



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



Dr. Zhanghua ZHENG
(Tony)

*Global Energy Interconnection
Development and Cooperation Organization (GEIDCO)*

June 2019



Dr. Zhanghua Zheng,

Manager, GEIDCO's Europe Office

- Senior Engineer
- Member, Chinese Society for Electrical Engineering (CSEE, China)
- Member, Institute of Electrical and Electronics Engineers (IEEE, US)
- Member, Institution of Engineering and Technology (IET, UK)

He received Ph.D from University of Bath in UK. Afterwards he joined State Grid Energy Research Institute at Beijing in China as research fellow. Since 2016, he works with Global Energy Interconnection Development and Cooperation Organization.

Book/s

- China Renewable Energy Analysis, China Electric Power Press, 2016, ISBN: 978-7-5123-8278-7

Papers

- Z. Zheng. "Assessment of marginal emissions factor in power system with consideration of ramp-rate constraint". CSEE Journal of Power and Energy Systems. 2016.



- 1. Our experience of Global Energy Interconnection**
- 2. Our organization, GEIDCO**
- 3. Our actions to promote GEI**



1. Our experience of Global Energy Interconnection (GEI)

Our experience of Global Energy Interconnection



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

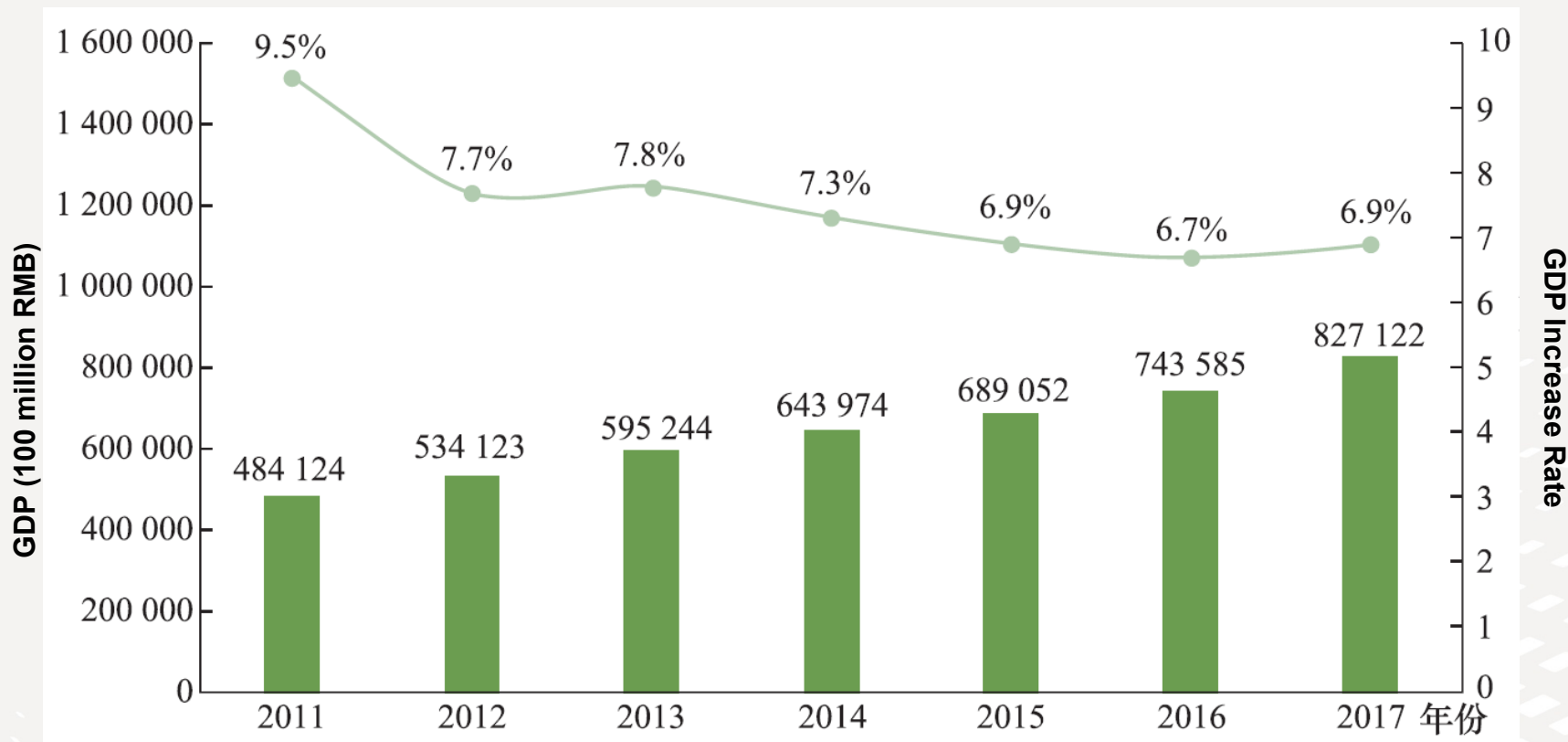


Origin of Global Energy Interconnection



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

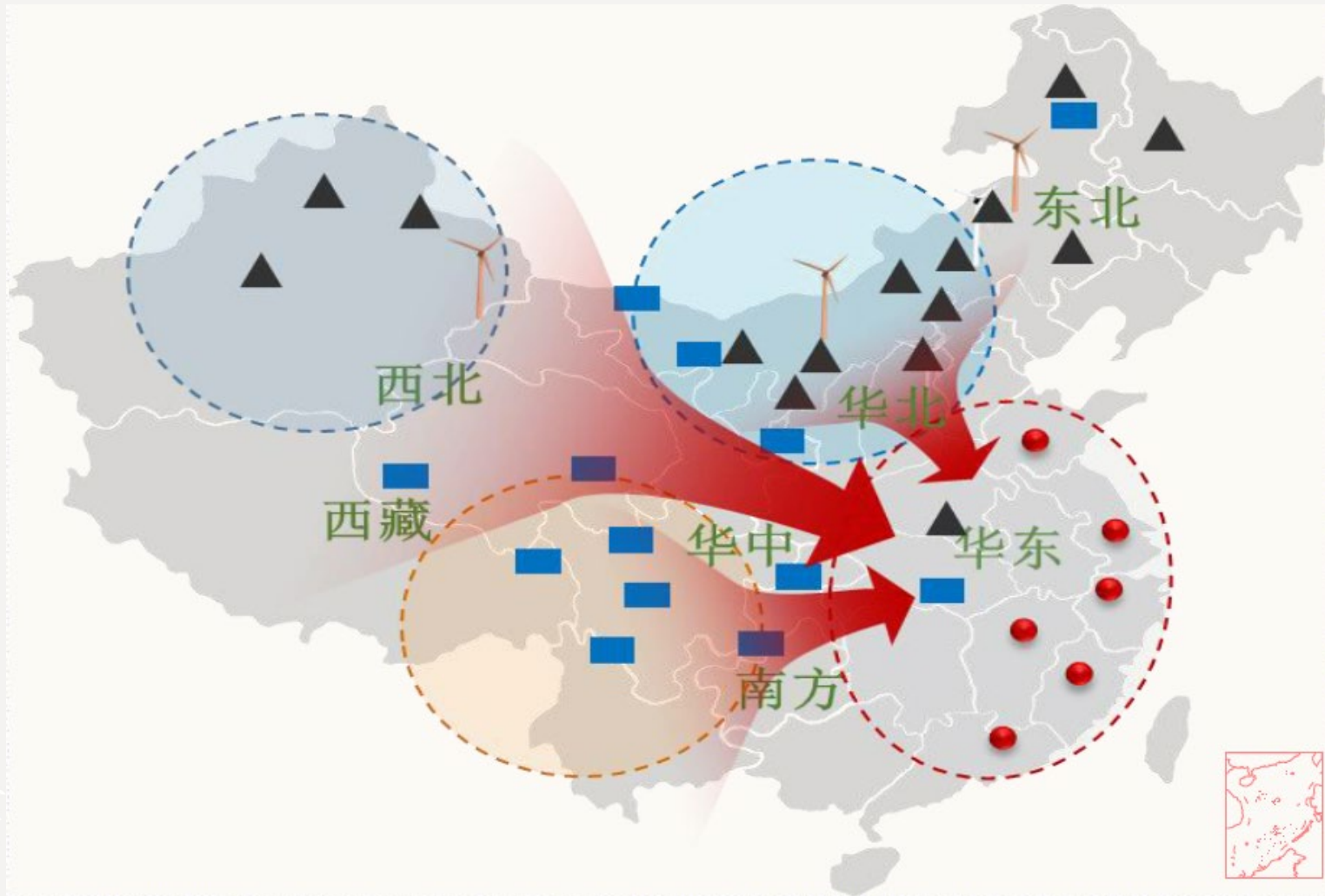
■ GDP



Our experience of Global Energy Interconnection



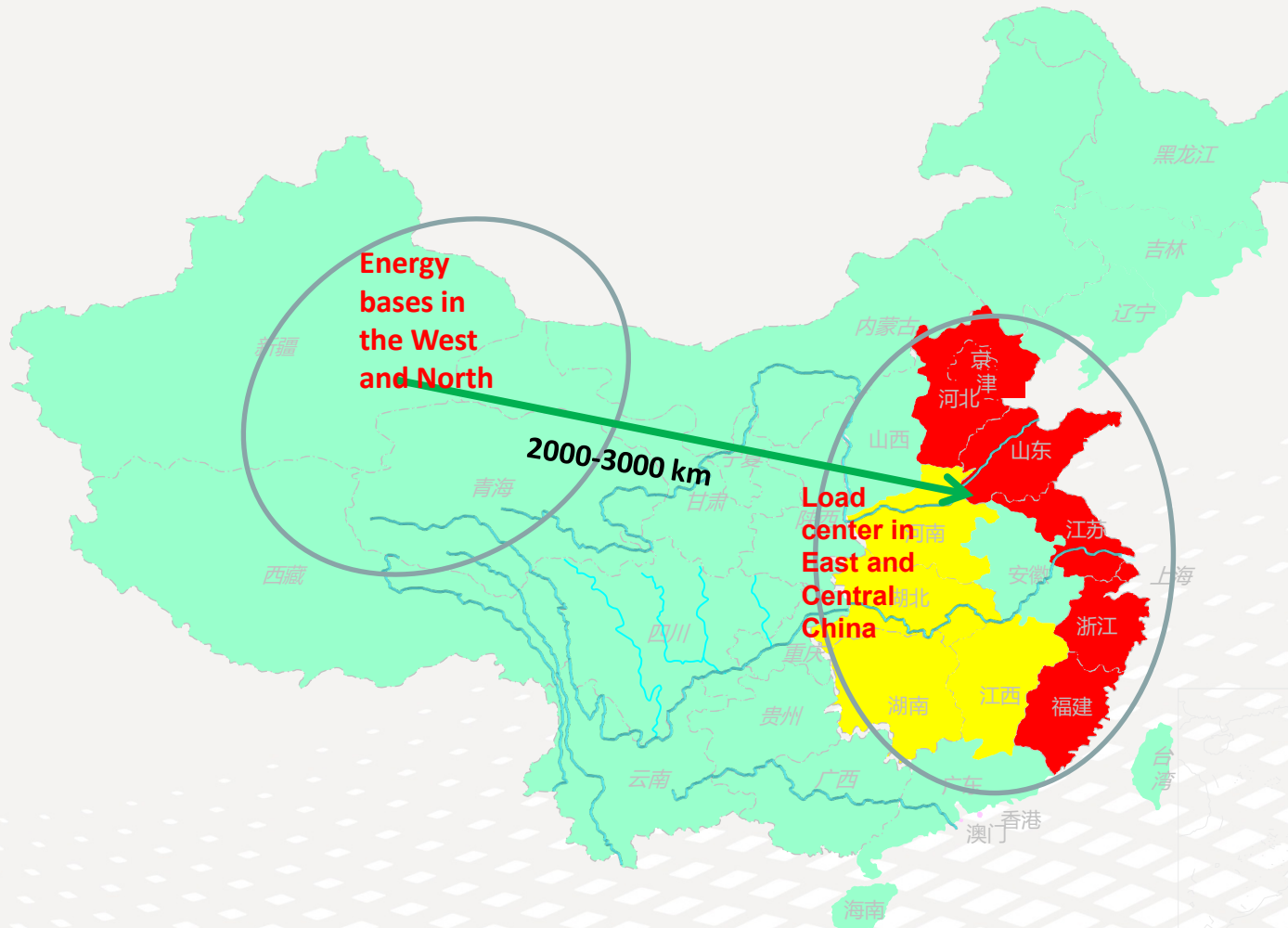
Global Energy Interconnection
Development and Cooperation Organization
全球能源互联网发展合作组织



Our experience of Global Energy Interconnection

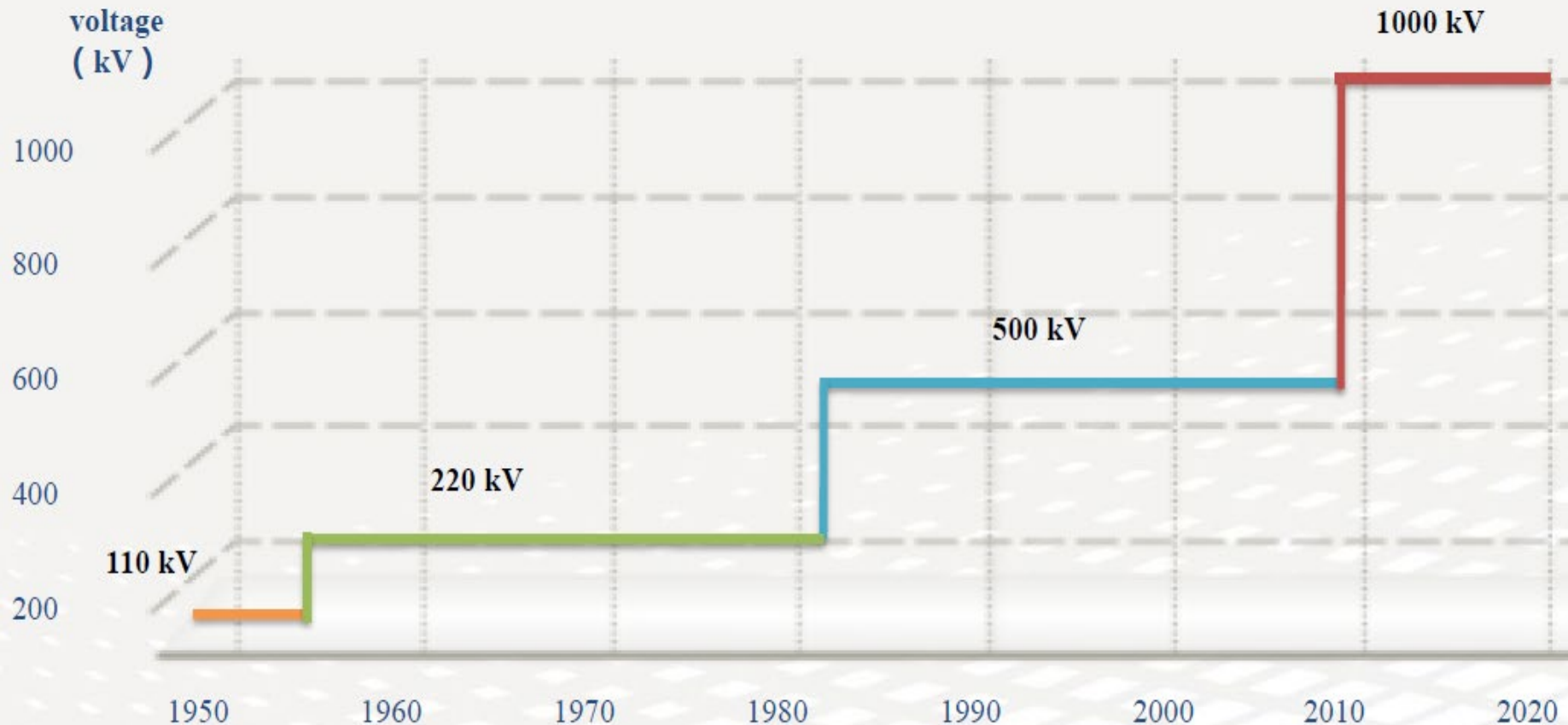


Global Energy Interconnection
Development and Cooperation Organization
全球能源互联网发展合作组织





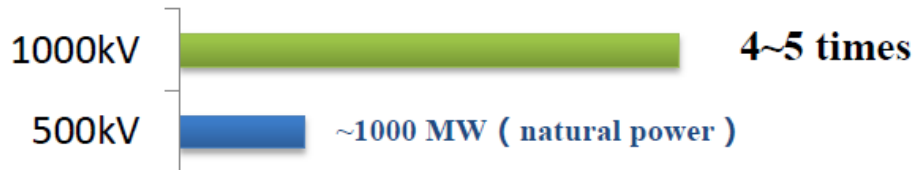
■ Development process of the highest voltage levels of AC network in China





- **AC: 1000 kV vs 500 kv**
- **The 1st 1000 kV pilot project was approved in 2006, and into operation in 2009.**

Larger Capacity



Longer Distance



Lower Loss

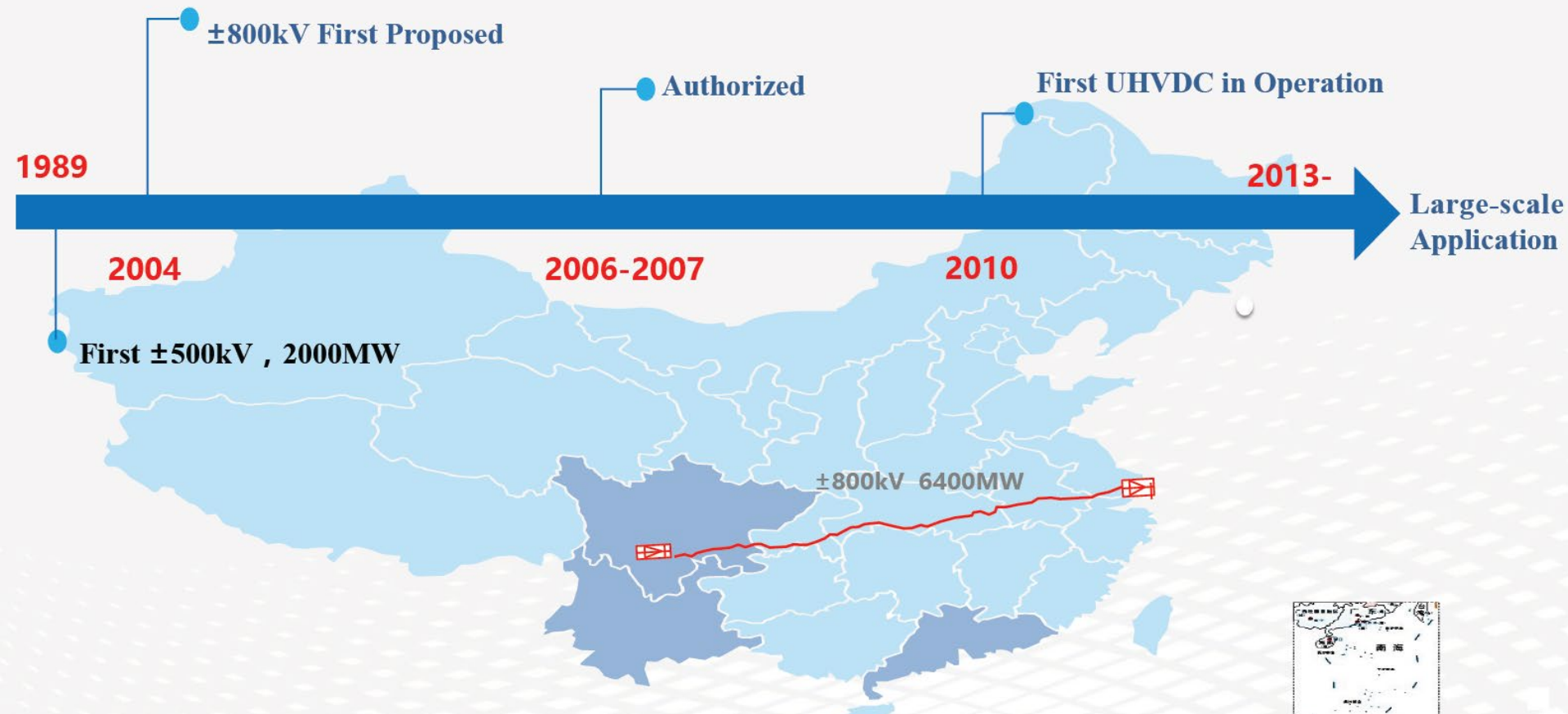


Narrower Corridor



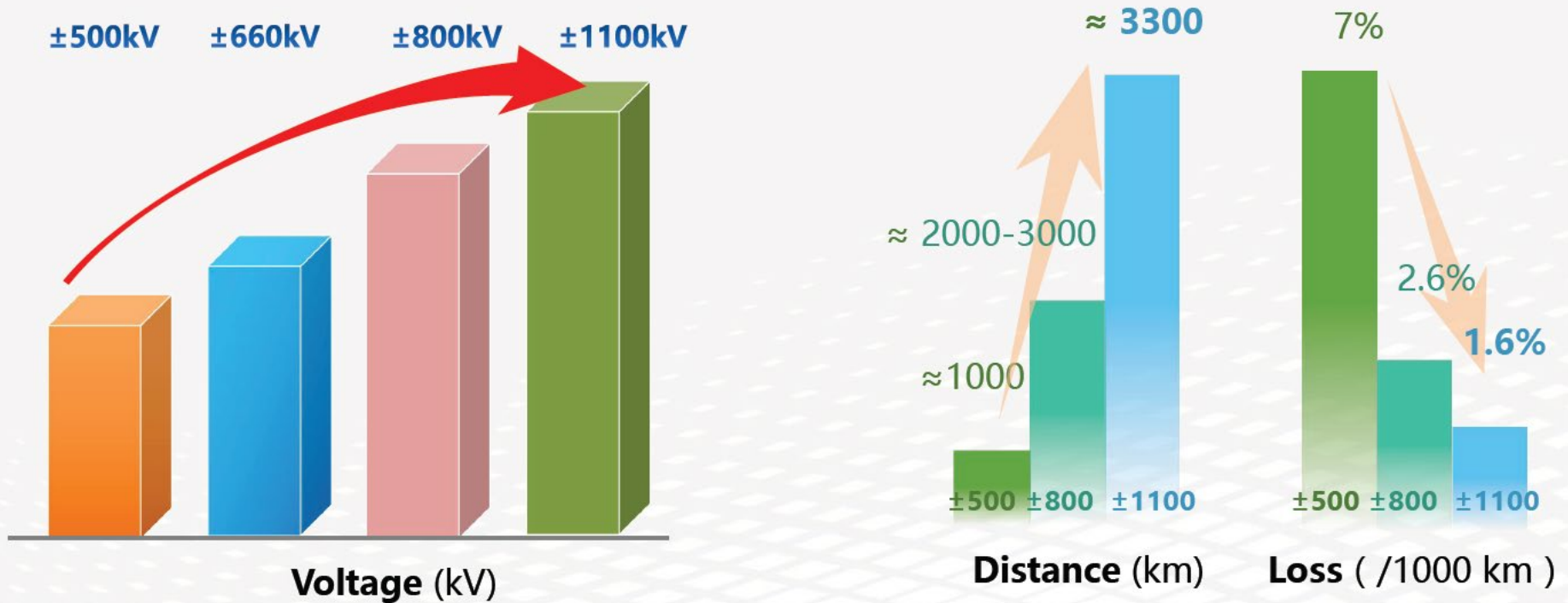


■ DC network



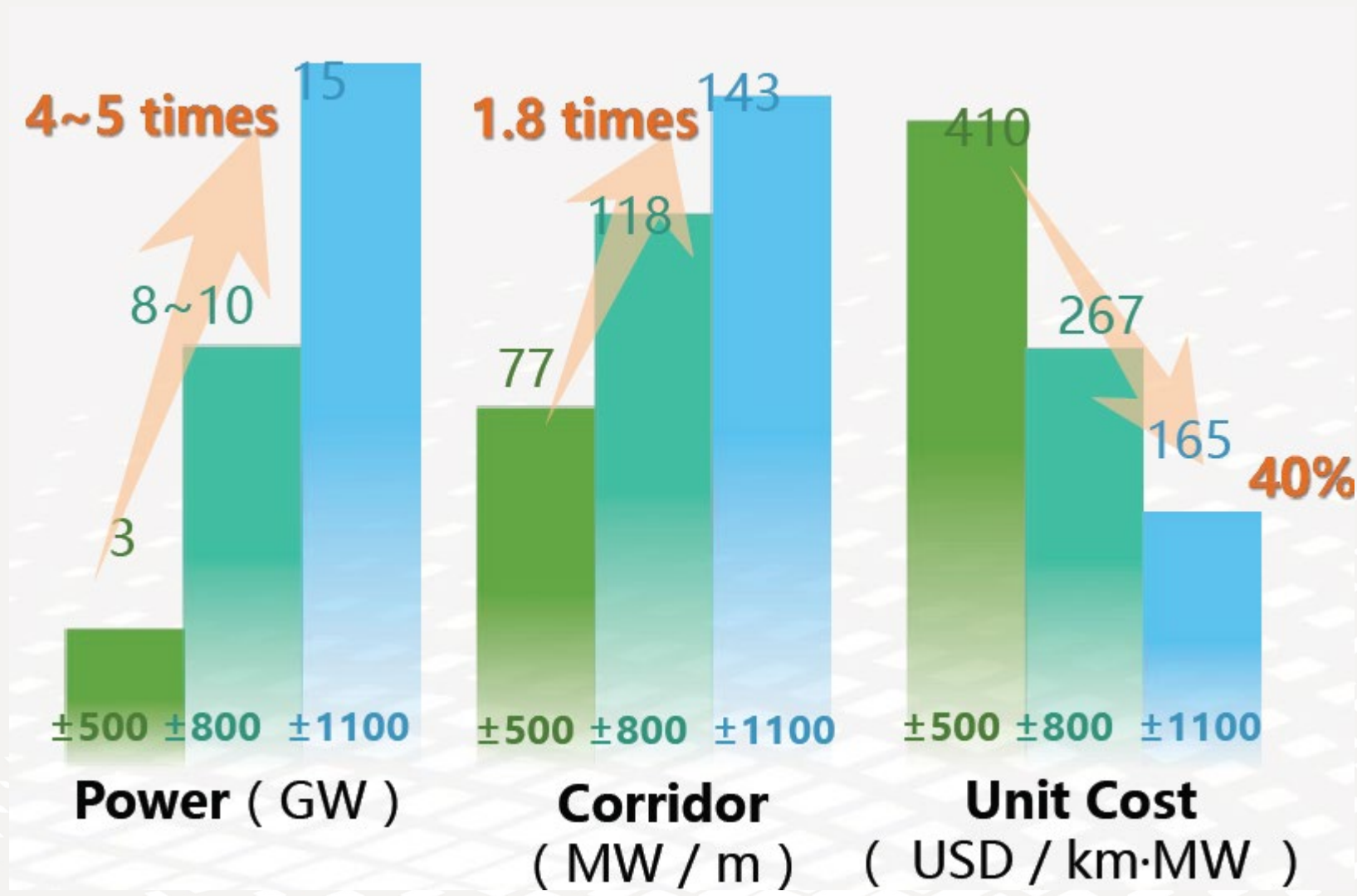


■ DC network





■ DC network

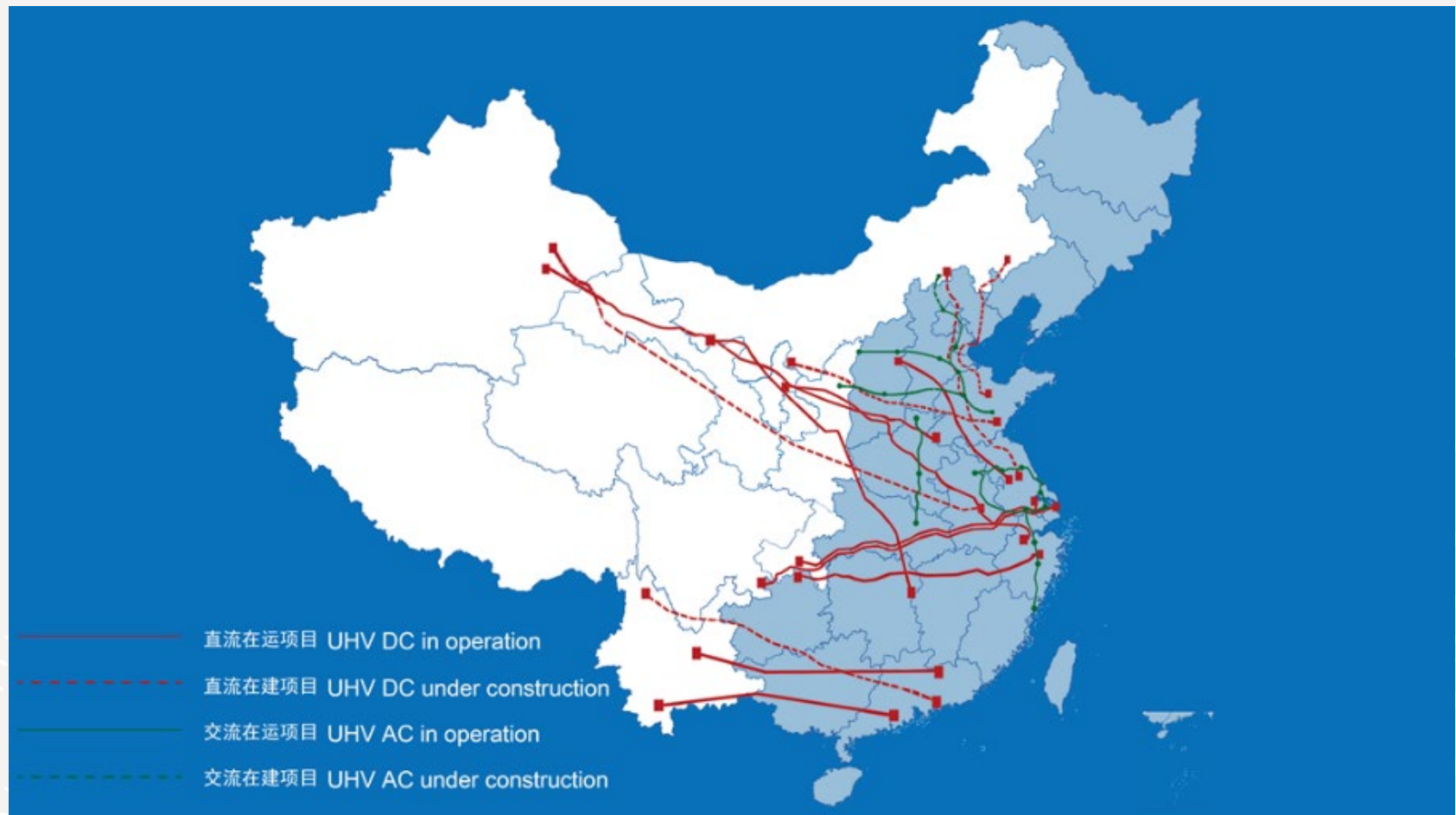


Our experience of Global Energy Interconnection



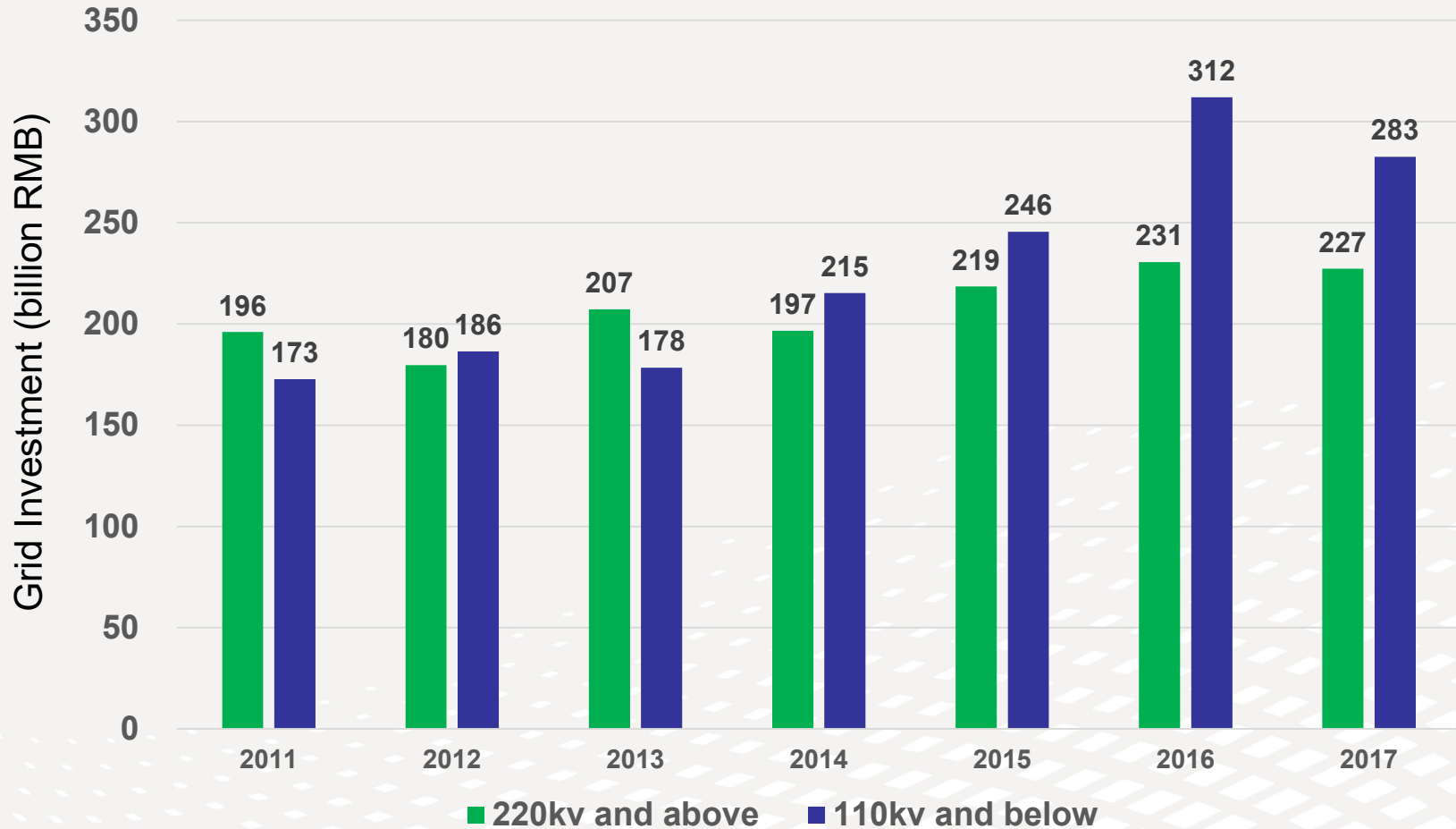
Global Energy Interconnection
Development and Cooperation Organization
全球能源互联网发展合作组织

- AC: 14 in operation, 5 under construction, 5 planed by 2030
- DC: 14 in operation, 4 under construction, 10 planed by 2030





■ Distribution system





■ Microgrid



Wind turbines



Rooftop PV



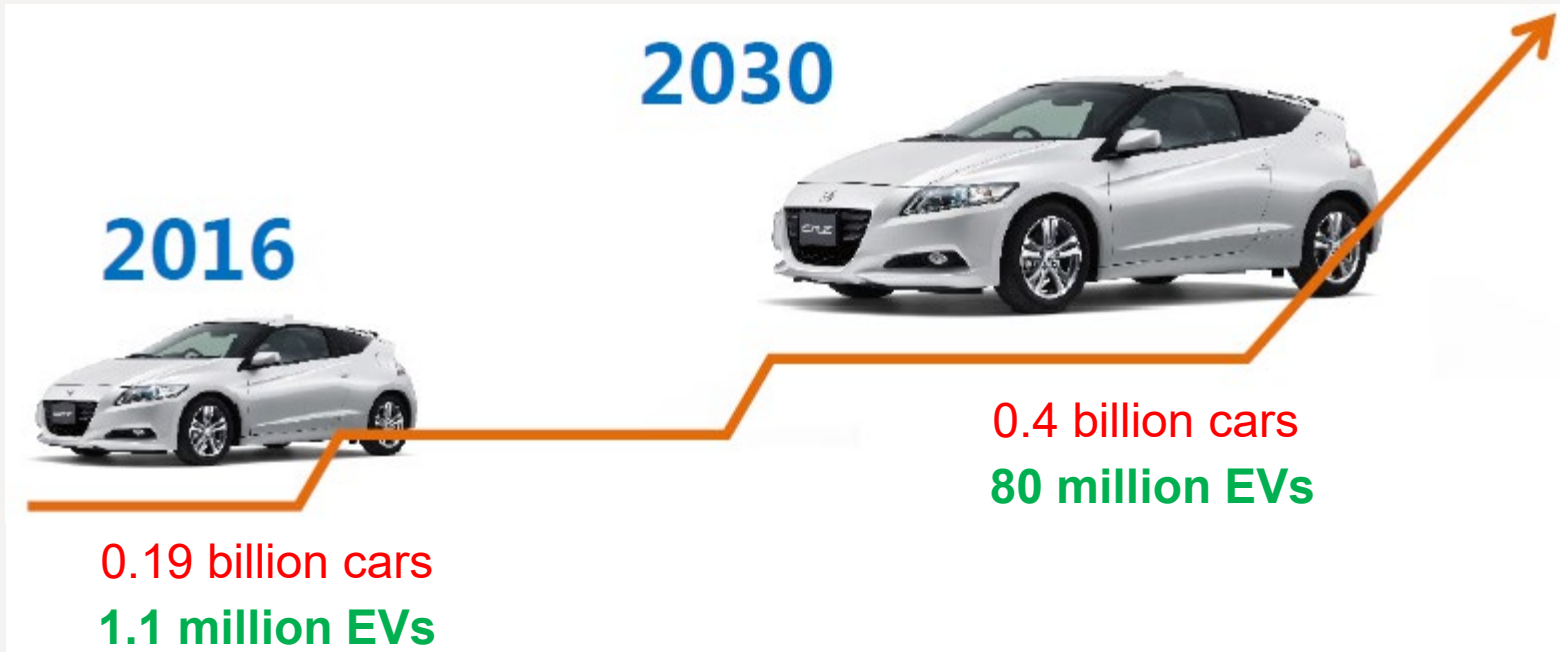
Storage



Converter



■ Electric Vehicle

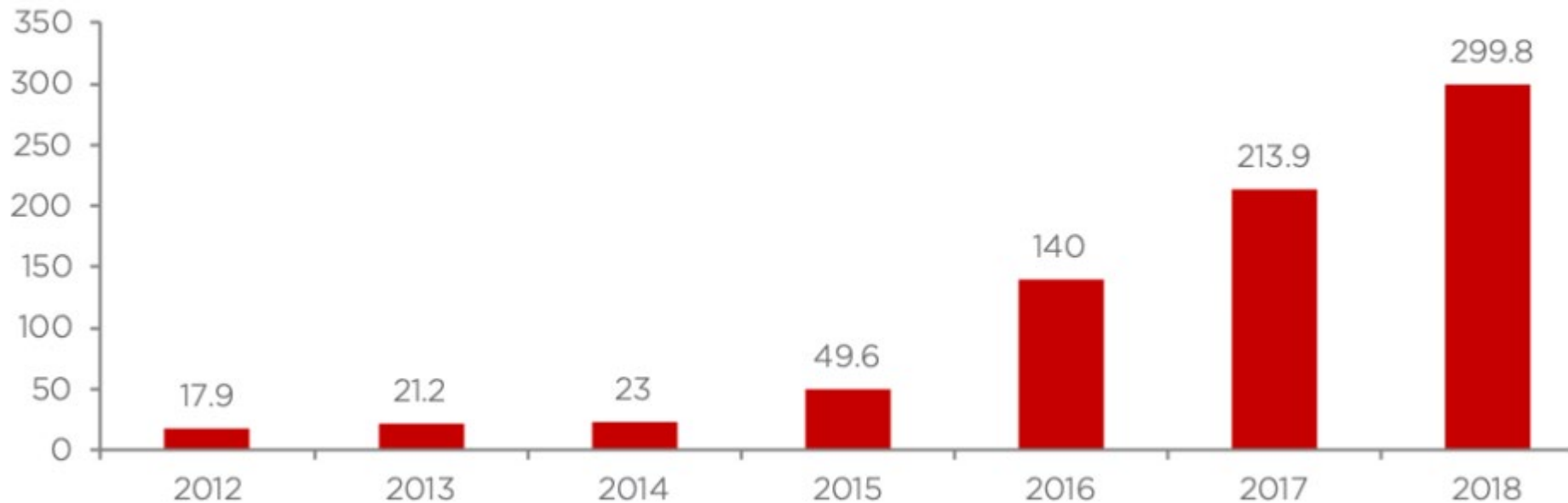


- Considering 100 kWh (Tesla) of storage capacity for each EV, the total storage capacity will be 8 TWh.
- 16 TWh of electricity consumption per day in 2016.
- 24 TWh of electricity consumption per day in 2030.



■ Electric Vehicle

Number of China public and dedicated fleet EV charging posts, in thousands

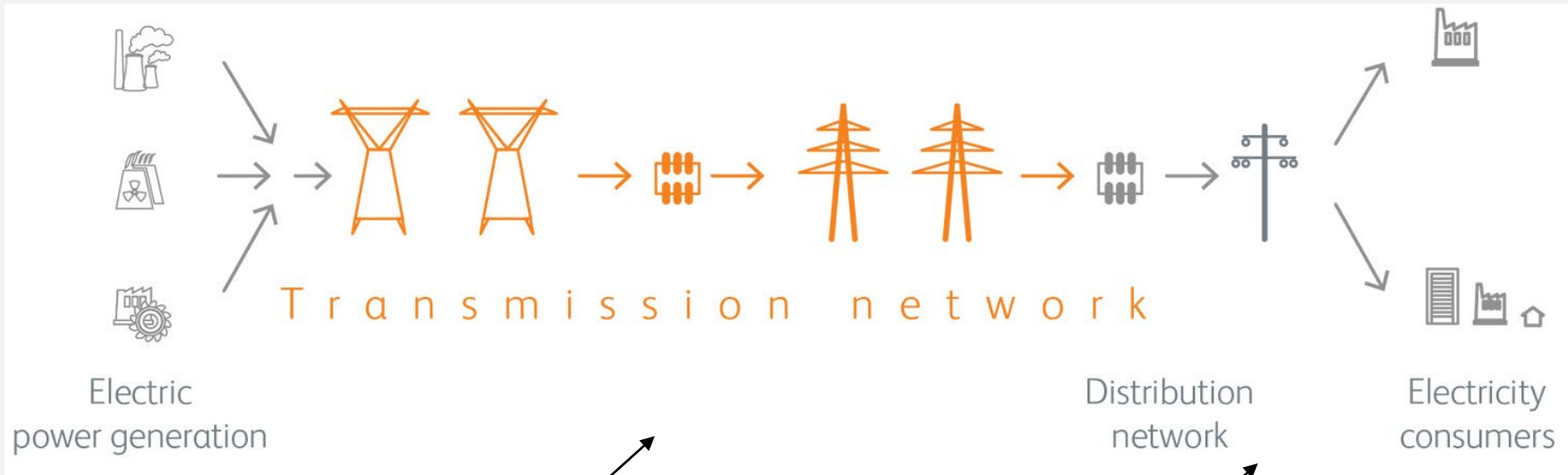


Source: China EV Charging Alliance, January 2019

Our experience of Global Energy Interconnection



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

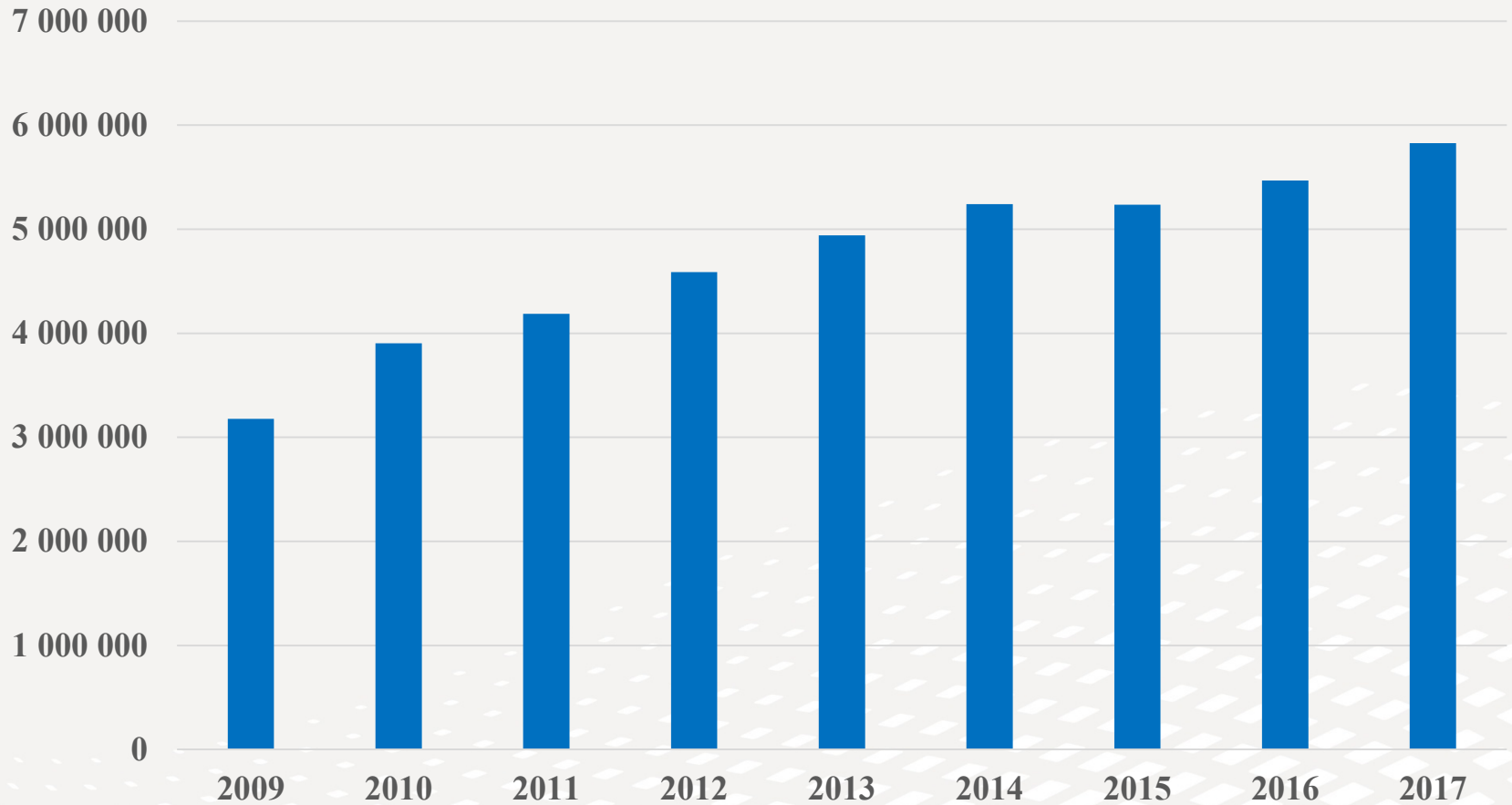


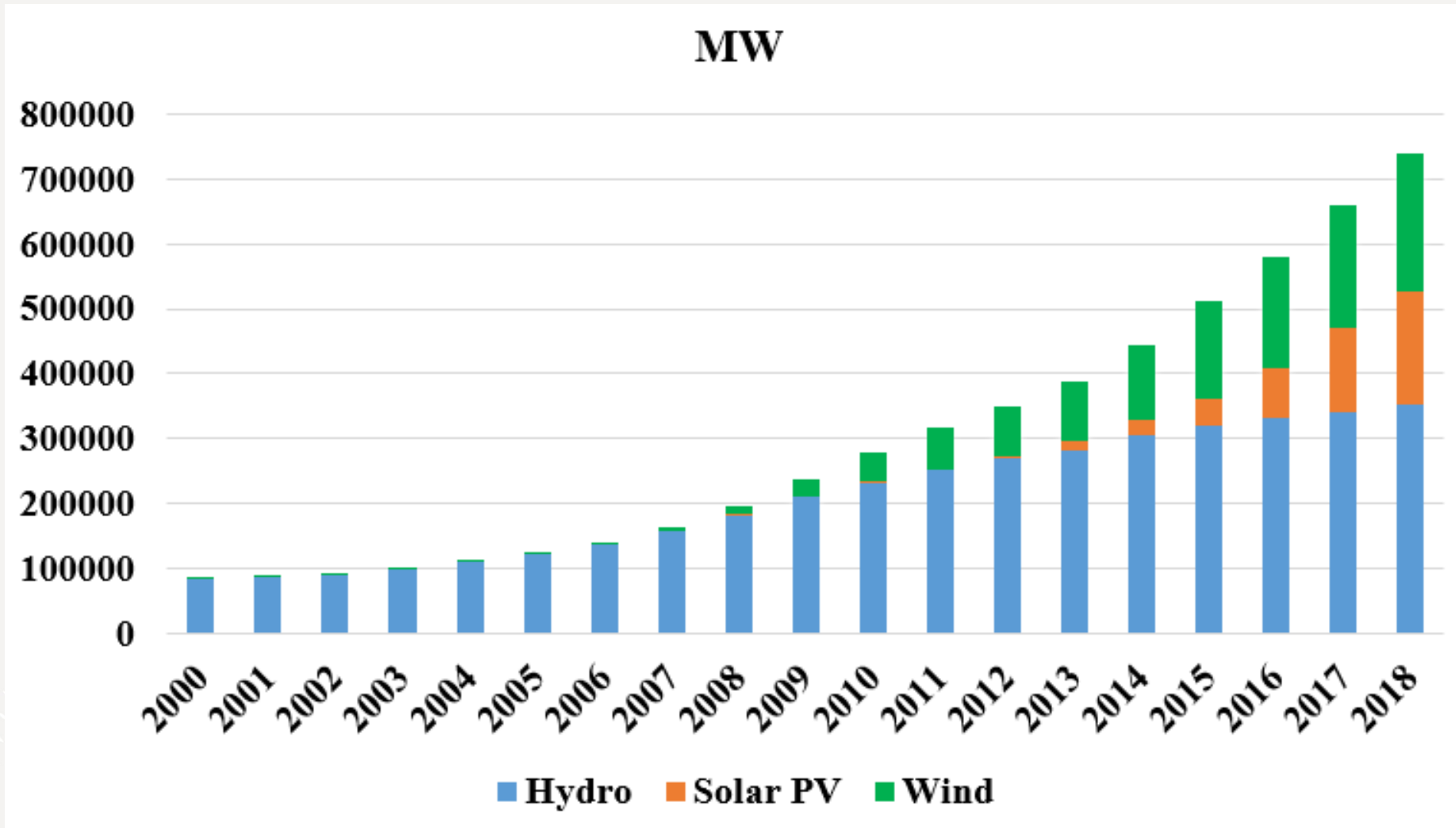
Longer distance
More efficient
Cheaper to build

Flexibility
Digitalization
E-mobility



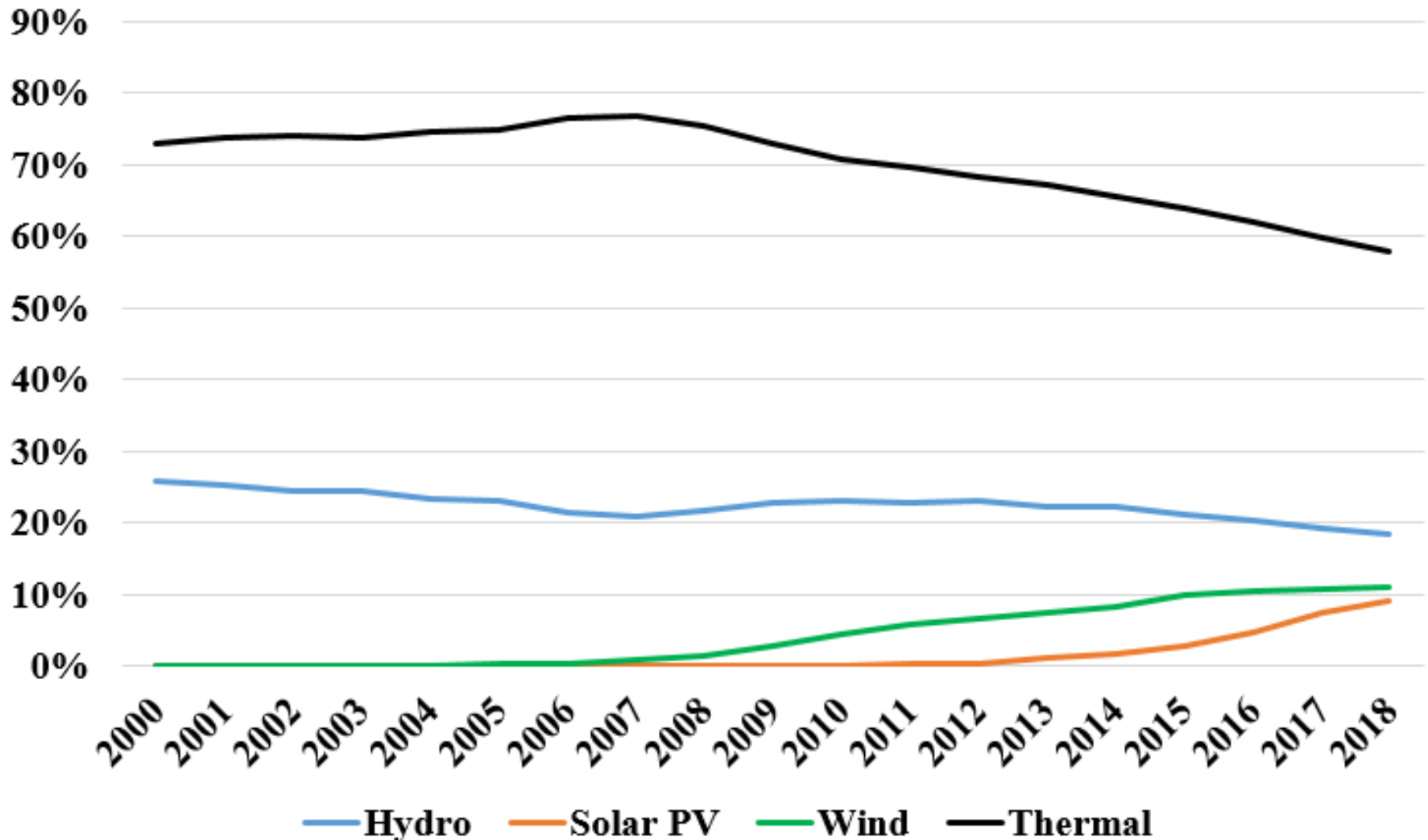
Power Consumption in China (GWh)





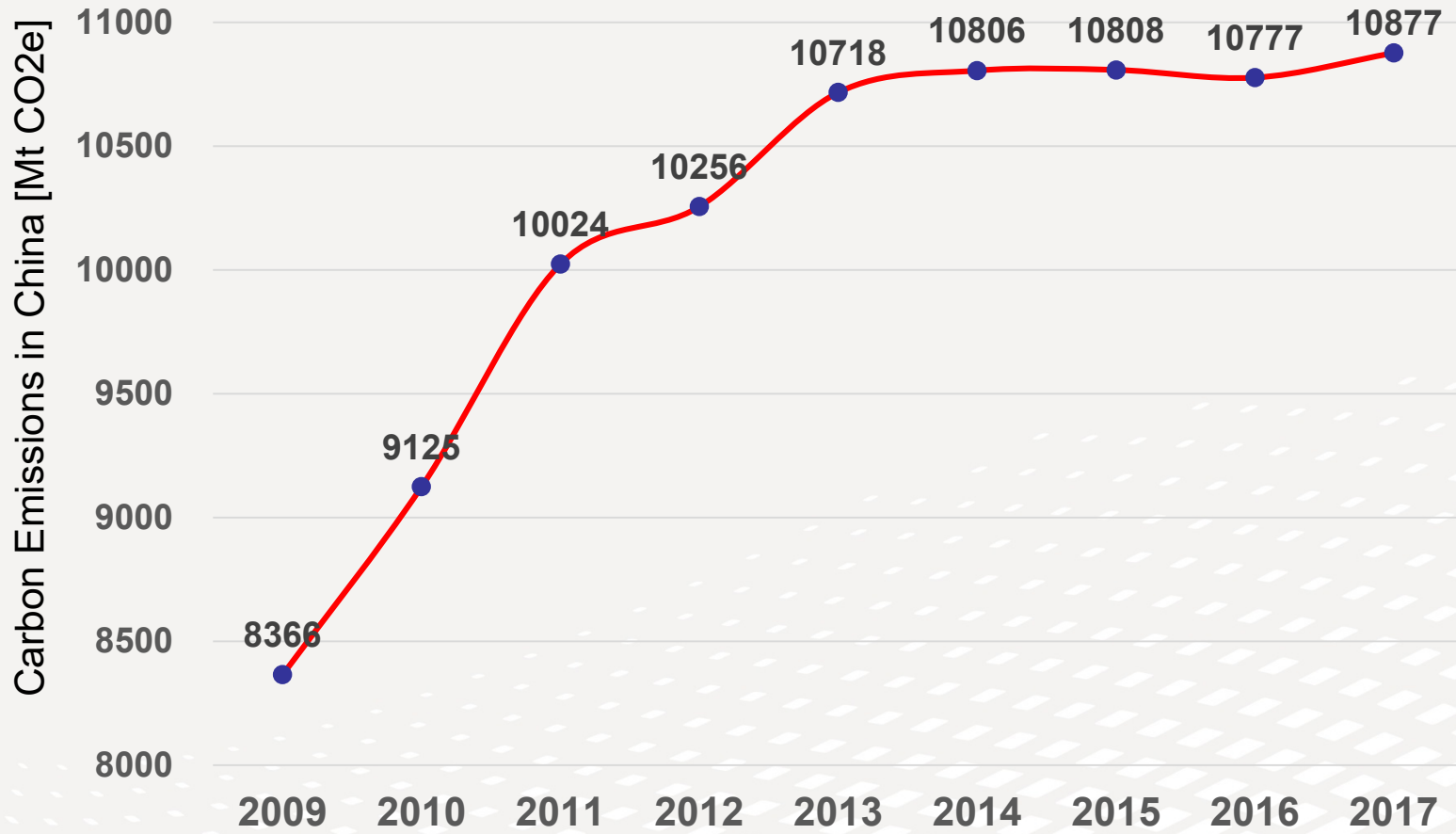


Percentage in the Generation Mix





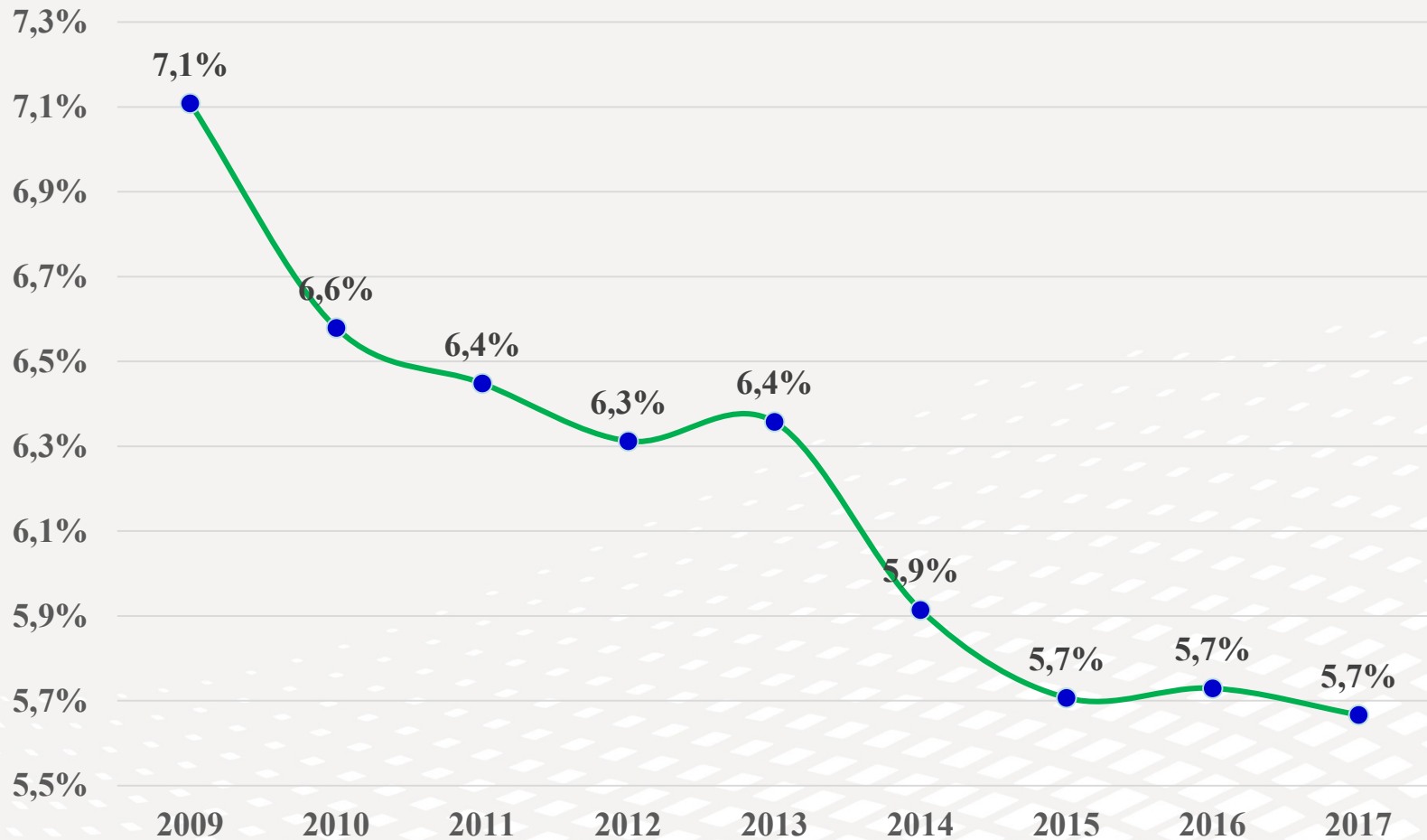
■ Carbon Improvement





■ Losses Improvement

Annual T&D Losses Rate (%)





2. Our organization

GEIDCO



Global Energy Interconnection (GEI)

GEI is a globally interconnected strong and smart grid with long-distance transmission technology grids as the backbone, an infrastructure platform on which clean energy can be developed, transmitted, and used massively worldwide.



Global Energy
Interconnection

=



Smart Grid

+



UHV Grid

+



Clean Energy

Introducing GEIDCO



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

- **GEIDCO** is a NGO
- **Date of foundation:** March 29, 2016
- **Purpose:** Building **Global Energy Interconnection (GEI)** to meet global power demand with clean and green alternatives
- **Members:** 635 members, 93 countries,
- **Chairman:** Mr. LIU Zhenya



Introducing GEIDCO



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



Liu Zhenya
Chairman



Dr. Steven Chu
Vice Chairman



Shu Yinbiao
Vice Chairman



Masayoshi Son
Vice Chairman

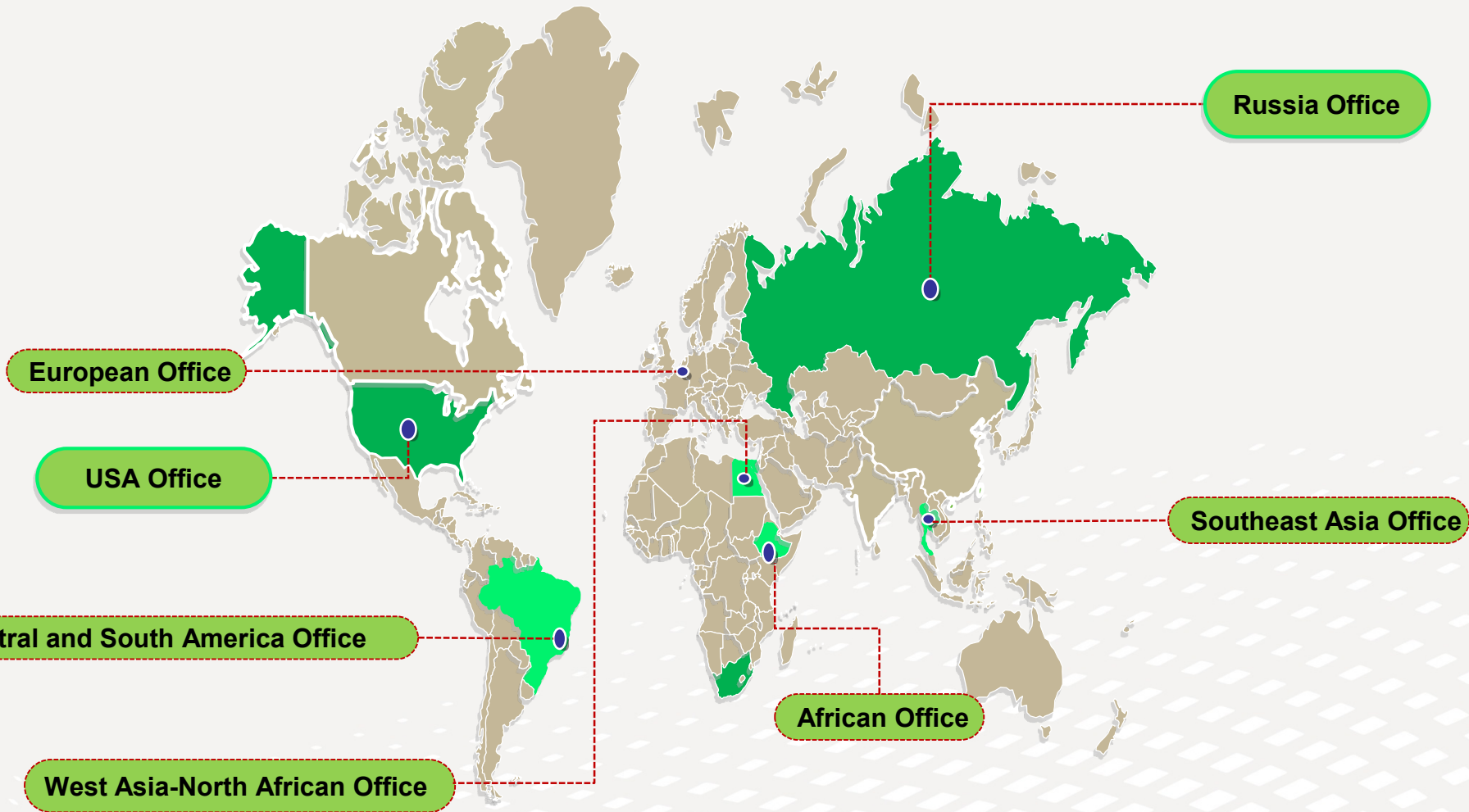


Oleg Budargin
Vice Chairman

Introducing GEIDCO



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





3. Our actions to promote GEI



a. Enhancing trust and mutual understandings

Synergize with major UN initiatives



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



MoU with UNDESA



MoU with UNFCCC

Communication with governments



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



On Mar 3rd 2019, Egypt's President Mr. Sisi welcomed GEIDCO Chairman LIU Zhenya



In Dec 2018, Mr. Philémon Yang, Prime Minister of Cameroon exchanged insights with GEIDCO Chairman LIU Zhenya



***b. Promote research in GEI
to create awareness of benefits related***



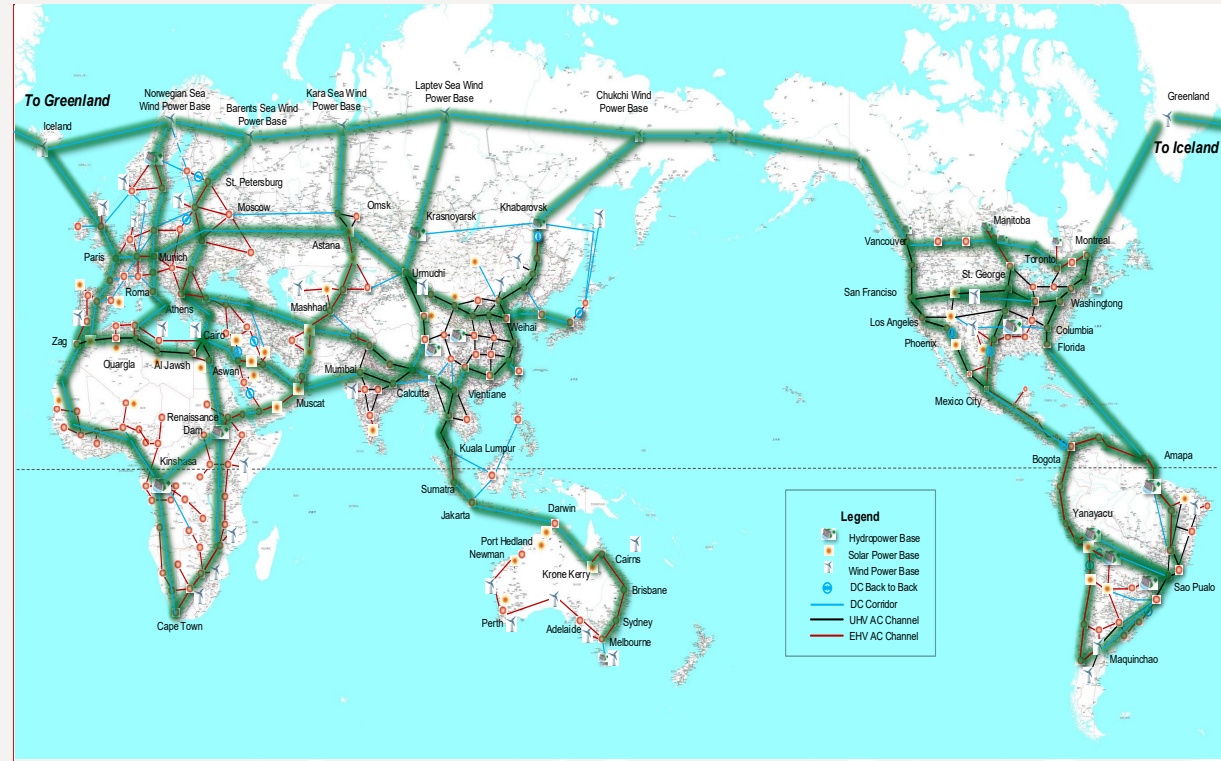
- Global Energy Interconnection Backbone Grid Research
- Global Energy Interconnection Standard System Research
- Global Energy Interconnection Technology & Equipment Innovation Outline.





■ The overall plan and goal:

- Clean replacement in energy production
- Electricity replacement in energy consumption;
- Based on cutting-edge technologies like UHV and smart grid;
- **GEI backbone network with 9 horizontal and 9 vertical grids**, will serve as the **energy artery** connecting the five continents.





■ Global Energy Interconnection Journal published by Published by Elsevier



ScienceDirect

Journals & Books



Create account

Sign in



Global Energy Interconnection

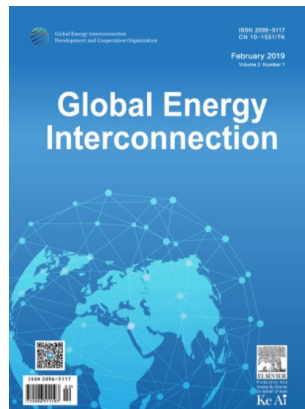
Open access

Latest issue [All issues](#)

Search in this journal



All issues



2018 — Volume 1



Volume 1, Issue 5

Pages 527-635 (December 2018)

Volume 1, Issue 4

Pages 404-526 (October 2018)

Volume 1, Issue 3

Pages 301-403 (August 2018)

Volume 1, Issue 2

Pages 103-196 (April 2018)

Volume 1, Issue 1

Pages 1-102 (January 2018)

ISSN: 2096-5117

Copyright © 2019 Global Energy Interconnection Group Co. Ltd. Published by Elsevier B.V.

Feedback

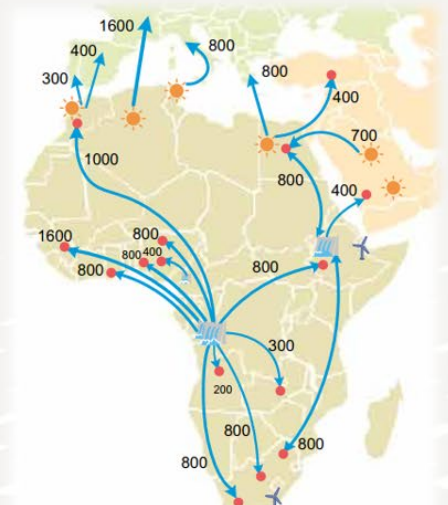


Europe Energy Interconnection Planning Research Report



Layout of the European Grid by 2050

Developing Africa Energy Interconnection to Promote Hydropower Resources Development and Achieve the Co-development of Electricity, Mining, Metallurgy, Manufacturing and Trade



Layout of African Power Flow by 2050



c. Organize conferences and workshops



In Brussels, May 2019



In Paris, May 2019



In Beijing, August 2018



In Nigeria, December 2018

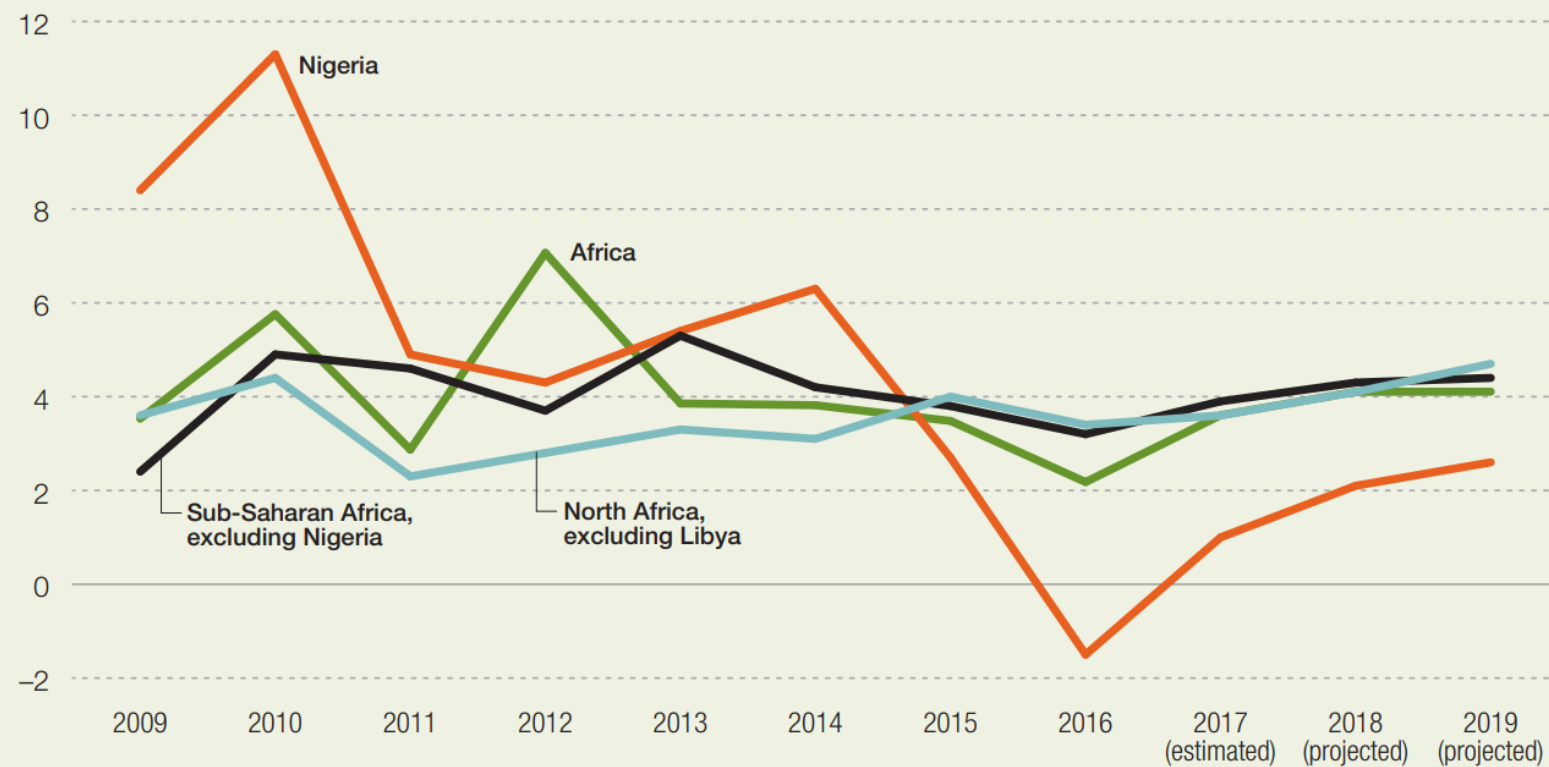


One more thing...

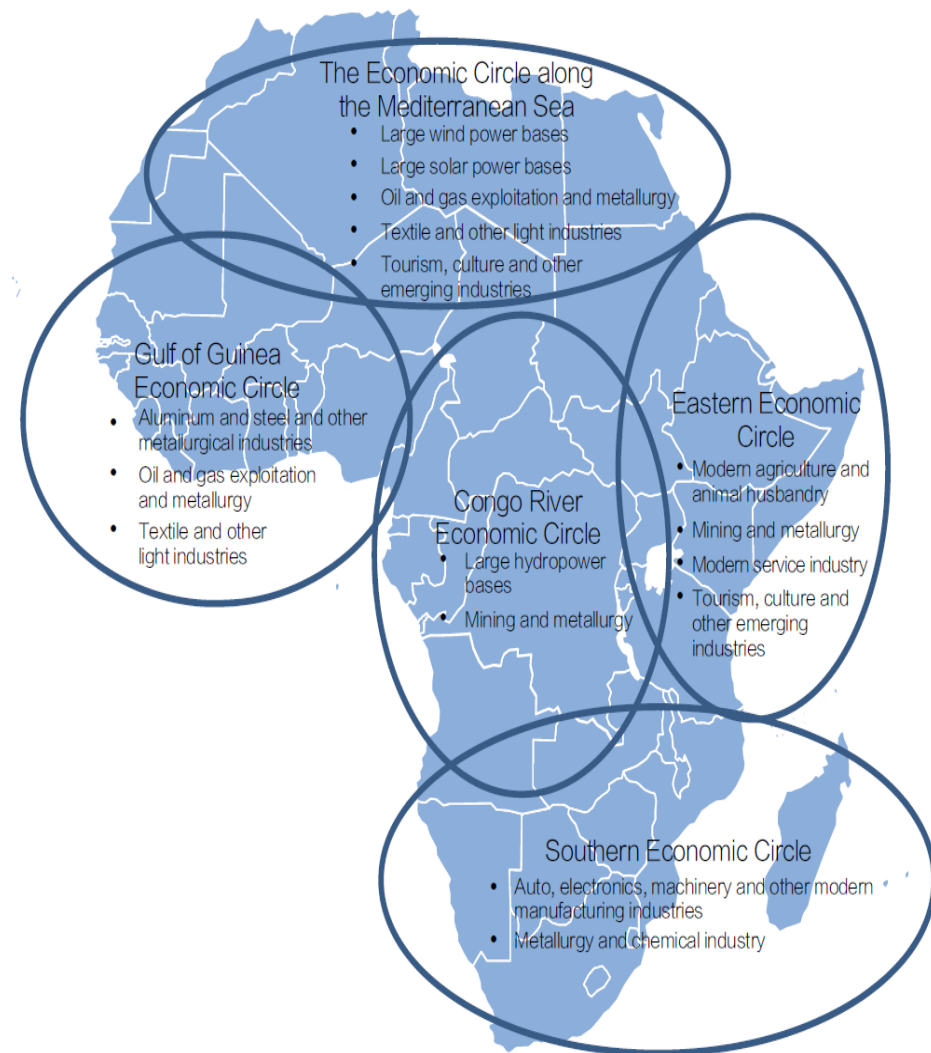
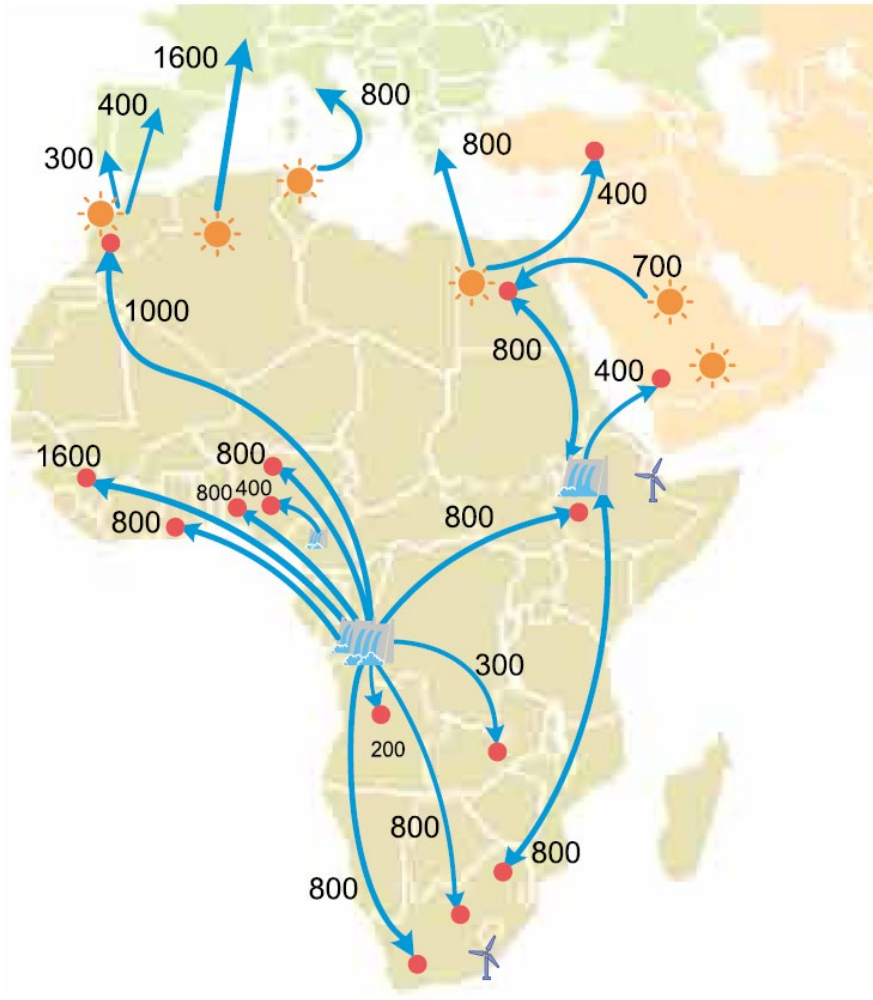


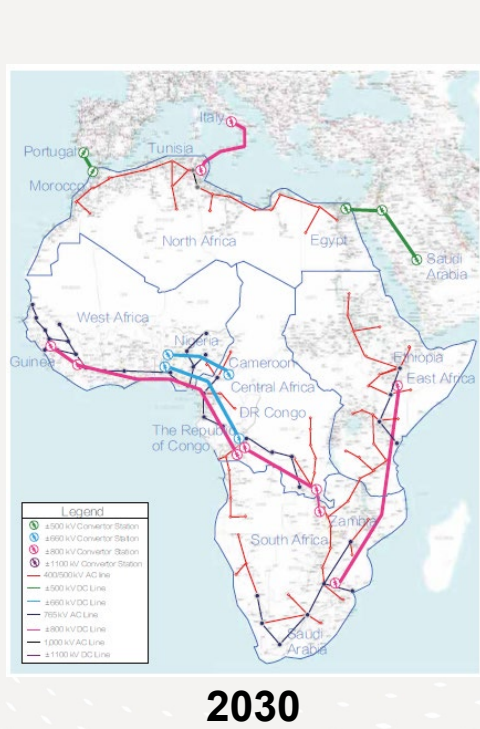
GDP growth in Africa, 2009–19

Percent

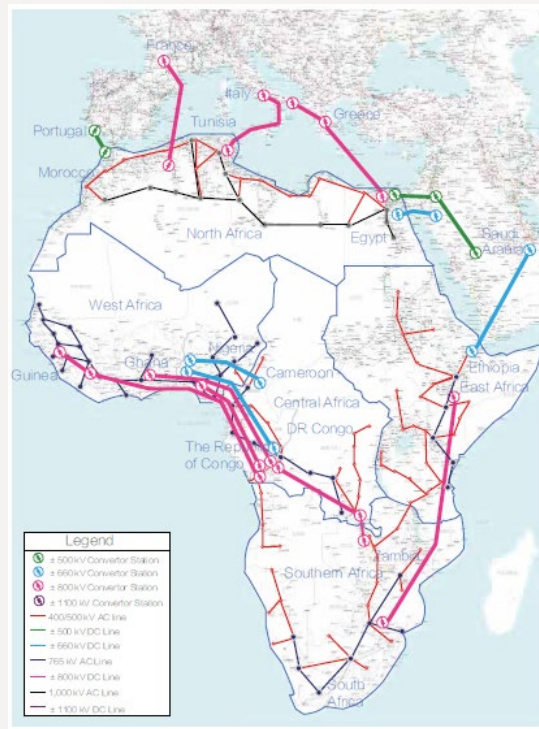


Source: AfDB statistics.

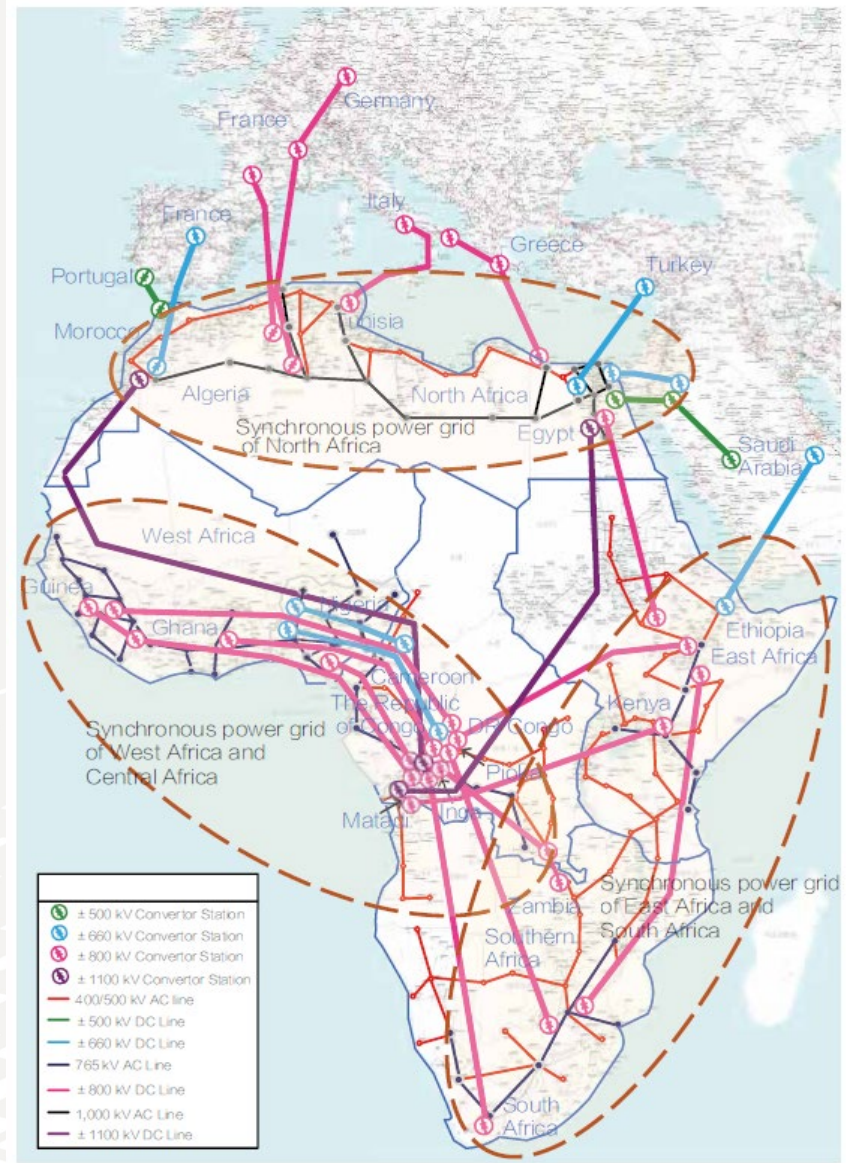




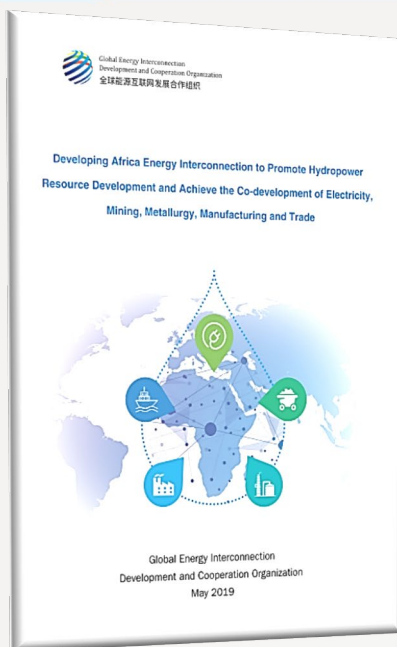
2030



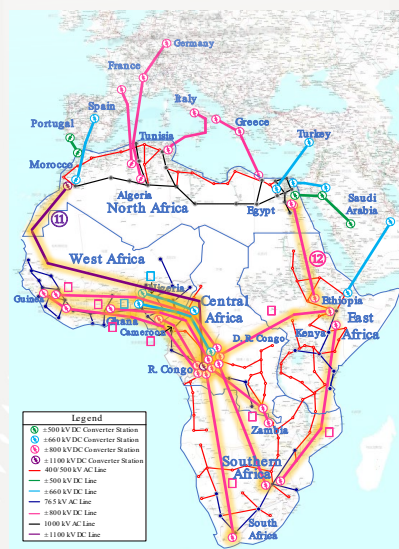
2040



2050



S/N	Project	Transmission Capacity	Length	Investment	Planned Completion Time
1	Cameroon-Nigeria ± 660 kV DC Project	400	1100	15	2030
2	D.R. Congo-Guinea ± 800 kV Three Terminals DC Project Phase I	800	4500	74	2030
3	D.R. Congo-Zambia ± 800 kV Three Terminals DC Project	800	2200	44	2030
4	R. Congo-Nigeria ± 660 kV DC Project	400	2000	23	2030
5	Ethiopia-South Africa ± 800 kV DC Project	800	2800	45	2030
6	D.R. Congo-Nigeria ± 800 kV DC Project	800	2000	38	2040
7	R. Congo-Ghana ± 800 kV DC Project	800	2800	45	2040
8	D.R. Congo-Guinea ± 800 kV DC Project Phase II	800	4500	70	2050
9	D.R. Congo-South Africa ± 800 kV DC Project	800	3800	54	2050
10	D.R. Congo-Ethiopia ± 800 kV DC Project	800	4000	56	2050
11	D.R. Congo-Morocco ± 1100 kV DC Project	1000	6500	94	2050
12	Ethiopia-Egypt ± 800 kV DC Project	800	1900	37	2050



■ African Energy Interconnection Sustainable Development Alliance (AEISDA)



A Cooperation Agreement between Republic of Guinea and GEIDCO was signed, during the 2018 Beijing Summit of the Forum on China-Africa Cooperation.



■ African Energy Interconnection Sustainable Development Alliance (AEISDA)

Participating African countries:

Currently, 20 countries including

Egypt, Ethiopia, the Republic of Congo, Gabon, Togo, Chad, Burkina Faso, Equatorial Guinea, Central African Republic, Guinea, Guinea-Bissau, Mali, Rwanda, Sierra Leone, Ghana, Gambia, the Democratic Republic of the Congo, Namibia, Niger and Botswana

Participating enterprises and institutions:

More than 80 enterprises and institutions including

State Grid Corporation of China, China Southern Grid, China Huaneng Group, China Three Gorges Corporation, China Export & Credit Insurance Corporation, China-Africa Development Fund, Eastern Africa Power Pool, Central African Power Pool, the Gambia River Basin Development Organization (OMVG), SoftBank, ABB, Siemens and Redes Energéticas Nacionais (REN).



■ African Energy Interconnection Sustainable Development Alliance (AEISDA)

Work Plan:

- September 2019, Preparatory Conference for the establishment of AEISDA.
- October 2019, Council meeting and Inaugural meeting of AEISDA.
- October 2019, International Symposium on Large-scale Hydropower Development in Downstream Congo River.
- By 2020, complete the planning of Central and West Africa Energy Interconnection and the overall planning of Co-development Model, and work out a project list.
- From 2021 to 2025, undertake the research and promote the construction of key projects

Consultations with other partners and initiatives are ongoing.



Thank You !

zhanghua-zheng@geidco.org

