

Global Energy Interconnection

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State Grid Brazil Holding S.A.



Fórum das Nações
Interconexões Internacionais



22 de maio de 2019

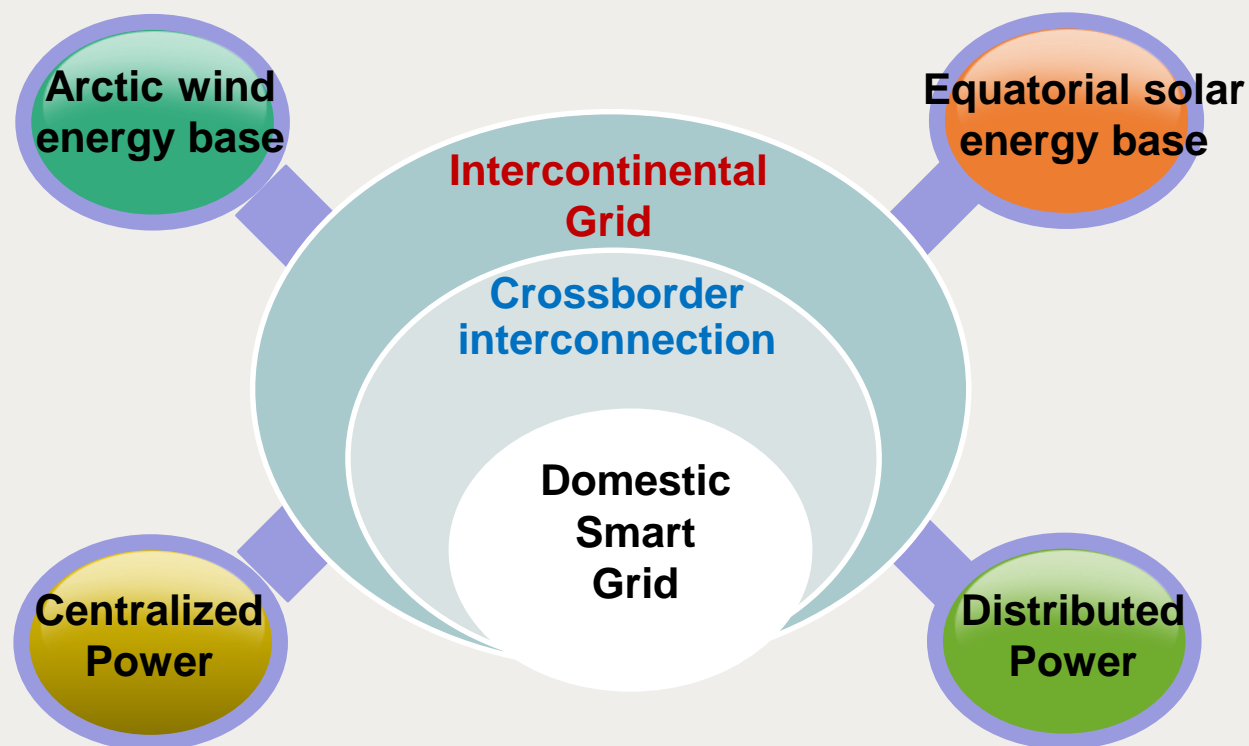


- I. **Global Energy Interconnection**

- II. **State Grid Corporation of China**

Global Energy Interconnection(GEI)

GEI is a infrastructure platform on which clean energy can be developed, transmitted, and consumed on a massive scale worldwide.

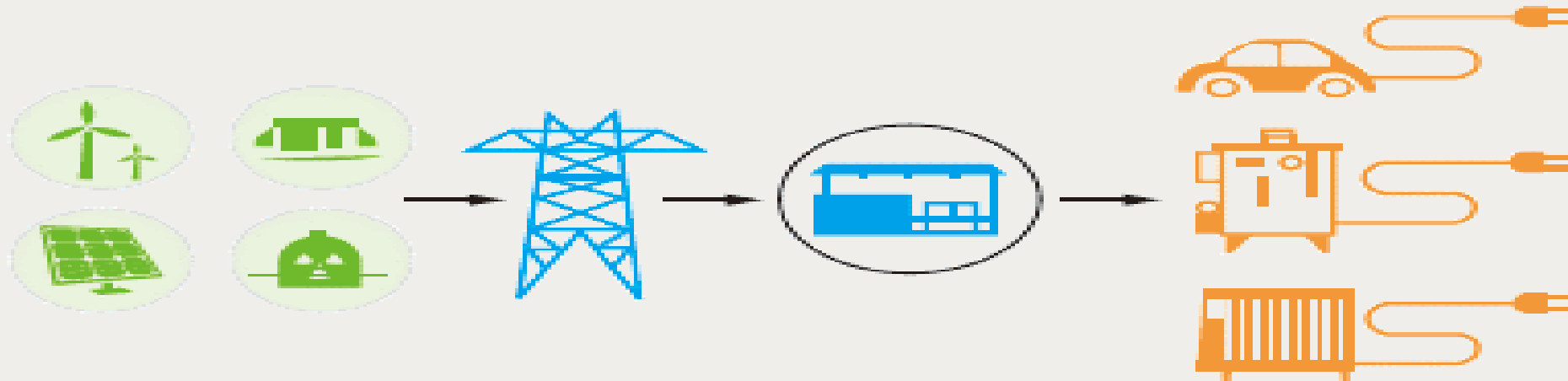


Clean Energy + UHV Grid + Smart Grid

- **Clean energy** is the foundation, dominant global energy in the future

- **UHV Grid** is the key, backbone of the global energy Interconnection

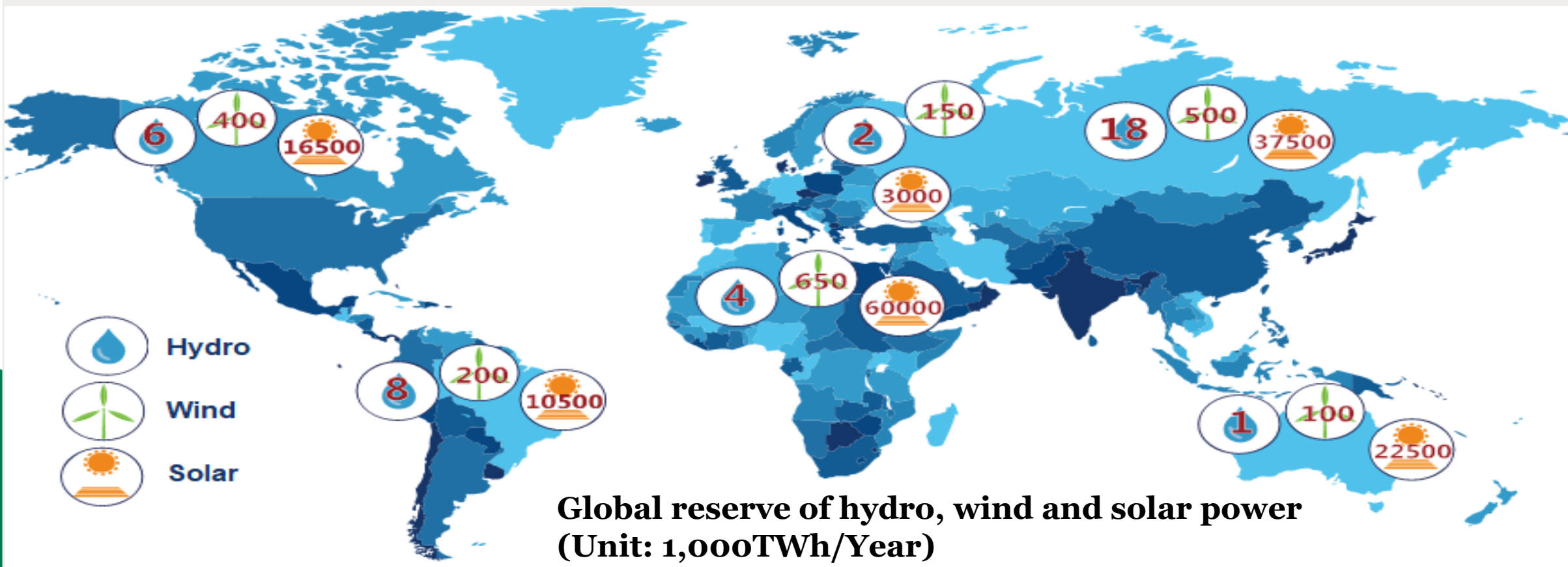
- **Smart grid** is fundamental, meeting the access to clean and distributed energy



Foundations of GEI

- **Clean Energy**

There is over 100,000TW reserve of clean energy around the globe. A mere 0.05% of them could meet the global total energy demand.



Foundations of GEI

■ UHV Grid: UHVAC & UHVDC

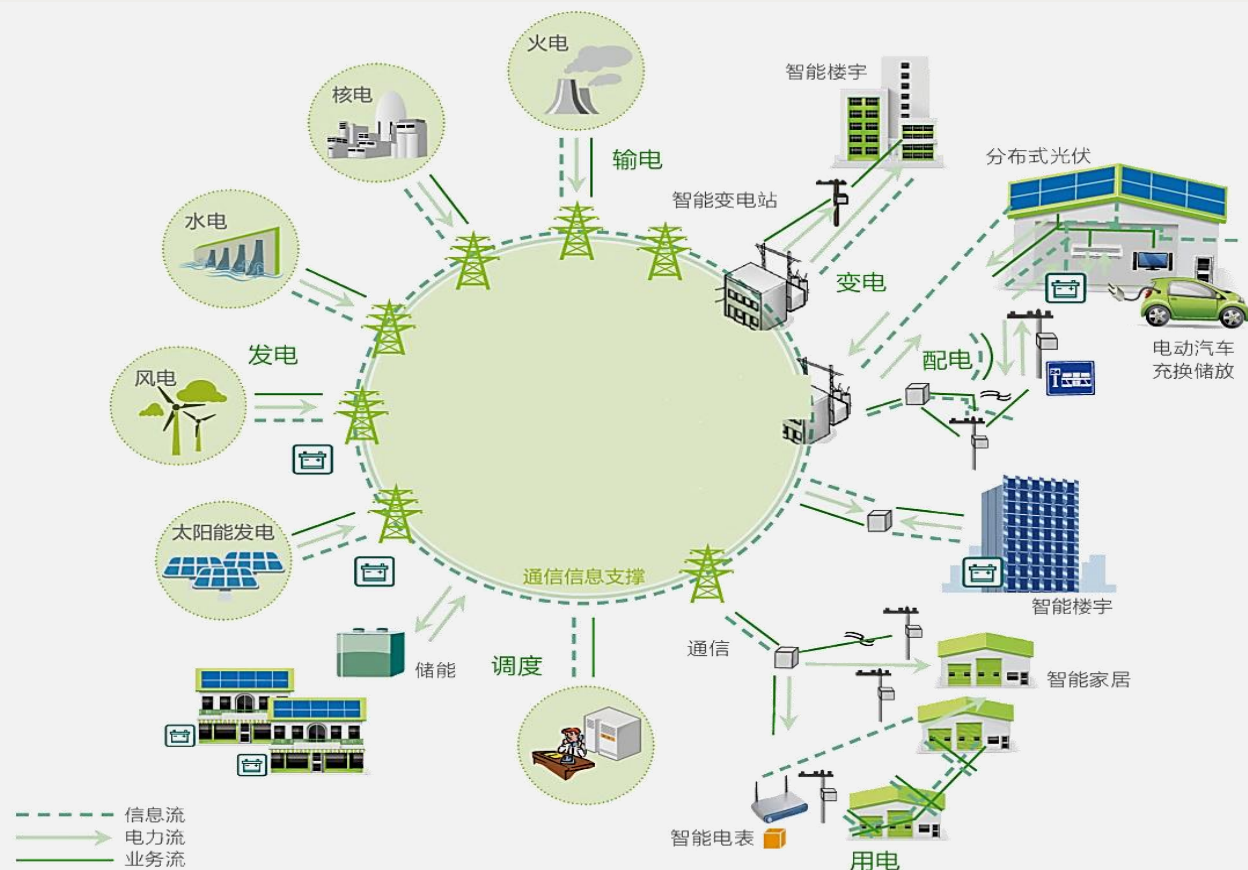
UHV Grid

- **Definition:** composed of **1000kV AC** and **±800kV DC, ±1100kV DC** power systems.
- **Advantages:** long transmission distance, large capacity, high efficiency, low line loss, economic land occupation and high levels of security.



Foundations of GEI

Smart Grid



Smart Grid is the foundation.
 Smart Grid integrates modern intelligent, information and power technologies, which can adapt to the connection and utilization of centralized and distributed clean energy, meet the needs of the interactive service of intelligent equipment, realize efficient coordination of the network, source, demand and storage, as well as multi-energy complementation and comprehensive utilization.

The key is to realize the Intelligent allocation of power resources.

GEIDCO Overview



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

- Established in March 29, 2016 in Beijing, China.
- An international nonprofit organization dedicated to promoting global energy interconnection.
- More than 400 members, from 62 countries.
- State Grid Corporation of China, Eletrobras are the founding member companies of GEIDCO.



Liu Zhenya



Steven Chu



Shu
Yinbiao

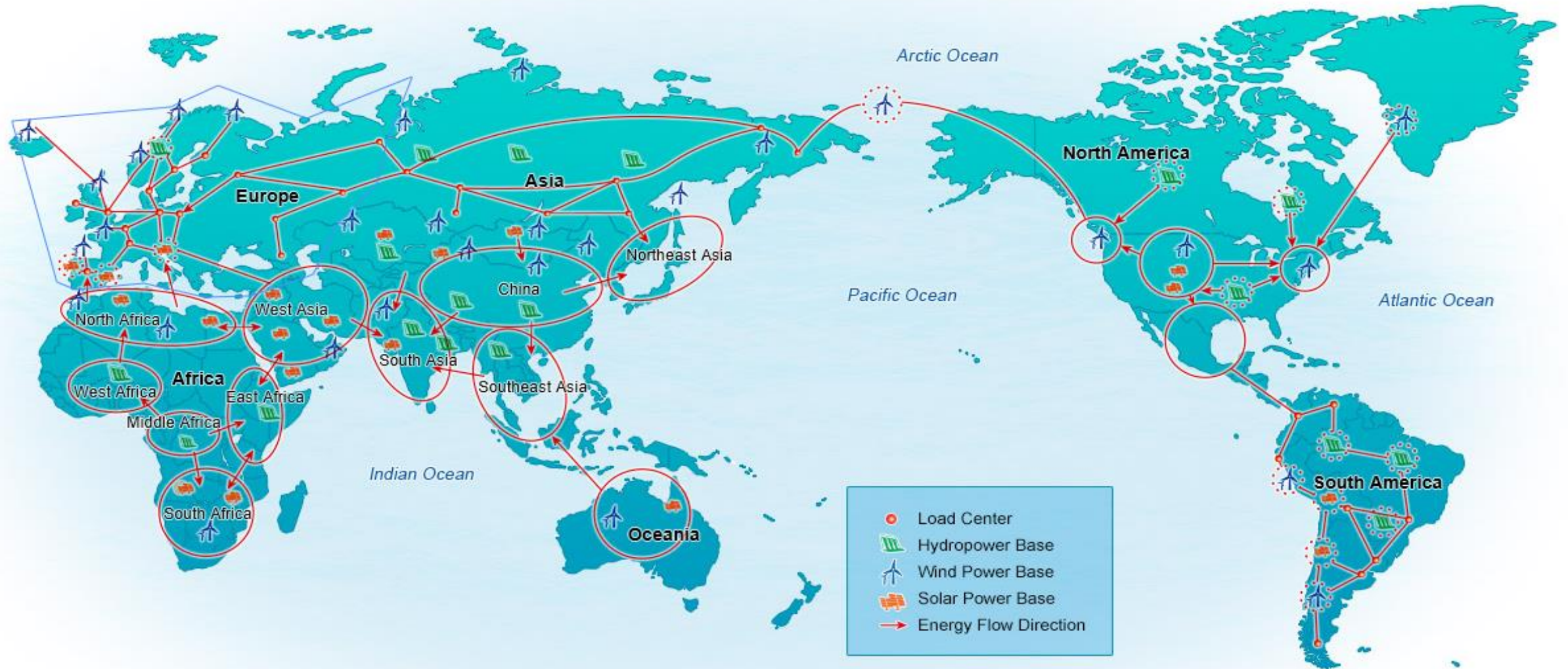


Masayoshi
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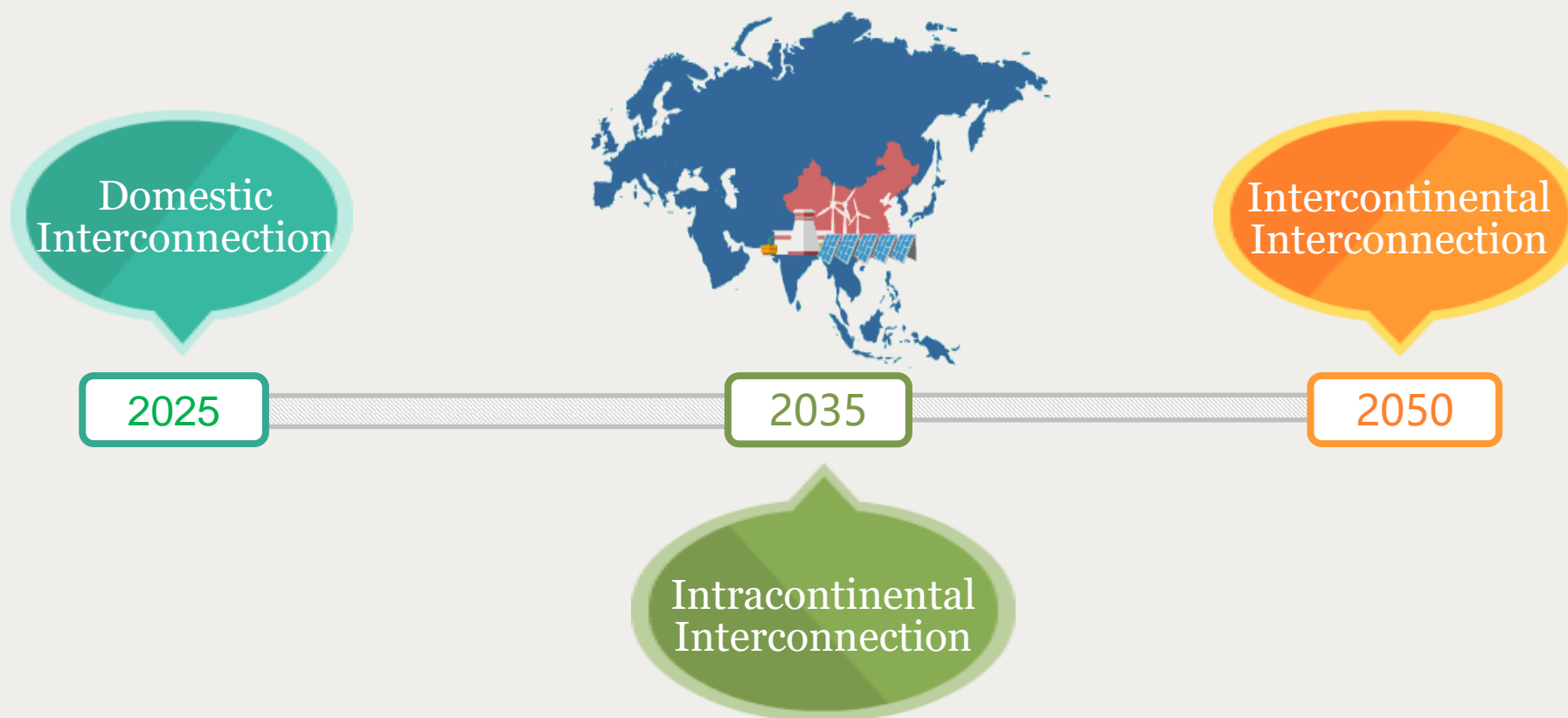
Oleg
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Prospect of GEI



Development Roadmap of GEI

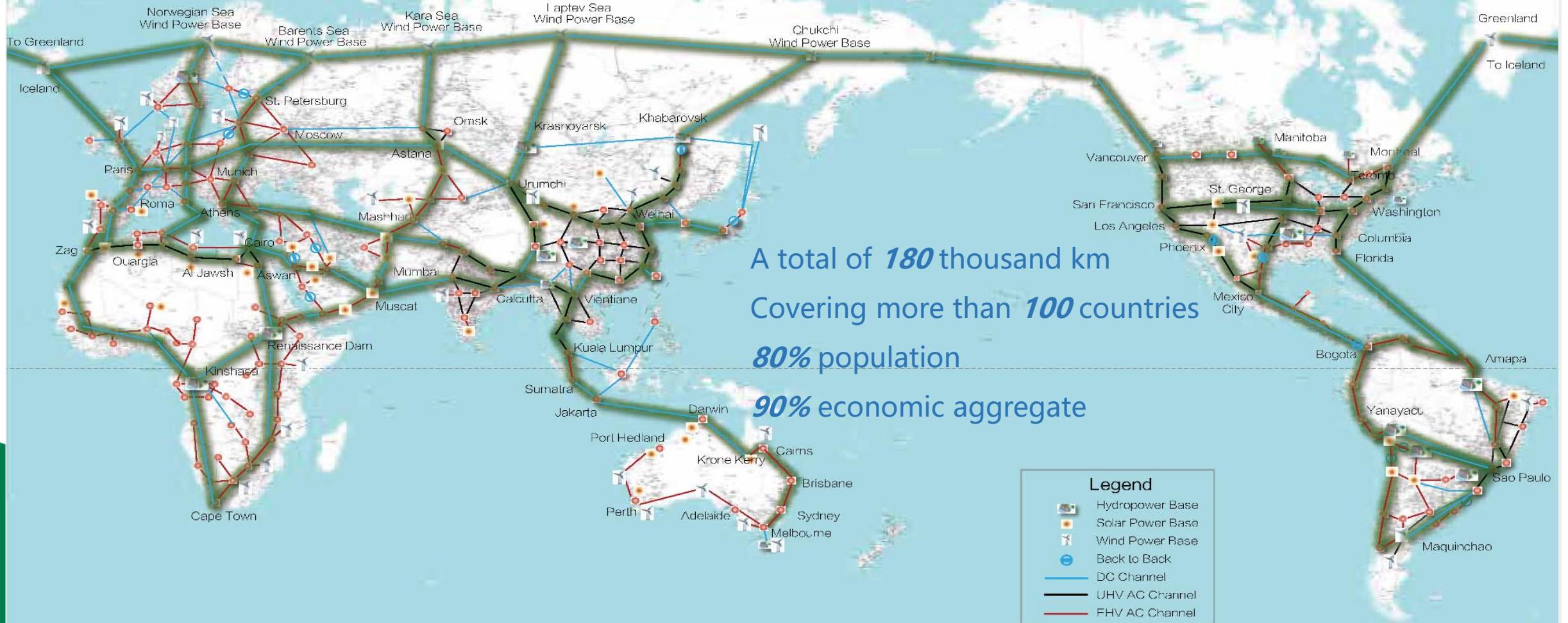
■ General layout of GEI



By 2050, GEI will basically be in place, meeting the global demand with clean energy, thus achieving energy transition and sustainable development goals.

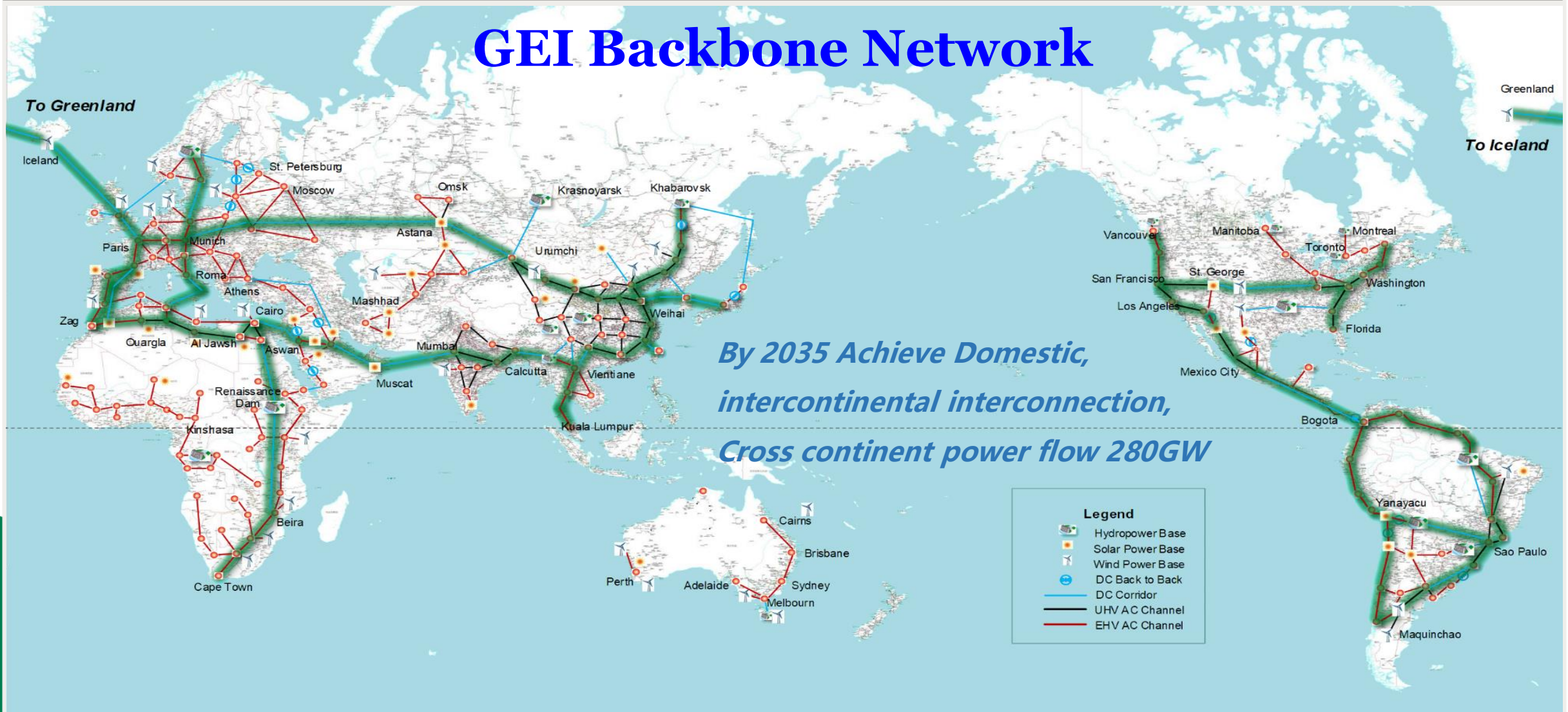
Prospect of GEI

GEI Backbone Network



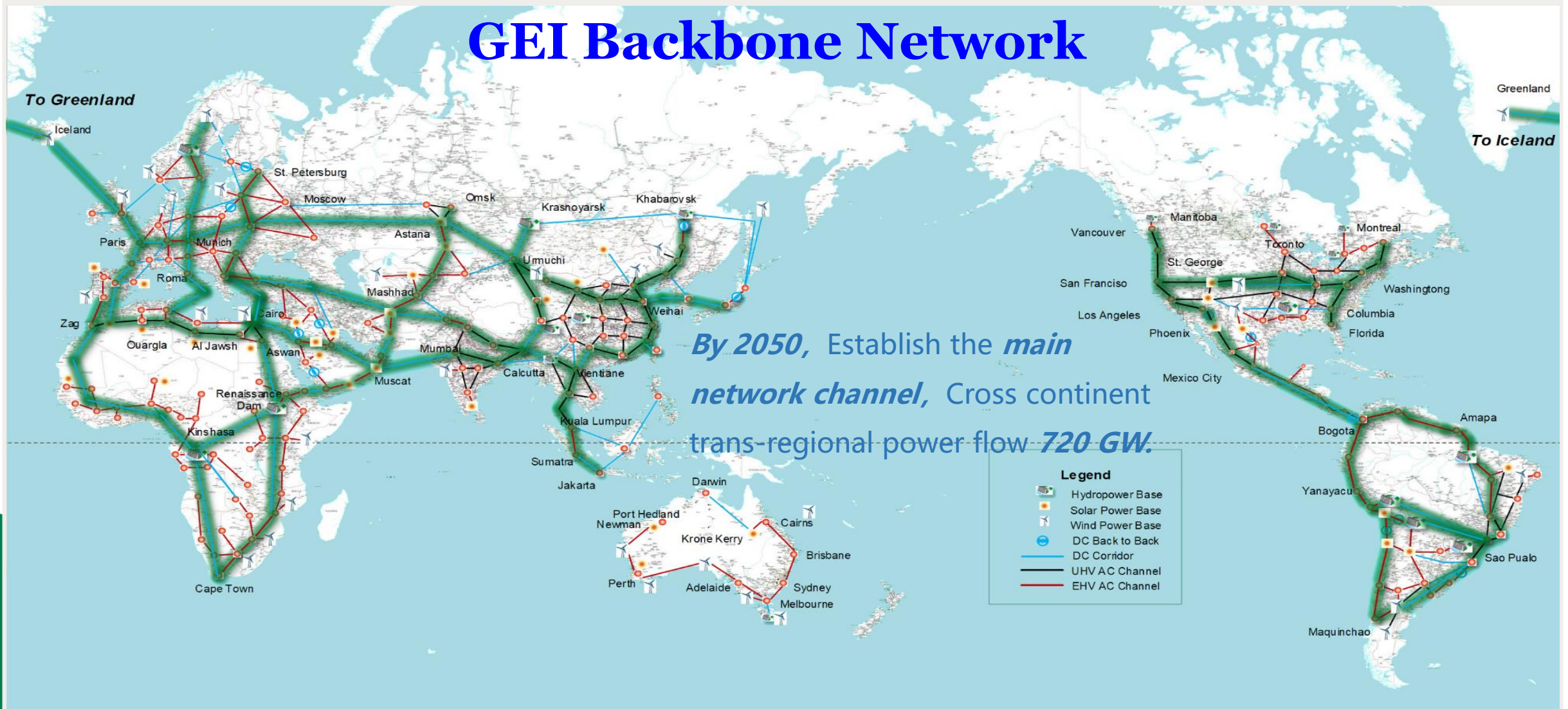
Development Prospect of GEI - I

GEI Backbone Network



Development Prospect of GEI - II

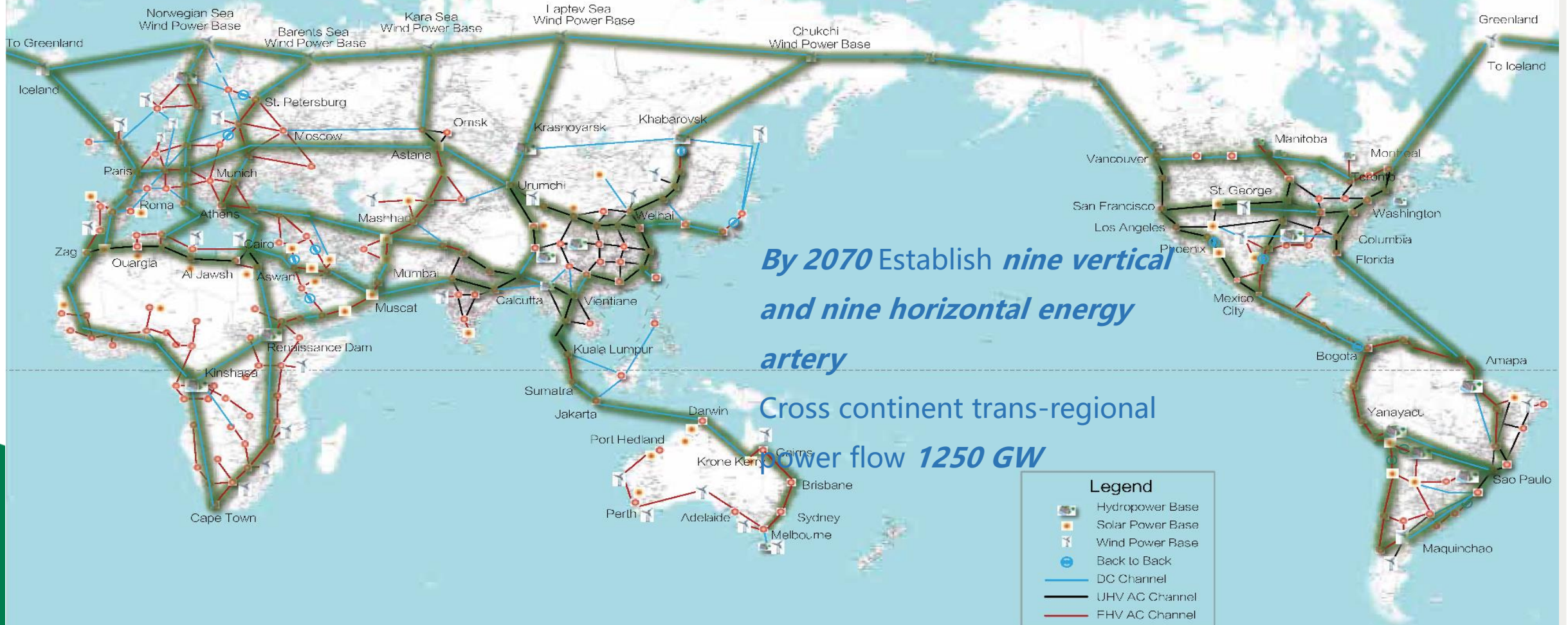
GEI Backbone Network



By 2050, Establish the *main network channel*, Cross continent trans-regional power flow **720 GW**.

Development Prospect of GEI - III

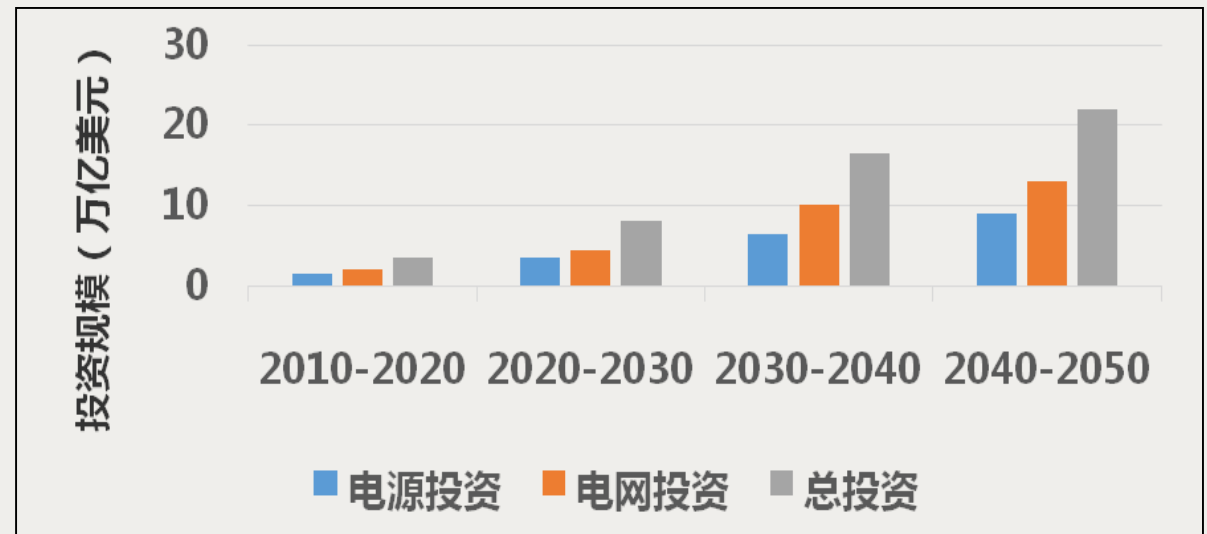
GEI Backbone Network



Benefits of GEI

□ Stimulate economic growth

- The cumulative investment in the electricity industry will exceed 50 trillion US dollars.
- Drive the development of emerging industries.
- Generate huge benefits from differences in time zones, seasons and tariffs.
- Electricity trade will gradually become the dominant power trade in the world.



**Investment scale of GEI
(Trillion US\$)**

Benefits of GEI

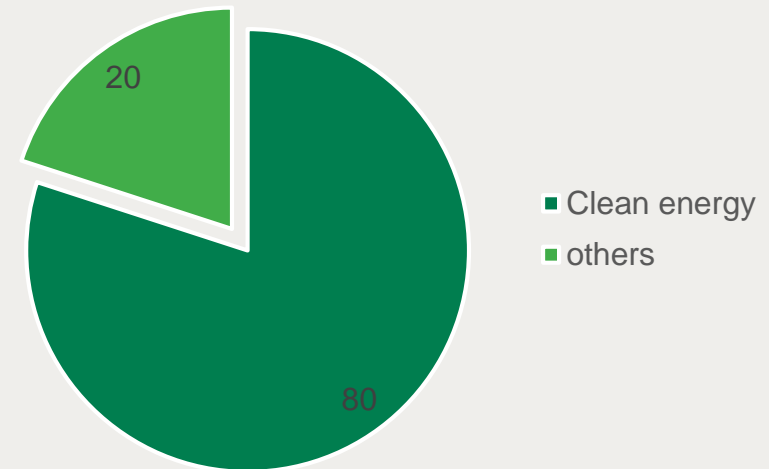
□ Guarantees energy supply

- Increase the percentage of the power generated from clean energy.
- Ensure universal access to electricity.



The Paris Agreement

Energy Matrix by 2050

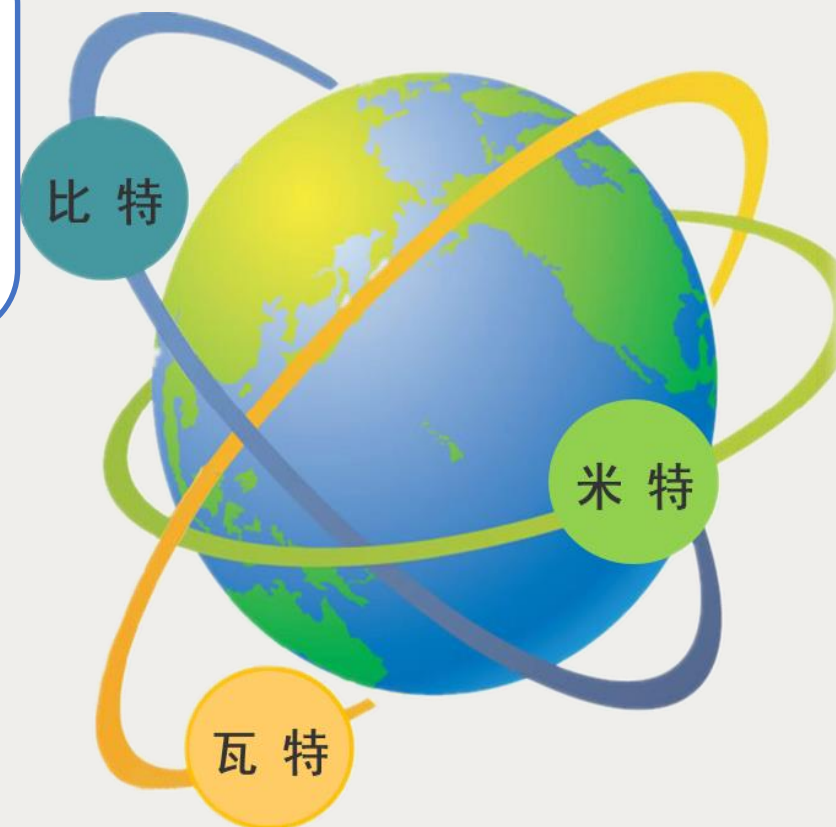
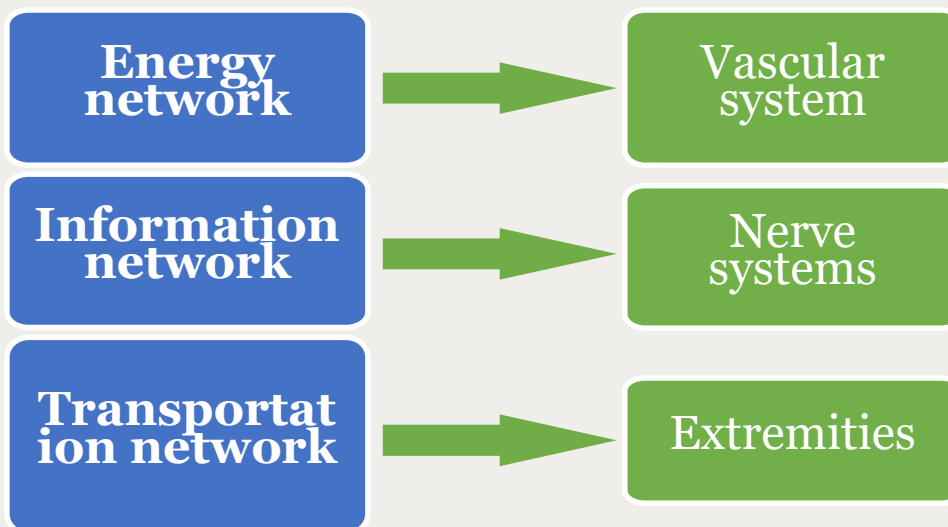


□ Combat climate change

- The target of holding global temperature increases by 2°C can be realized.
- Without GEI, the temperature rise would exceed 3°C by the end of this century, seriously threatening human survival and development.

Future of GEI

- Building GEI will significantly promote the development of Energy, Information and Transportation Integration, or the “**Watts, Bits and Meters**” (EITI).
- This will a high level of Electrification, Intelligentization, and Globalization, with the state of human well-being always at the core.





- I. Global Energy Interconnection
- II. **State Grid Corporation of China**

State Grid Corporation of China(SGCC)



- The largest utility company in the world.
- A leading player in energy interconnection promotion and international cooperation.
- Total Revenue: US\$ 363.1 billion.
- **Ranks 2nd in Fortune Global 500.**
- Transmission lines: 987 thousand km.
- Transformation capacity: 4,350,000 MVA.
- UHV Grid forms the main grid structure, with 34,900 km UHV transmission lines, and more than 361 GVA(GW) converting capacity.
- Investments in energy networks of 7 countries and regions around the globe, including Brazil, the Philippines, Portugal, Australia, Italy, Hong Kong China and Greece .

SGCC in Brazil



SGCC's UHVDC practices in Brazil



- Two Bipoles of ± 800 kV UHVDC transmission projects.
- Link Belo Monte hydroelectric power station to consumption centers in southeast region.
- Transmission distance longer than 2000 km.
- Transmission Capacity in total: 8000 MW.
- Energy enough to support more than 30 million people.

SGCC's UHVDC practices in Brazil

❑ Bipole I - Belo Monte Power Transmitter (BMTE)

- SGCC(51%), Furnas(24.5%), Eletronorte(24.5%).
- From Xingu in Pará to Estreito of Minas Gerais.
- Construction period: 44 months.
- COD: December, 2017.
- 2 months before schedule.
- Energy delivered since COD: 23 billion kWh.

❑ Bipole II - Xingu River Transmitter of Energy (XRTE)

- From Xingu in Pará to Rio de Janeiro.
- The longest UHVDC transmission line in the world (2539 km).
- Expected COD: August, 2019.
- Total investment: R\$ 8.8 billion.



Changing Power Industry

Information Technology and other new technologies are changing the world.

- ❑ New Trends
 - Electric vehicle
 - Big data
 - AI
 - 5G + Cloud computing
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- ❑ Transition of electricity utility's function
 - In tradition: passive transmission of electricity.

 - New role:
 - Real-time monitor
 - Automatic diagnosis
 - Accommodation of intermittent renewables
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Towards the Future – SGCC's Strategy

□ Enterprise Strategy

World leading **Energy Interconnection Company**, with features of:

- **Junction**
- **Platform**
- **Share**

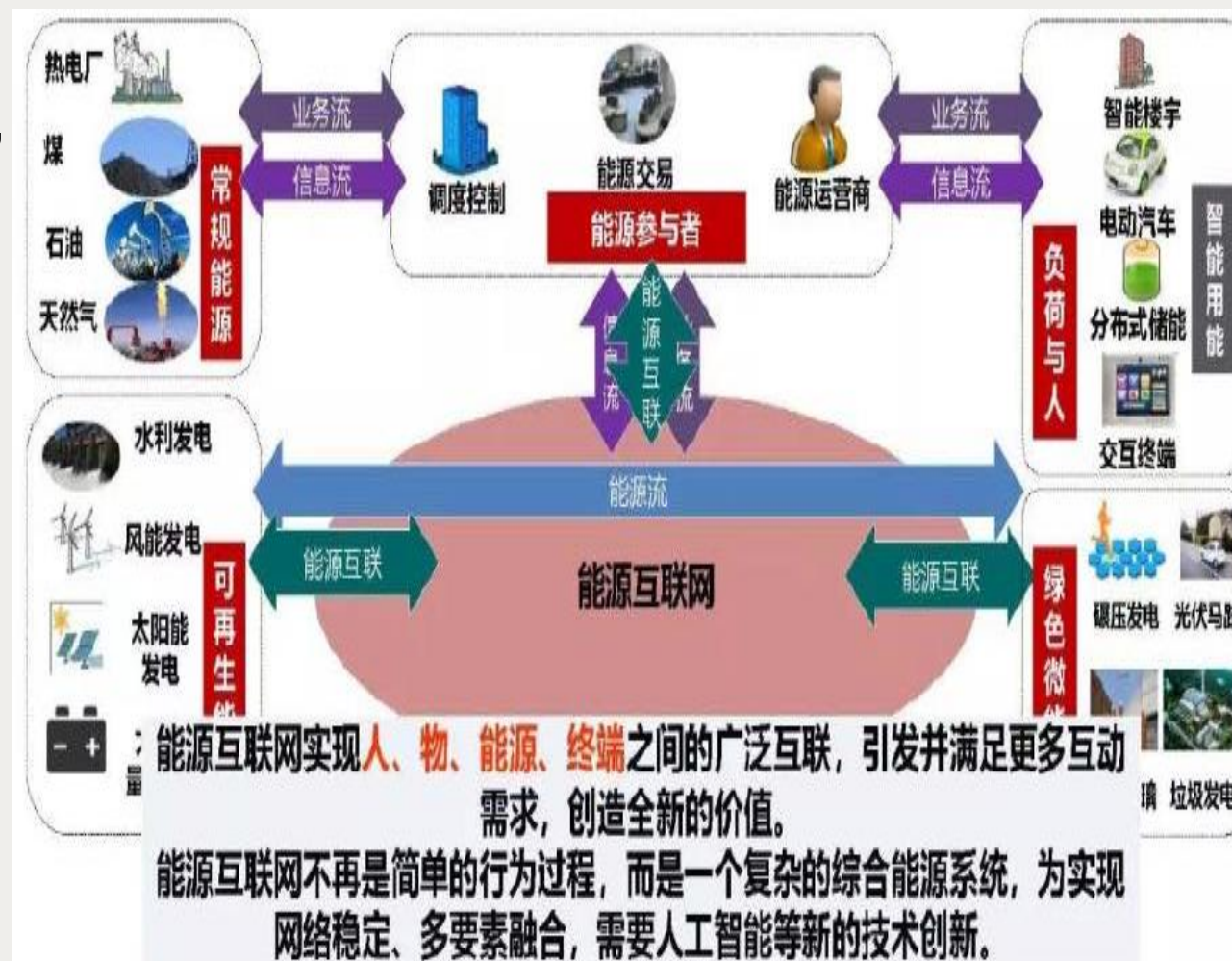
□ Foundation

- **Strong and intelligent electricity network**
UHV transmission network & Smart Grid

- **Universal Internet of Things in Power Systems**

Interconnections between all things.

Interaction between human beings and machines.





Obrigado
谢谢