation.
- Better usage of sustainable energy. Benefit all countries.

To promote cross-border power connectivity:

- Making full use of the platform of ESCAP, especially the **experts working group on energy connectivity.**
- **Governmental level:** coordinating power development policies and strategies.
- **Enterprises level:** studying on technologies and business model of specific power connectivity projects
- **Experts level:** more in-depth research cooperation between different countries. A number of basic research topics need to be carried out, such as power demand forecast, project feasible study, dispatching mode, standard and laws, etc..

Discussion

- 1. What are the main roles of regional cooperation to accelerate cross border power connectivity? Objectives, main elements of regional cooperation.**
- 2. How to go about developing this regional cooperation mechanism? What type of information and analysis is needed for this task? The discussion will guide the nature and format of background studies to be conducted in support of regional cooperation under the purview of the Expert Working Group on Energy Connectivity.**

Thank you!