

Developing the Northeast Asia Regional Energy Market

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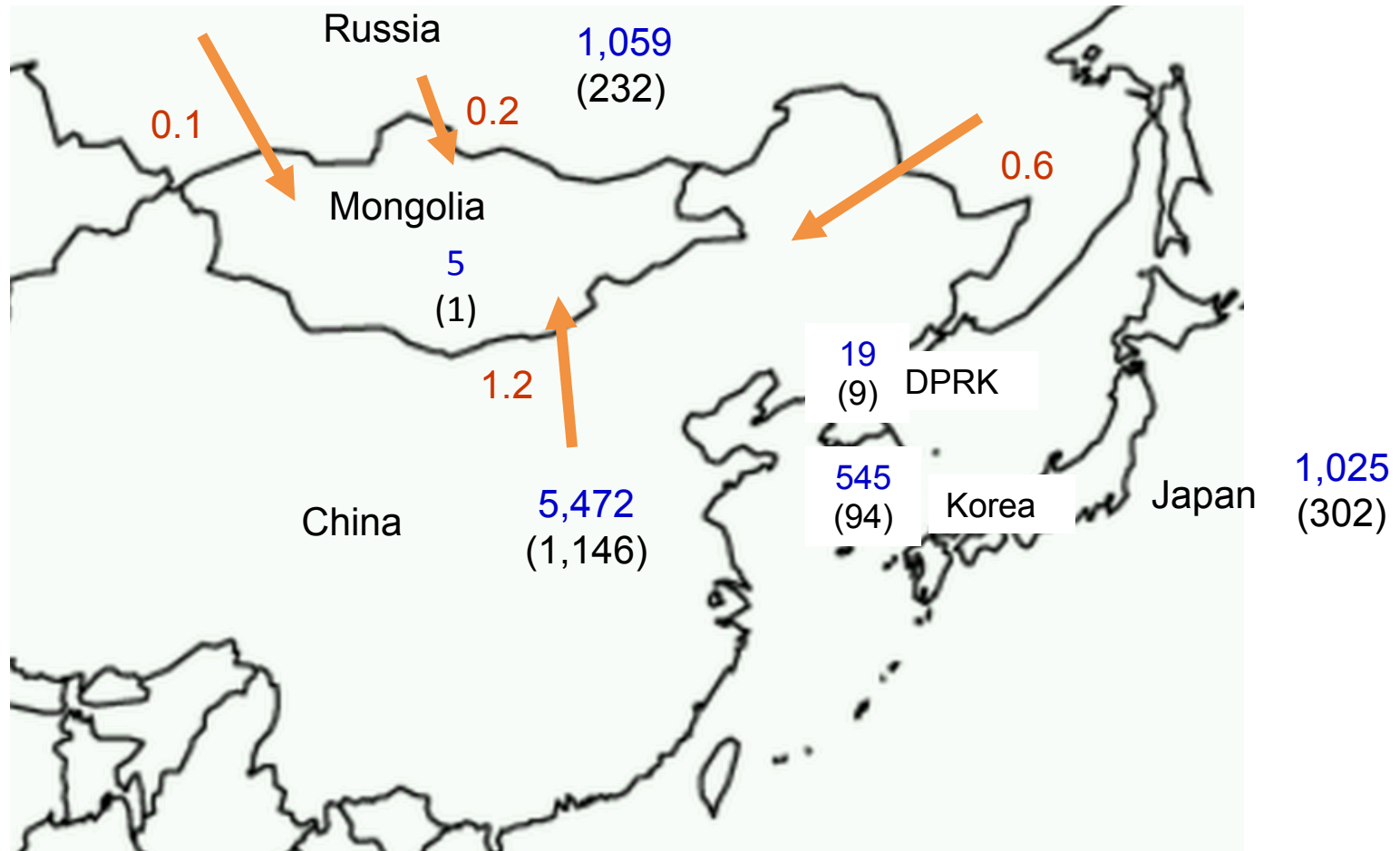
Northeast Asia – Key Information

Nearly 40% of global CO₂ emissions from the region

	GDP (in billion dollars) Figures in parentheses are GDP per capita (in thousand dollars)	Population (in million people)	Electricity generated (in TWh)	CO ₂ emissions (in million tons CO ₂)
China	8,909 (6.5)	1,376	5,811	9,154
Japan	5,986 (47.2)	127	1,036	1,208
South Korea	1,267 (25.0)	50	522	649
Mongolia	12 (3.9)	3	5	18
Russia	1,616 (11.0)	143	1,063	1,483
Northeast Asia	17,790 (~10.5)	1,699	8,437	12,512
World	74,889 (10.2)	7,349	24,098	33,508
Share of Northeast Asia	20-25%	20-25%	30-35%	~37%
Source	World Bank *Constant 2010	United Nations	BP; For Mongolia, figure from IEA in 2014	BP; For Mongolia, figure from IEA in 2014

Source: Created by Renewable Energy Institute based on data released by national governments and international organizations.

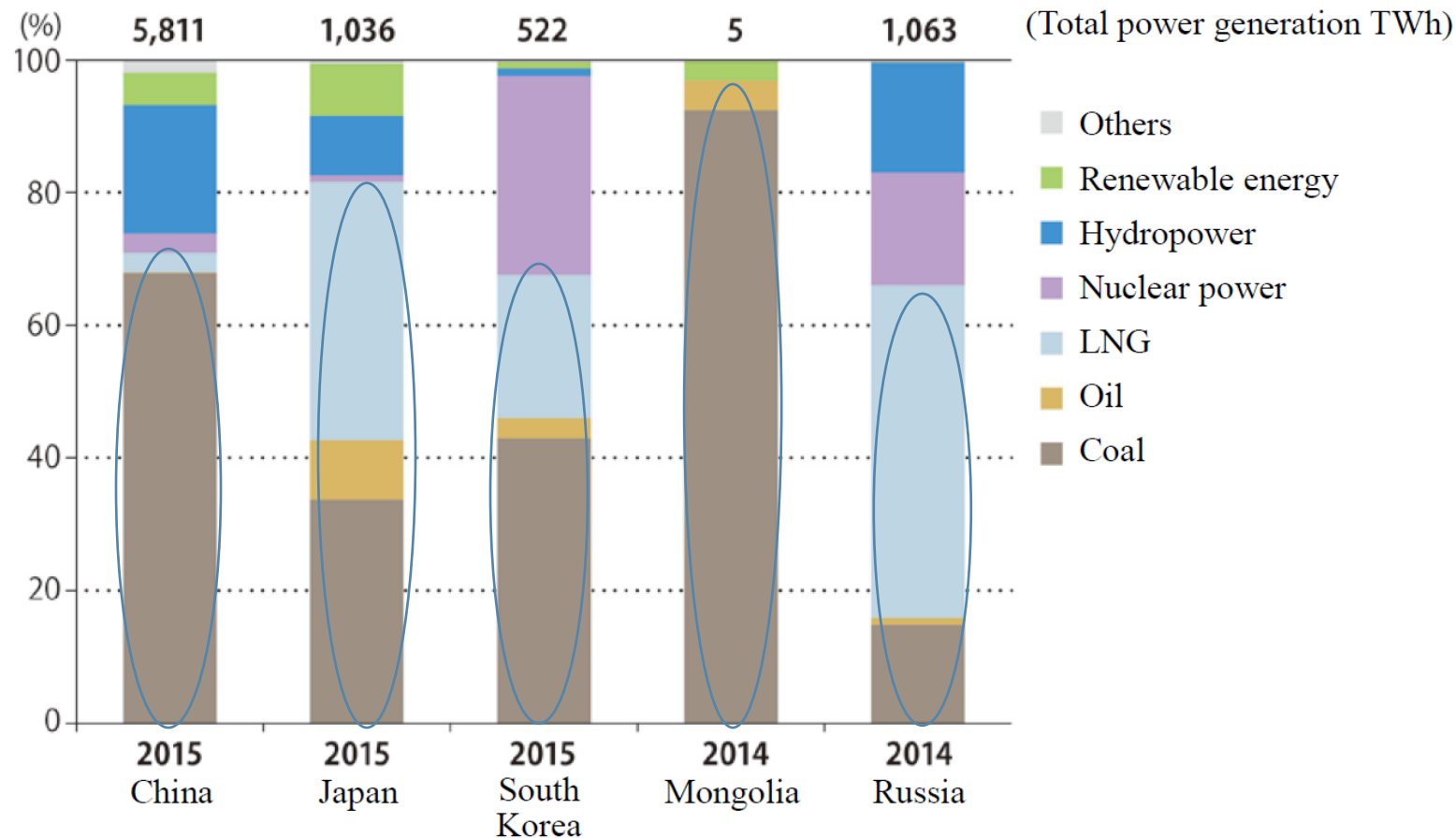
Installed Capacity & Electricity Production (2016)



5 production in 2016 (TWh)
(1) installed capacity (GW)
➔ Cross border trade (TWh)

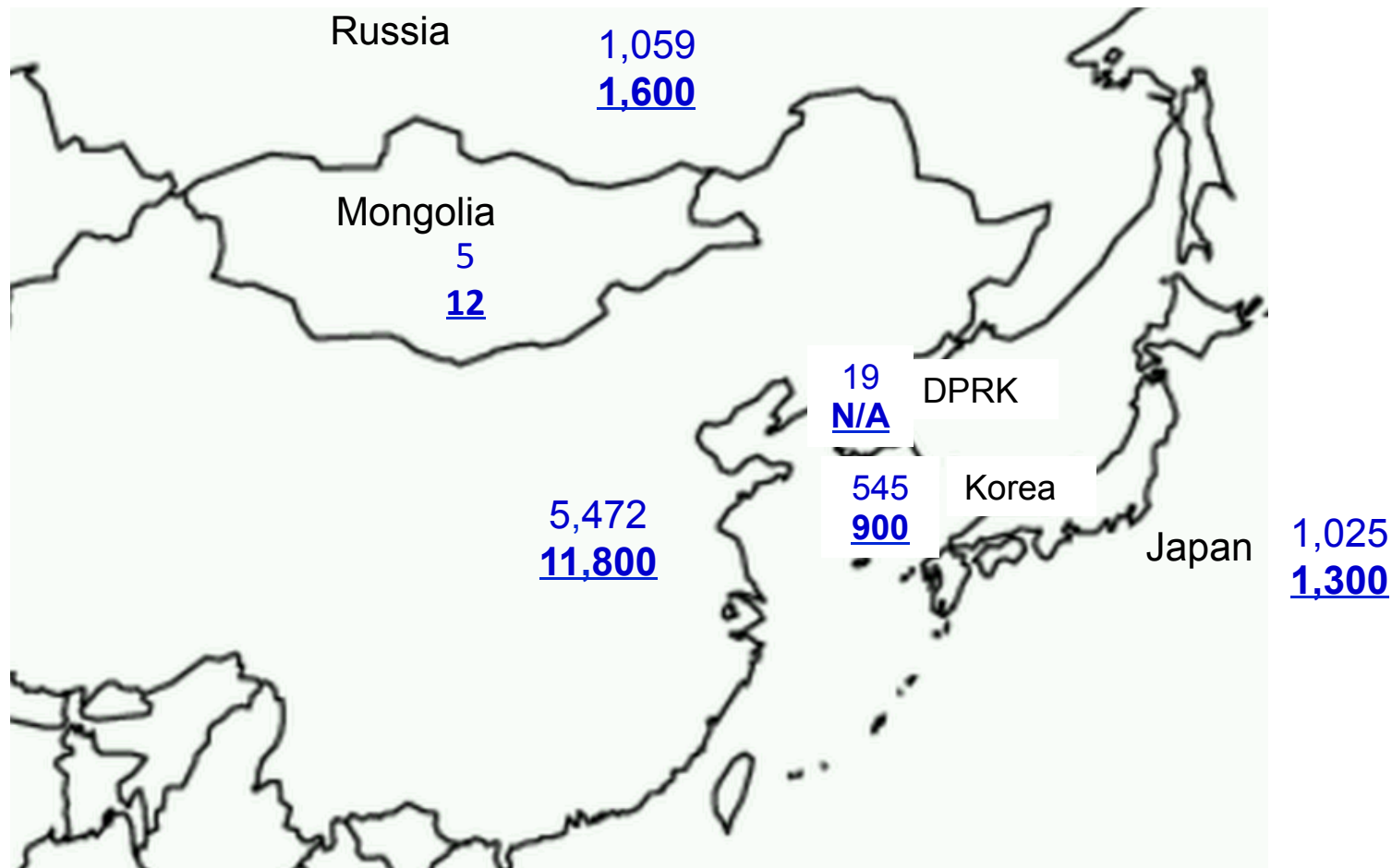
Source: International Energy Agency 2016

Power Generation Mix – High share of fossil fuels



Source: Created by Renewable Energy Institute based on CEC “Annual Data,” IEA “Statistics by countries” “Electricity Information 2016,” BP “Statistical Review of World Energy 2016.

Projected Electricity Production in 2030 Compared with 2016 –



5 production in 2016 (TWh)
12 estimates in 2030 (TWh)

Source: BP energy outlook 2030

Electricity Tariff (2016)–

Highest Japan – Lowest Mongolia in the region

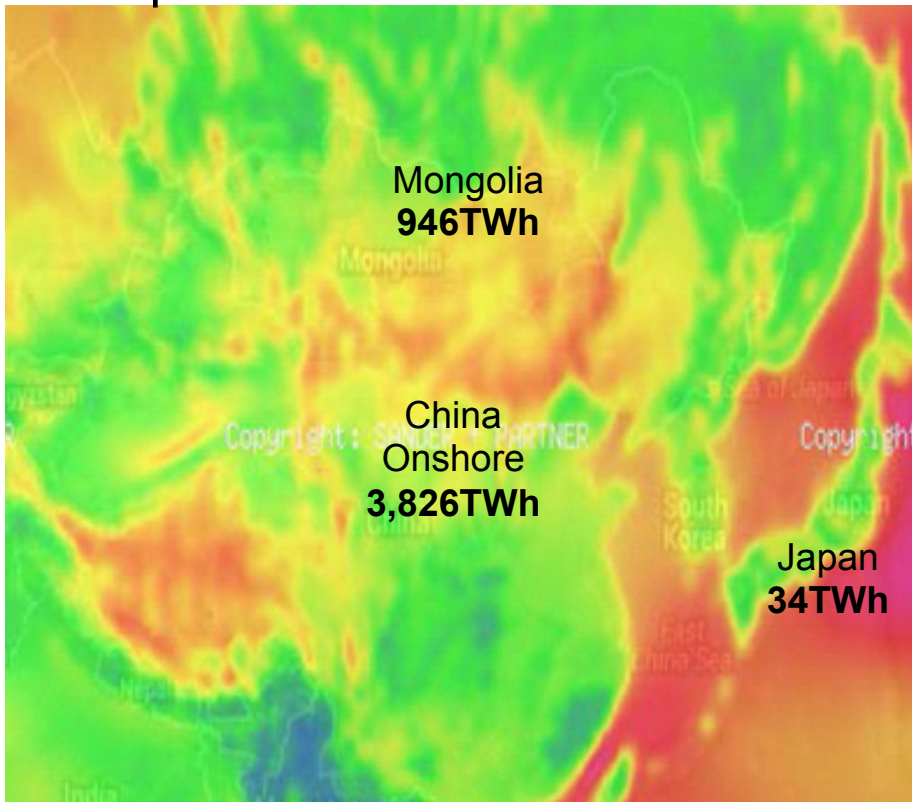


5.3 – Industrial (cent/kWh)
4.9 – Household (cent/kWh)

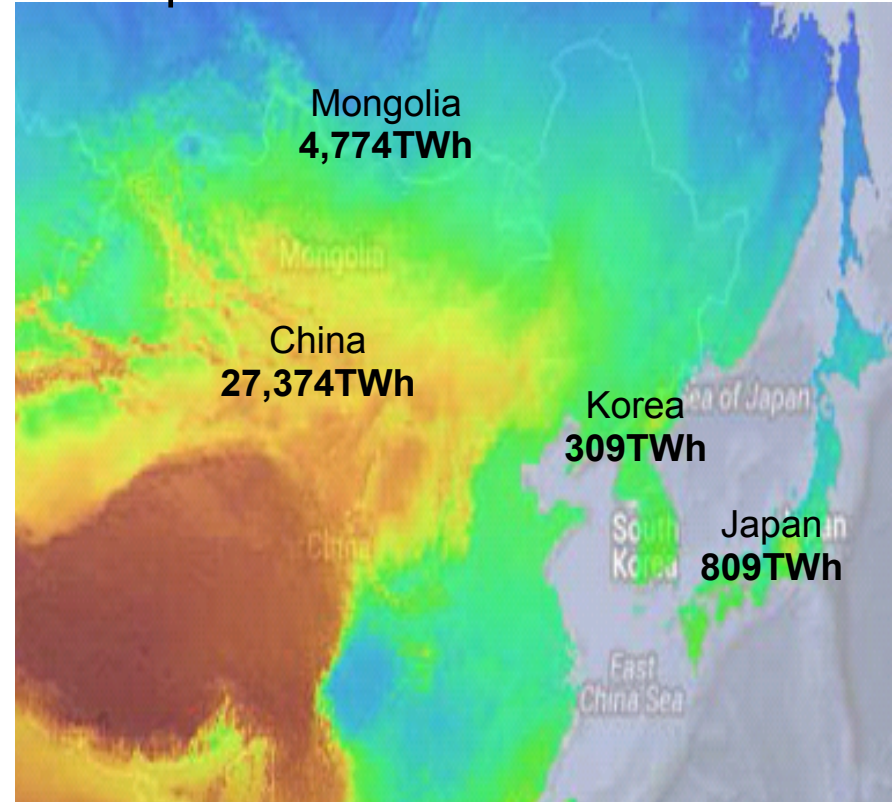
Source: Energy Regulator Commission 2016

Renewable Energy (Solar + Wind) Potential – Rich resources in China and Mongolia

Wind potential

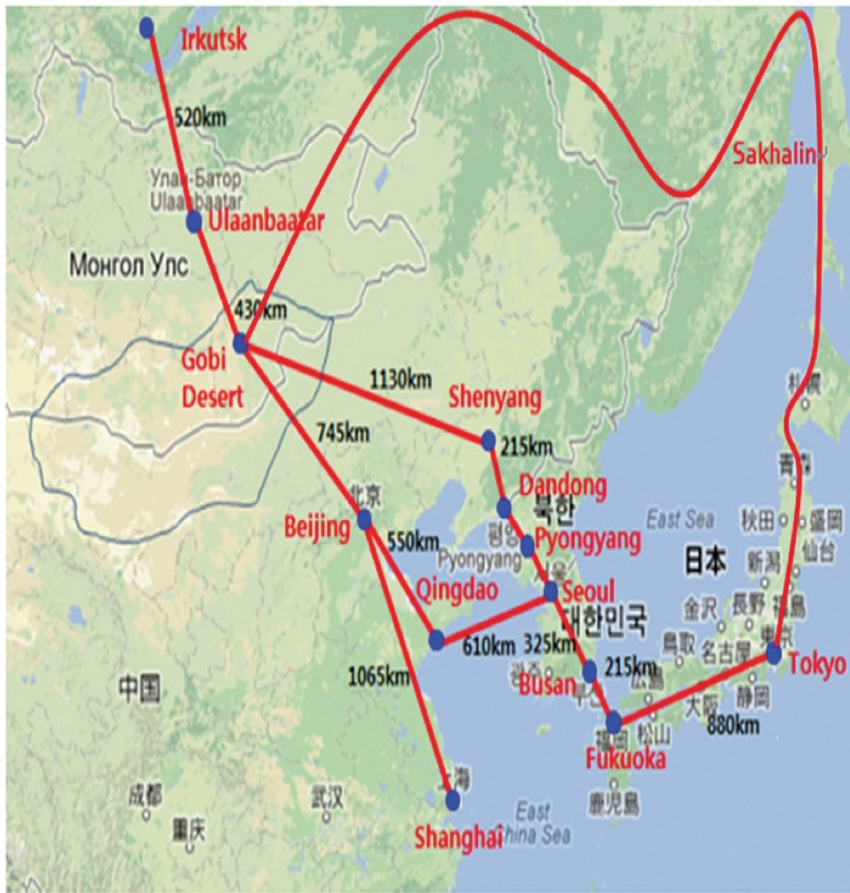


Solar potential



Source: <http://globalatlas.irena.org/>

Proposed Solution: Interconnection (HVDC) + Renewables + Intelligence = Smart Northeast Regional Grid



Source: Electric power grid interconnections in Northeast Asia: A quantitative analysis of opportunities and challenges.

What ADB is doing ?

TA 9001-MON: Strategy for Northeast Asia Power System Interconnection

- **Study cost:** \$1.75 million
- **Implementation period:** 2 years (from May 2017 to May 2019)
- **Executing Agency:** Ministry of Energy, Mongolia
- **Study team:** Électricité de France + China Electric Power Reach Institute + Nova Terra (Mongolia)

Advisory Committee Members

- **Mongolia:** Ministry of Energy, Central Region Transmission Company, Energy Regulatory Commission,
- **China:** State Grid of China and/or GEIDCO (proposed)
- **Korea:** KEPCO (proposed)
- **Japan:** Renewable Energy Institute
- **Russia:** ROSSETI
- **International organizations:** Energy Charter, IRENA

Key Activities of Study

Module 1: Stock Taking

- Existing power studies in North Asia (Literature Review, etc.)
- Initial Consultations
- Remarks of the workshop and the Steering Committee

Module 2: Market & Power Trade Assessment

For each area/country :

- Electricity demand (i.e., annual load curve, forecasts, etc.)
- Electricity generation fleet detailed information

Module 3: Planning & Evaluation Criteria

- General economic data to validate the internal demand
- Industry economic data in Mongolia
- Macroeconomics data of the different countries

Module 4: Energy Sector Profile & Projections

- Geospatial data for suitable land areas assessment
- Resource data and technology characteristics
- Data on densely populated areas for social acceptability assessment.

Module 5: Power System interconnection Expansion Plan

- Present and future bulk power system
- Operation of the bulk power system
- Existing system performance
- Environmental data

Module 6: Institutional and tariff Settlements & Modelling

For each area/country:

- Current regulation and planning procedures

Upcoming Confirmed Events

- **November 2017** – conference in Korea
- **March 2018** – conference in Japan

ADB welcomes those interested in this study to participate in conferences and / or as an advisory committee member!

Beyond Northeast Asia.....

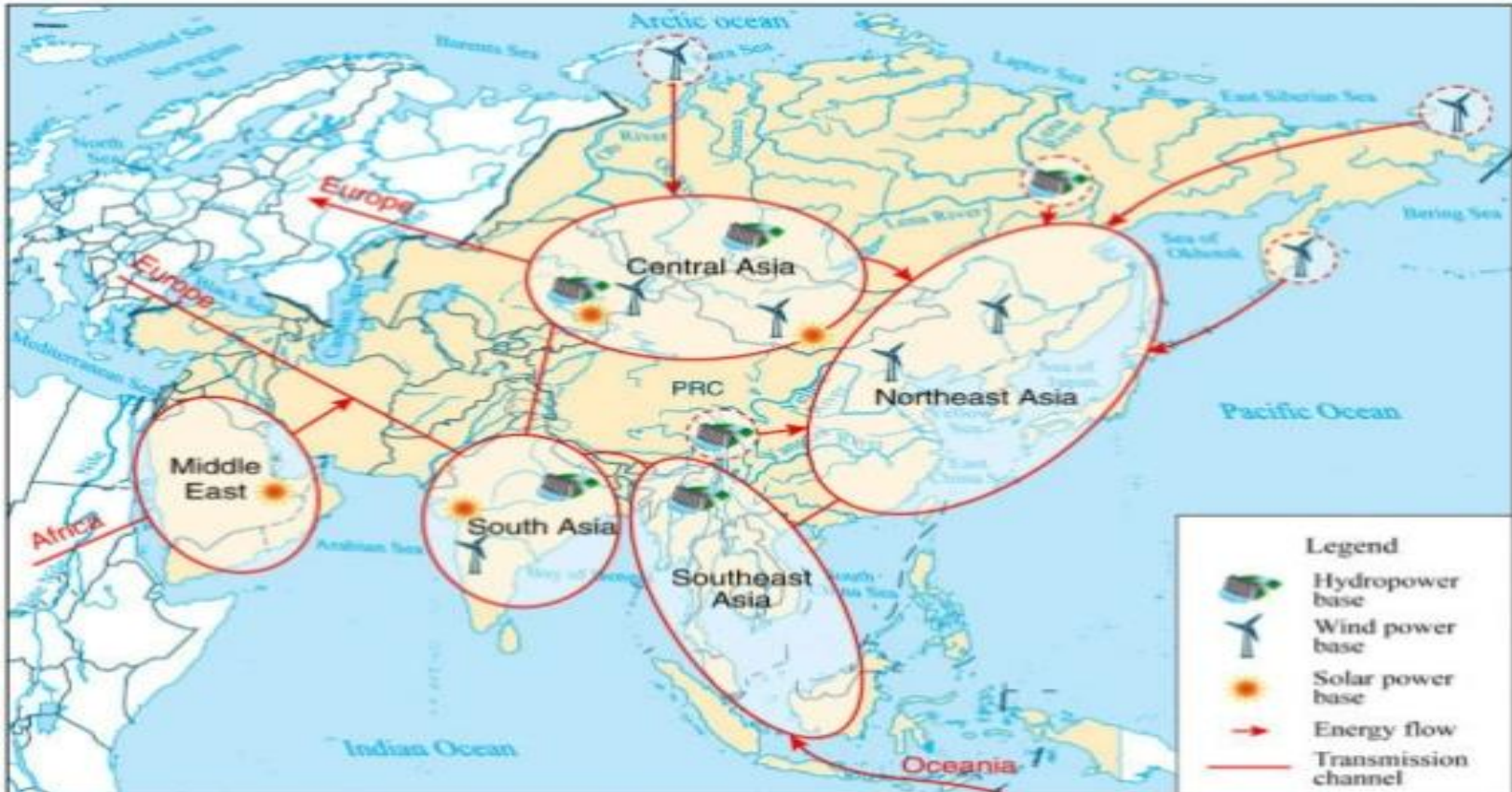


Illustration of Asia's Transnational Grid Interconnections

Source: Global Energy Interconnection Development and Cooperation Organization

Thank you
for further information -

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