Research on Asian Energy Interconnection

Global Energy Interconnection Development and Cooperation Organization

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Global Energy Interconnection
Development and Cooperation Organization
全球能源互联网发展合作组织

I. Research Background

II. Research Framework

III. Key Study Results

I. Research Background

- The COVID-19 pandemic is impacting communities all over the world. By now, the number of cumulative infections of COVID-19 is over 3 million. This is a global crisis that requires a global response. Solidarity and cooperation are necessary to overcome the pandemic.
- Next, bigger and longer-lasting crisis -- Climate Change which is now affecting every country on every continent.
- A global pandemic caused by a virus could eventually be solved by vaccine, but when the climate and ecological crisis broke out irreversibly, mankind could not produce a vaccine to prevent this crisis.

UN SDG13--Take urgent action to combat climate change and its impacts

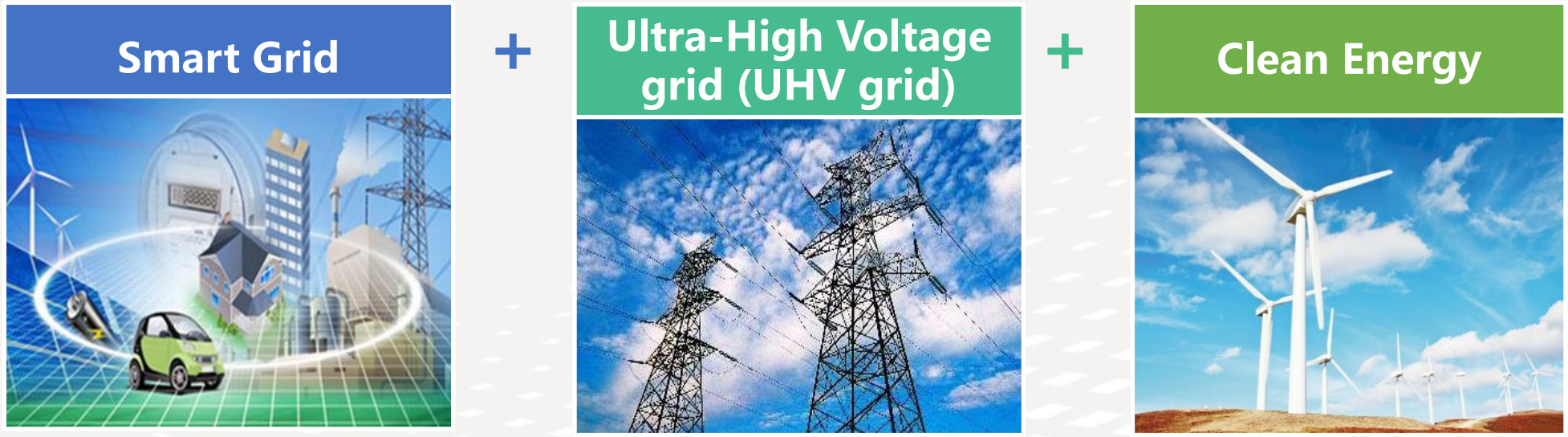
Climate change, however, is a global challenge that does not respect national borders. It is an issue that requires solutions that need to be coordinated at the international level to help developing countries move toward a low-carbon economy.

I. Research Background

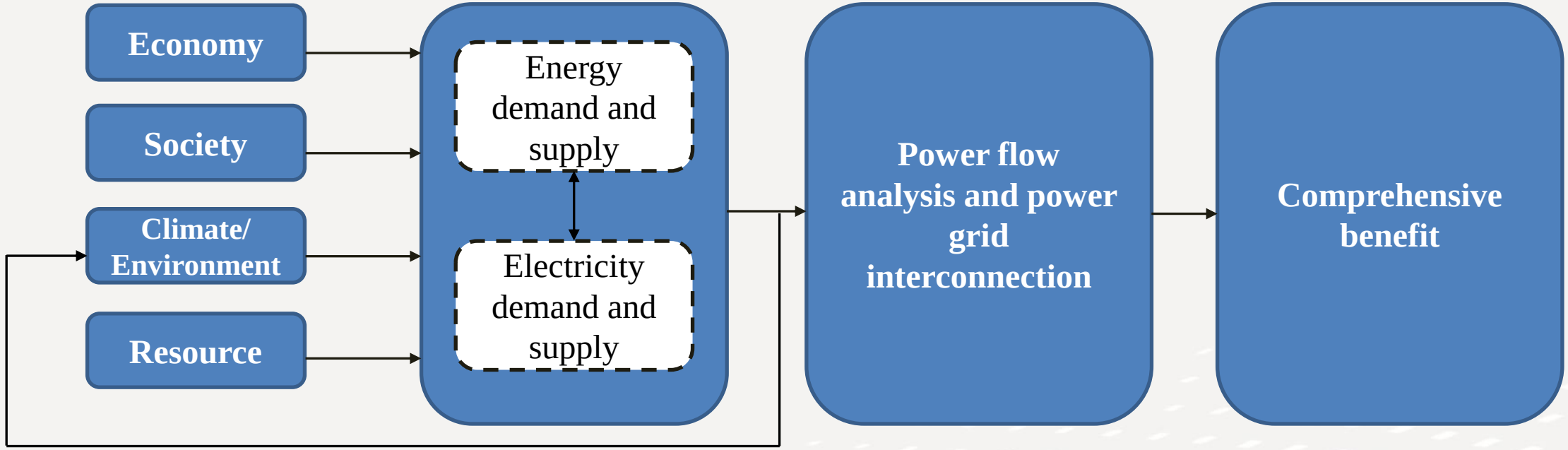
- Over 70% of world's coal, oil and natural gas are used as fuels.
- The core of sustainable development lies in clean development.
- Strengthening communication and coordination to fight climate change.

I. Research Background

- The global energy interconnection (GEI) is a modern energy system steering towards clean energy production, widespread energy allocation and electrification of energy consumption.
- GEI is in itself an integration of "Smart Grid +UHV Grid+ Clean Energy", and a platform for large-scale development, transmission and utilization of clean energy resources worldwide.



II. Research Framework



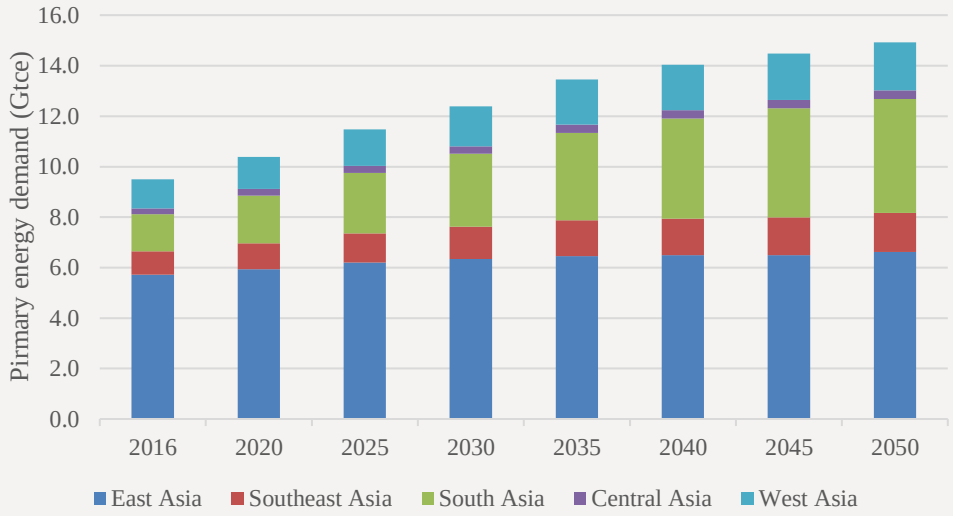
Output

- Electricity demand, Installed capacity mix
- Power flow, backbone grid
- Investment, emission, employment

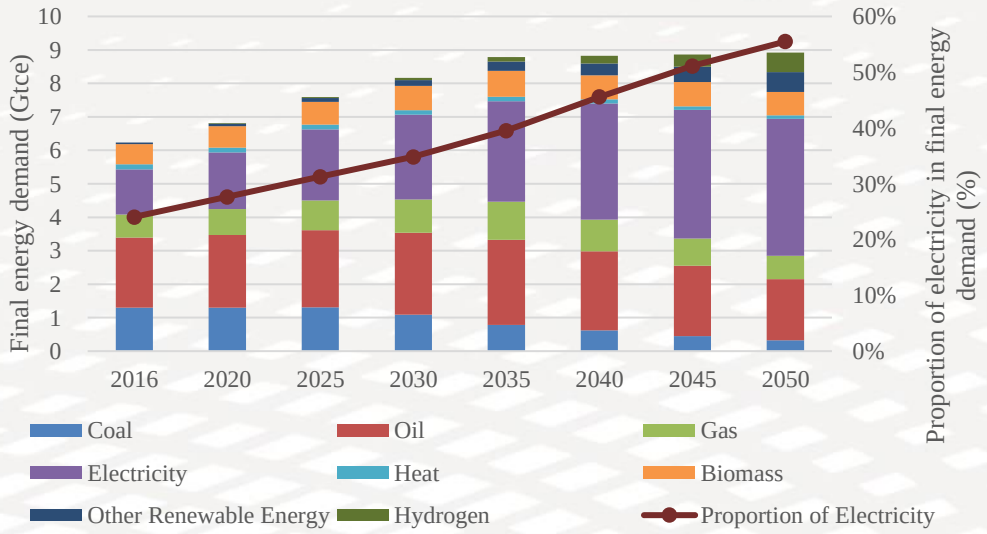
III. Key Study Results

Energy development

- **Steady growth of TPEC.** By 2050, TPEC in Asia will increase to 14.9 Gtce, with an annual growth rate of 1.3%. Per capita primary energy demand will rise to 2.9 tce.
- **Around 2040, clean energy will surpass fossil energy as the dominant energy.** By 2050, clean energy in Asia will increase to 9.7 Gtce, accounting for 69% of primary energy.
- **Electricity will dominate final energy demand.** By 2050, the proportion of electricity in TFC will increase to 55%. Increment of electricity in commercial, residential and transport sectors will become an important driving force to improve the proportion of electricity in TFC.



TPEC by Region

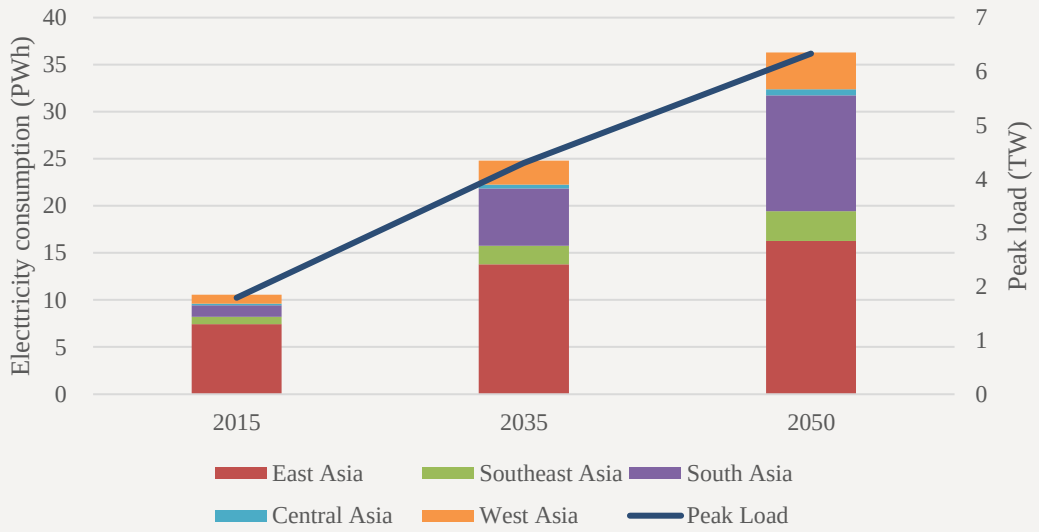


TFC and Proportions of Electricity in Asia

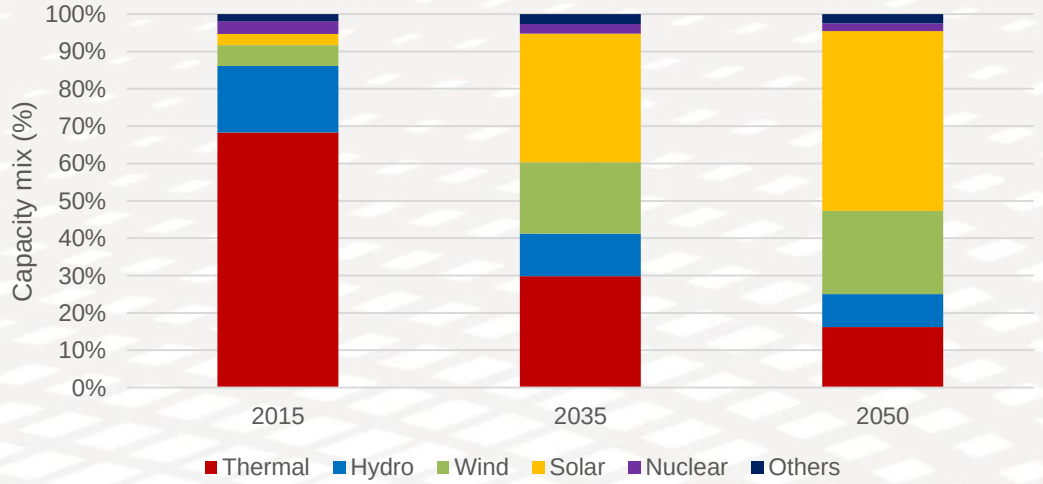
III. Key Study Results

Electric Power

- **Electricity consumption** will rise to 36 PWh in 2050, with an annual growth rate of 3.6%. The proportion of Asia's electricity consumption in the world will increase to 60% in 2050. By 2050, per capita electricity consumption will exceed 7,000 kWh/year.
- By 2050, the **total installed capacity** in Asia will be 15.8 TW, five times that of 2016.
- **Clean energy generation** will expand rapidly. By 2035, clean energy will surpass fossil energy to become the dominant power source. The installed capacity of clean energy will increase from 33% to 84% from 2016 to 2050.



Growth Trend of Electricity Consumption by Region

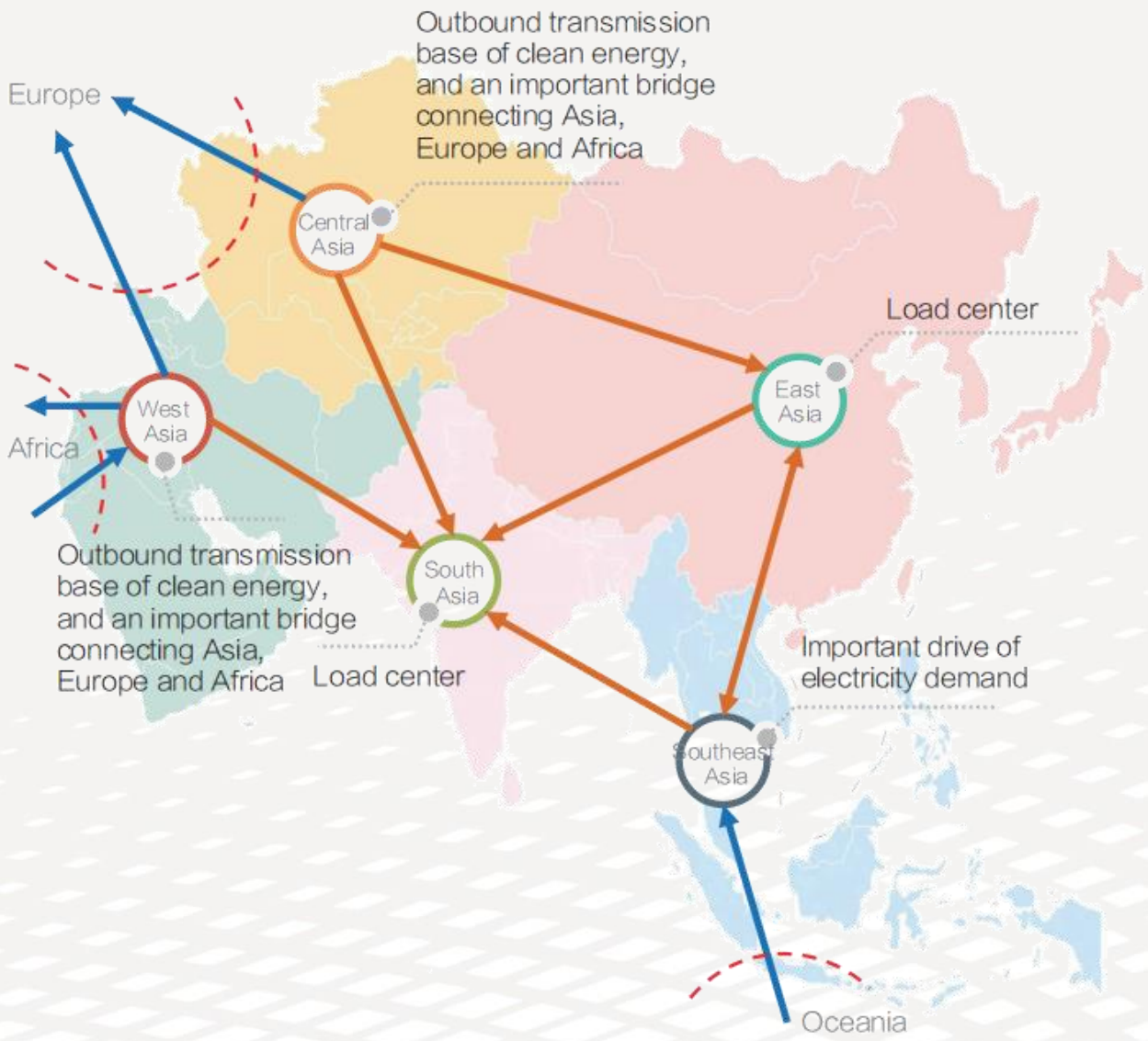


Installed Capacity by Type

III. Key Study Results

Region roles

- **Central Asia and West Asia** are clean energy transmission bases and the important bridges connecting Asia, Europe and Africa.
- **East Asia and South Asia** are the main power load centers.
- **Southeast Asia** is the important drive of electricity demand.



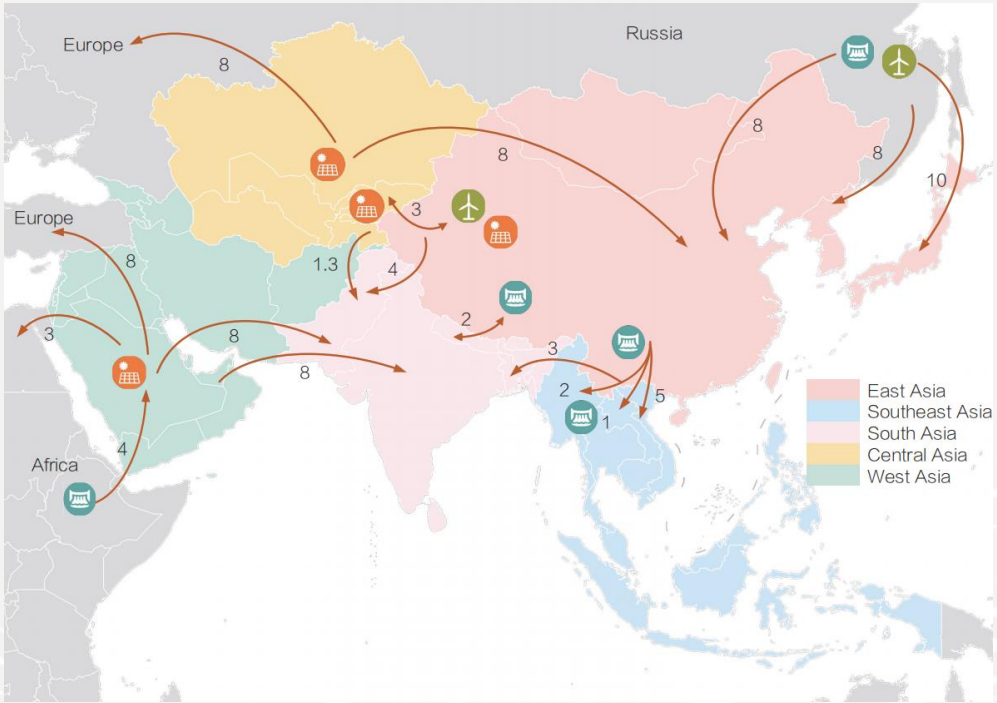
III. Key Study Results

Power flow: intra-continental power is expected to be delivered from West to East and from North to South; inter-continental power will be exchanged with Europe, Africa and Oceania.

By 2035

Inter-continental: 23 GW

Inter-regional: 71 GW

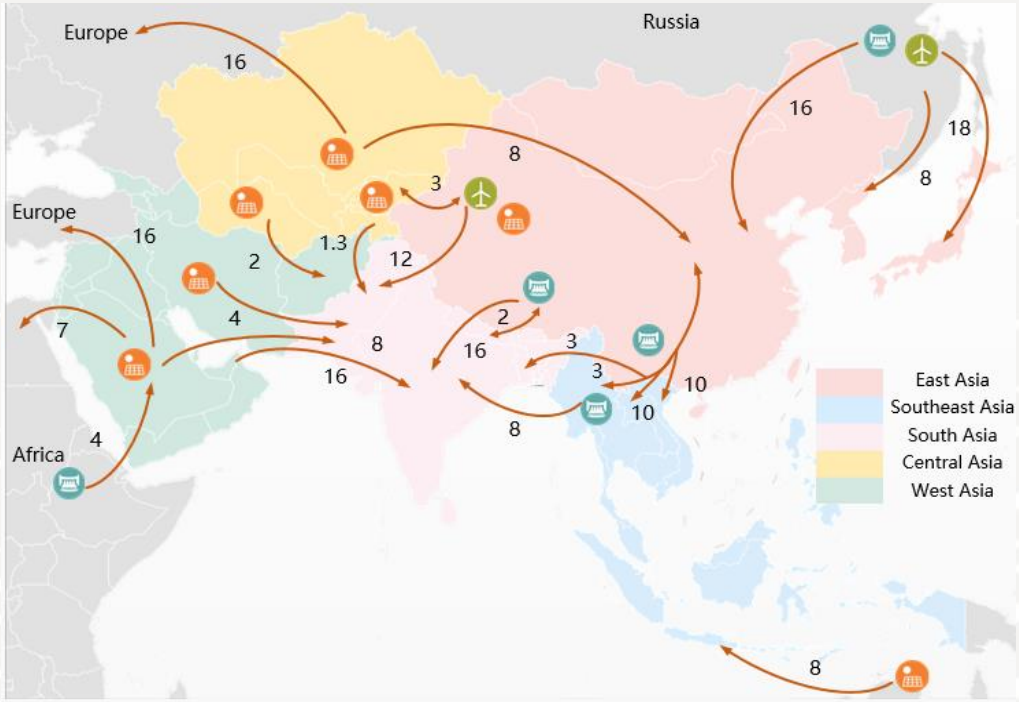


Power Flow in Asia by 2035 (Unit: GW)

By 2050

Inter-continental: 51 GW

Inter-regional:150 GW



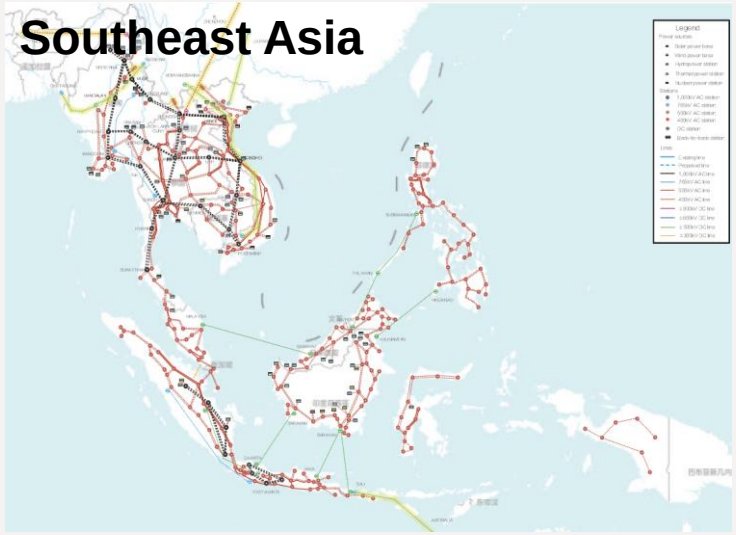
Power Flow in Asia by 2050 (Unit: GW)

III. Key Study Results

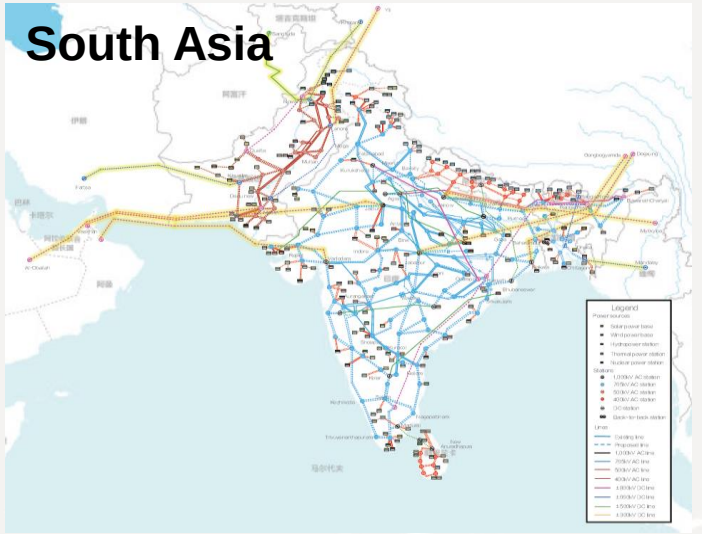
Sub-region

East Asia

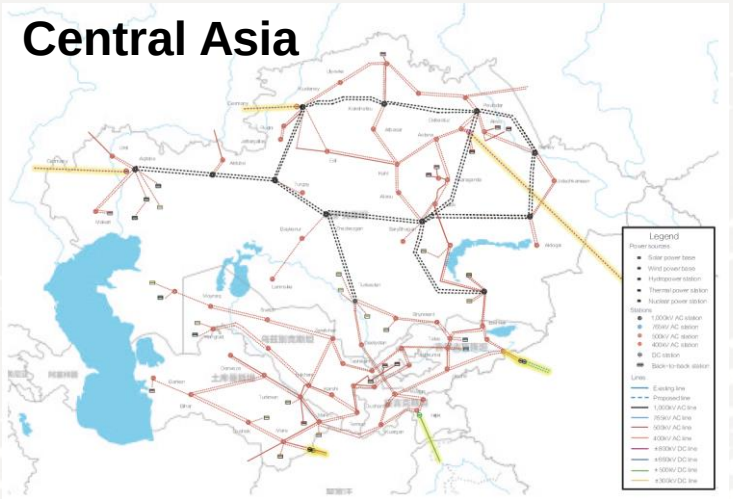
Southeast Asia



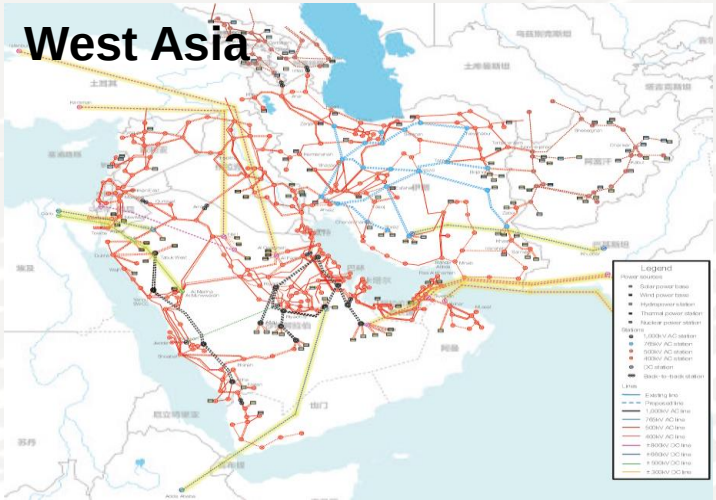
South Asia



Central Asia



West Asia



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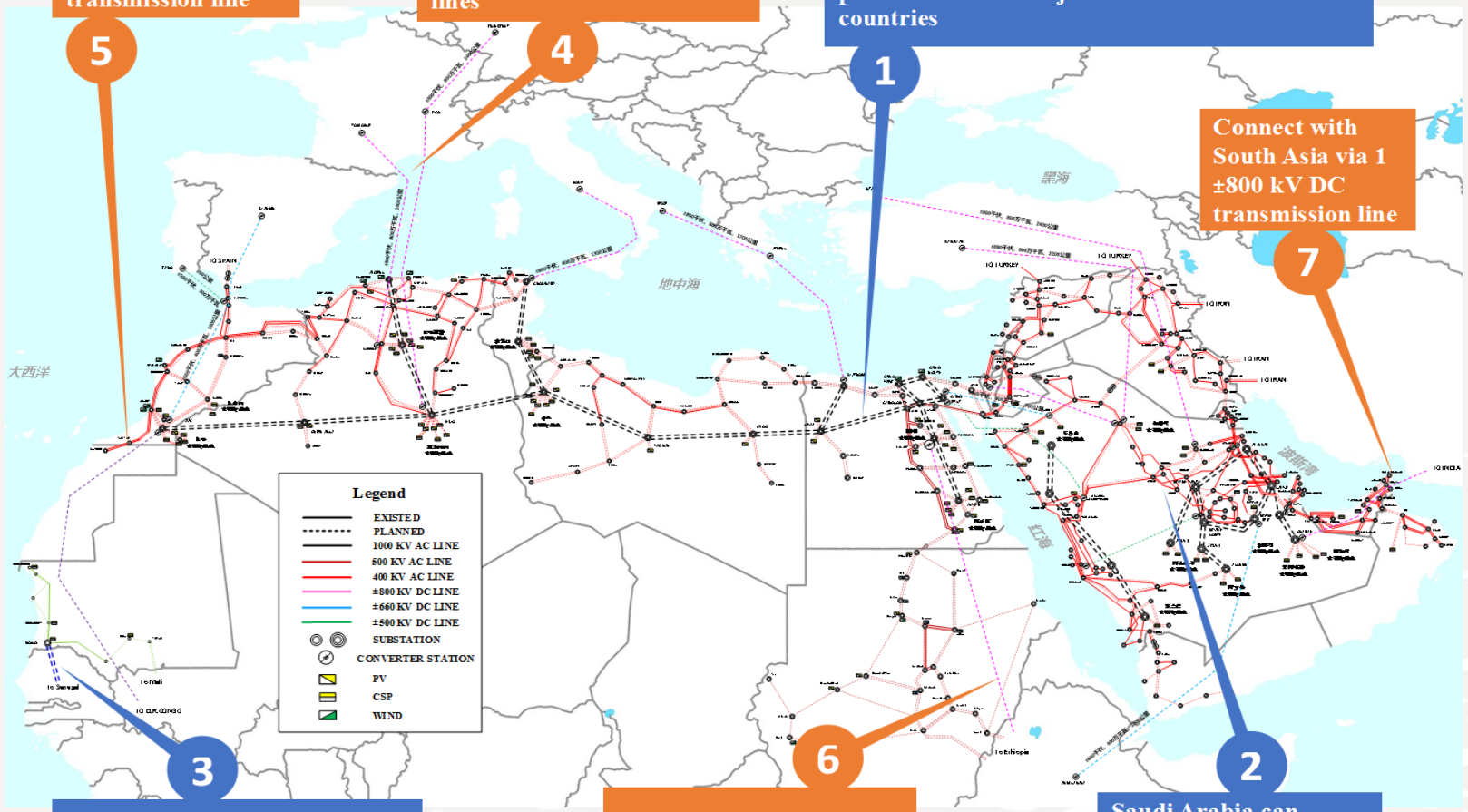

1. Build strong 1,000 KV backbone grids in North Africa and Saudi Arabia, and expand regional 500/400 KV AC main grids, covering large solar power bases and major load centers of all countries
2. Saudi Arabia can connect with neighboring countries via BtB DC connection
3. The large-scale solar power base in Mauritania can deliver electricity to West Africa via a 765 kV transmission line
4. Connect with Europe via 6 ±800 kV, 1 ±660 kV and 1 ±500 kV DC transmission lines
5. Connect with Central Africa via 1 ±1100 kV DC transmission line
6. Connect with East Africa via 1 ±800 kV and 1 ±660 DC transmission lines
7. Connect with South Asia via 1 ±800 kV DC transmission line

Arab States Energy Interconnection Development

Make joint efforts for innovative development, and create a beautiful future together