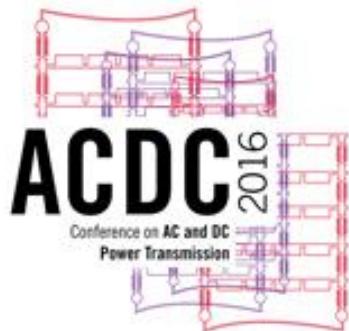


Welcome Address by

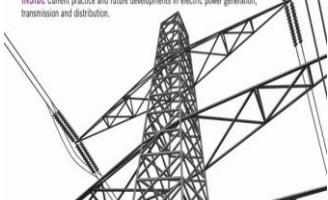
Prof. Rong Zeng

Conference Chairman

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INSIDE Current practice and future developments in electric power generation,
transmission and distribution.



■ ACDC是一个历史悠久，并备受推崇的专注于交直流输电的国际会议。

ACDC is a long established and highly respected international conference focusing on AC and DC power transmission.

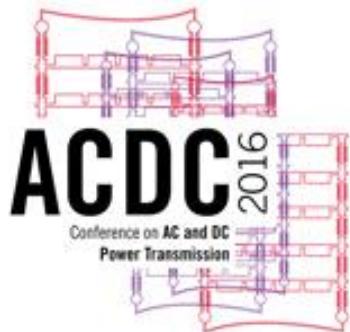
■ ACDC2016是第十二届会议。

ACDC 2016 is the twelfth in the planned series conference.

■ 挂靠《 IET Generation, Transmission & Distribution 》。

Linked to the IET Generation, Transmission & Distribution Journal.

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High Voltage

日益增长的对长距离输电的需求

Increasing need to transmit power over longer distances

市场的变化

Changes in the marketplace

可再生能源的广泛接入对电网发展的影响
Impact of wider implementation of renewable technologies on network development

老化电网可靠性及效率的提升

Improvements in the reliability and efficiency of aging grid systems

HVDC与HVAC的最新技术进展

Latest advances in HVDC and HVAC technologies

最近的交、直流工程

Recent AC and DC projects

会议主题
Technical scope

system

engineer

challenge

5

4

7

6

2

3

equipment

经济社会挑战及其对输电网络的影响
New challenges and impact on the development of transmission networks

快速增长的经济对远距离输电的需求
Vast distance transmission requirements of growing economies

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世界直流工程分布 World DC project distribution



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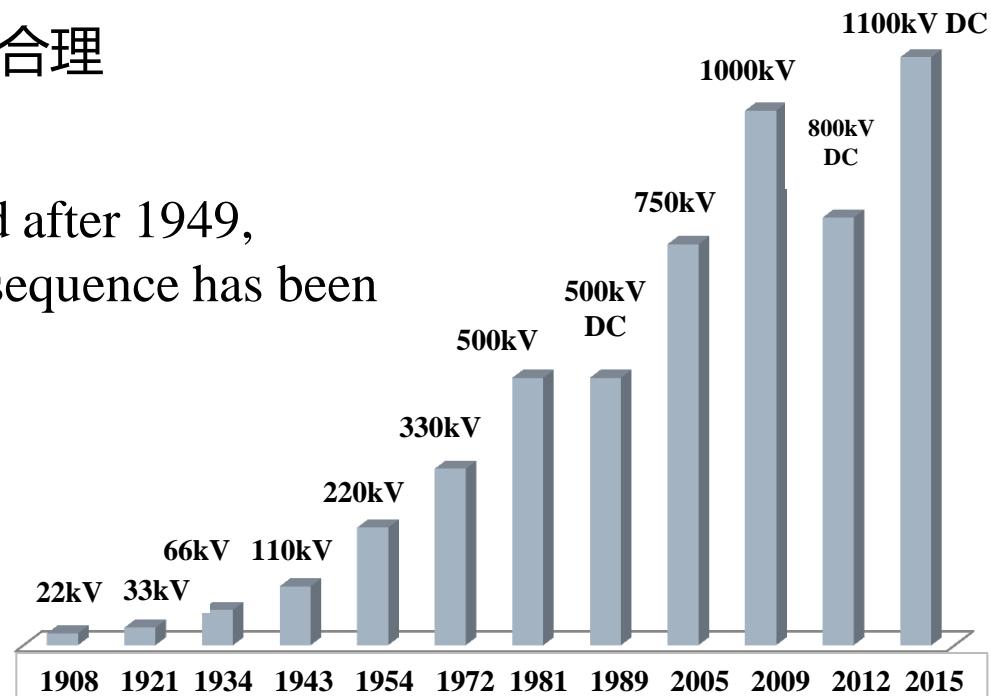
世界上长距离架空线路高压直流输电工程（截至2010年底）
World long-distance HVDC overhead lines (Before 2011)

序号 No.	项目 Project	额定电压(千伏) Rated voltage(kV)	额定功率(万千瓦) Rated active power($\times 10\text{MW}$)	输电距离(公里) Transmission distance(km)	投运时间 Operation time	国家 Country
1	卡布拉-巴萨 (Cahora Bassa)	± 533	192	1360	1978	莫桑比克-南非 MOZ-ZAF
2	因加—沙巴 (Inga-Shaba)	± 500	56	1700	1982	刚果 CGO
3	纳尔逊河二期 (Nelson River bipolar 2)	± 500	180	937	1985	加拿大 CAN
4	山间直流 (Path 27)	± 500	192	784	1986	美国 USA
5	伊泰普一期 (Itaipu 1)	± 600	315	785	1984	巴西 BRA
6	伊泰普二期 (Itapúa 2)	± 600	315	850	1984	巴西 BRA
7	太平洋联络线 (Pacific DC Intertie)	± 500	310	1361	1989	美国 USA
8	葛上 (Gezhouba - Shanghai)	± 500	120	1052	1989/90	中国 CHN
9	魁北克多端 (England Transmission)	± 450	200	1100	1986/90/92	加拿大-美国 CAN-USA
10	亨德-德里 (Rihand-Delhi)	± 500	150	814	1992	印度 IND
11	天广 (Tianshengqiao-Guangdong)	± 500	180	960	2000	中国 CHN
12	东南联接 (East South-II ESI II)	± 500	200	1450	2002	印度 IND
13	三常 (Three Gorges-Changzhou)	± 500	300	890	2003	中国 CHN
14	三广 (Three Gorges-Guangzhou)	± 500	300	946	2004	中国 CHN
15	贵广 (Guizhou-Guangdong)	± 500	300	882	2004	中国 CHN
16	三上 (Three Gorges-Shanghai)	± 500	300	1040	2006	中国 CHN
17	贵广II (Guizhou-Guangdong II)	± 500	300	1194	2007	中国 CHN
18	印度-Ballia (HVDC Ballia-Bhiwadi)	± 500	250	780	2009	印度 IND
19	云广 (Yunnan-Guangdong)	± 800	500	1373	2010	中国 CHN
20	向上 (Xiangjiaba-Shanghai)	± 800	640	1907	2010	中国 CHN
21	宁夏-山东 (Ningxia- Shandong)	± 660	400	1350	2010	中国 CHN
22	呼辽 (Hulunbeir-Liaoning)	± 500	300	920	2010	中国 CHN

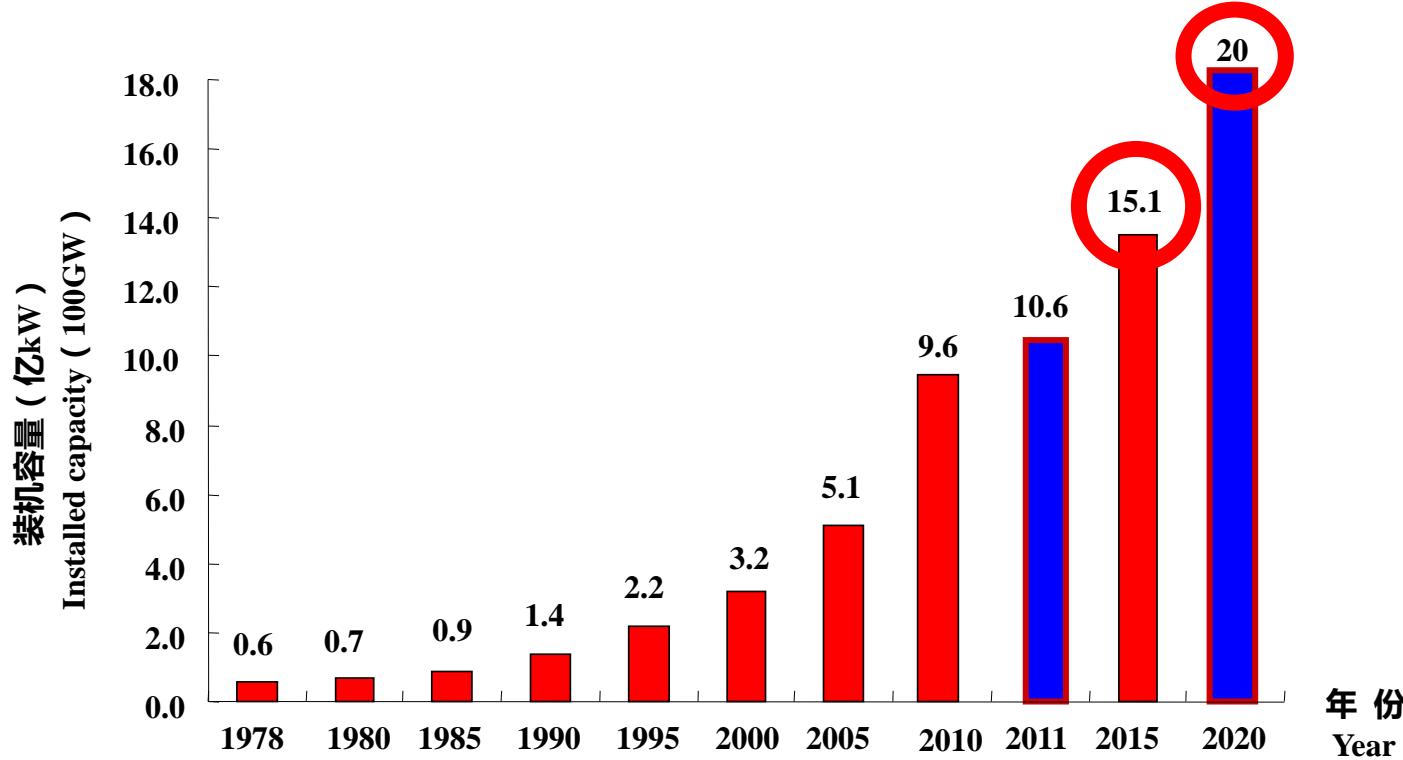
中国电力工业发展轨迹 China electric power industry development

- 1949年以前，发展较慢。 Develops slowly before 1949
- 新中国成立后，我国电网发展逐步统一电压等级，形成经济合理的电压等级系列。

Voltage level gradually unified after 1949,
economic reasonable voltage sequence has been
formed.



中国电力工业发展轨迹 China electric power industry development



- 截至2015年底，我国发电装机容量15.1亿千瓦，用电量5.55万亿千瓦时；
By the end of 2015, installed capacity is 1510GW, electricity consumption is 5.55 trillion kWh.
- 到2020年，装机容量可能超过20亿千瓦，用电量7万亿千瓦时。
By 2020, installed capacity will be 2000GW, electricity consumption will reach 7 trillion kWh.

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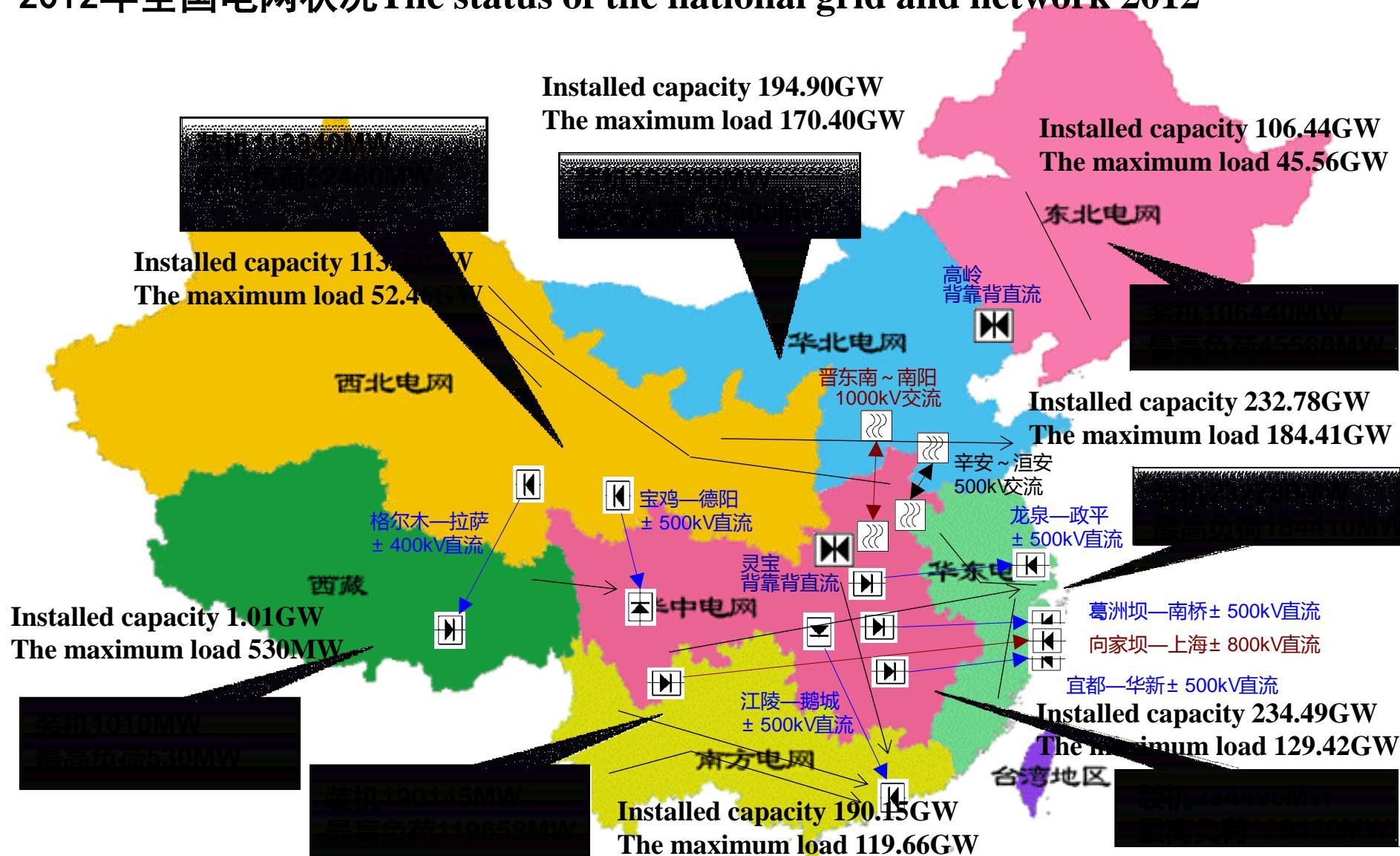
以500kV为主网架建设6大区域电网，之间通过交直流进行互联
6 regional 500kV power grid interconnected by AC/DC



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2012年全国电网状况 The status of the national grid and network 2012



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中国现有直流输电工程(至2015年)

Chinese present DC transmission project (2015)

序号 No.	工程名称 Project	功率(MW) Active power(MW)	电压 (kV) Voltage(kV)	距离 (km) /Distance		投运时间 (年) Operation time
				架空线/Line	电缆 /Cable	
1	舟山直流工程(单极)	50	-100	42	12	1987
2	葛洲坝-上海直流工程	1200	± 500	1045	/	1989
3	天生桥-广州直流工程	1800	± 500	960	/	2000
4	嵊泗直流工程	60	± 50	6.5	59.7	2002
5	三峡-常州直流工程	3000	± 500	860	/	2002
6	三峡-广东直流工程	3000	± 500	960	/	2004
7	贵州-广东I直流工程	3000	± 500	880	/	2004
8	灵宝背靠背工程	1110	/	/	/	2005
9	三峡-上海直流工程	3000	± 500	1049	/	2006
10	贵州-广东II直流工程	3000	± 500	1225	/	2007
11	高岭背靠背工程	1500	/	/	/	2008
12	德阳-宝鸡直流工程	3000	± 500	534	/	2009
13	三峡-上海II直流工程 (双回 , 葛上直流工程改造)	3000	± 500	976	/	2010
14	云南-广东特高压	5000	± 800	1373	/	2010
15	向家坝-上海特高压	6400	± 800	1907	/	2010
16	呼伦贝尔-辽宁直流工程	3000	± 500	908	/	2010
17	宁东-山东直流工程	4000	± 660	1335	/	2011
18	锦屏-苏南	6400	± 800	2059	/	2012
19	溪洛渡-广东	6400	± 500	1254	/	2012
20	溪洛渡-浙江	8000	± 800	1653	/	2014
21	哈密-郑州	8000	± 800	2192	/	2014
22	糯扎渡-广东	5000	± 800	1413	/	2015

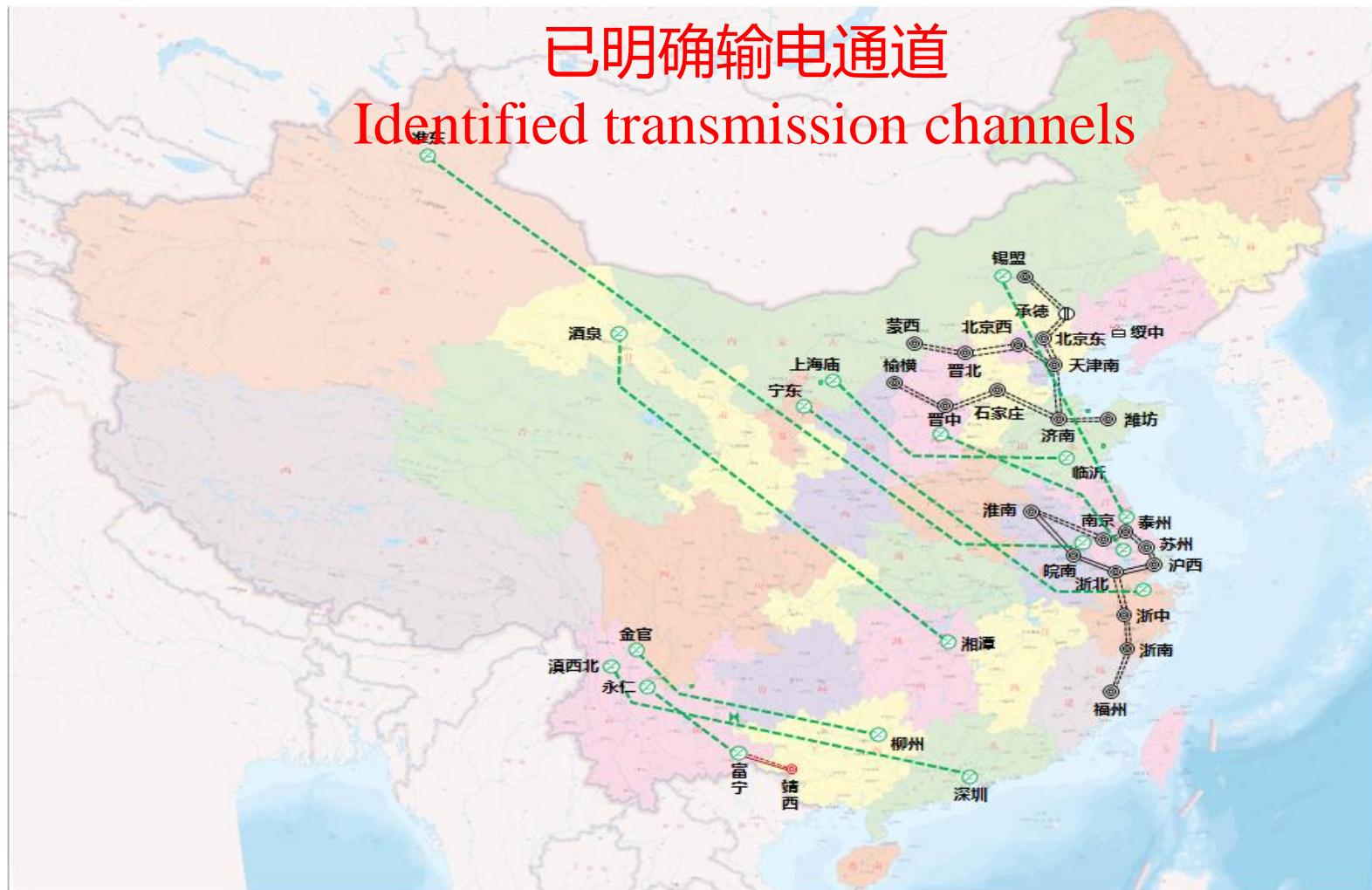
中国电力能量流 Power flow of China Power Grid in near future



近期电网规划展望 Short-term power grid planning

已明确输电通道

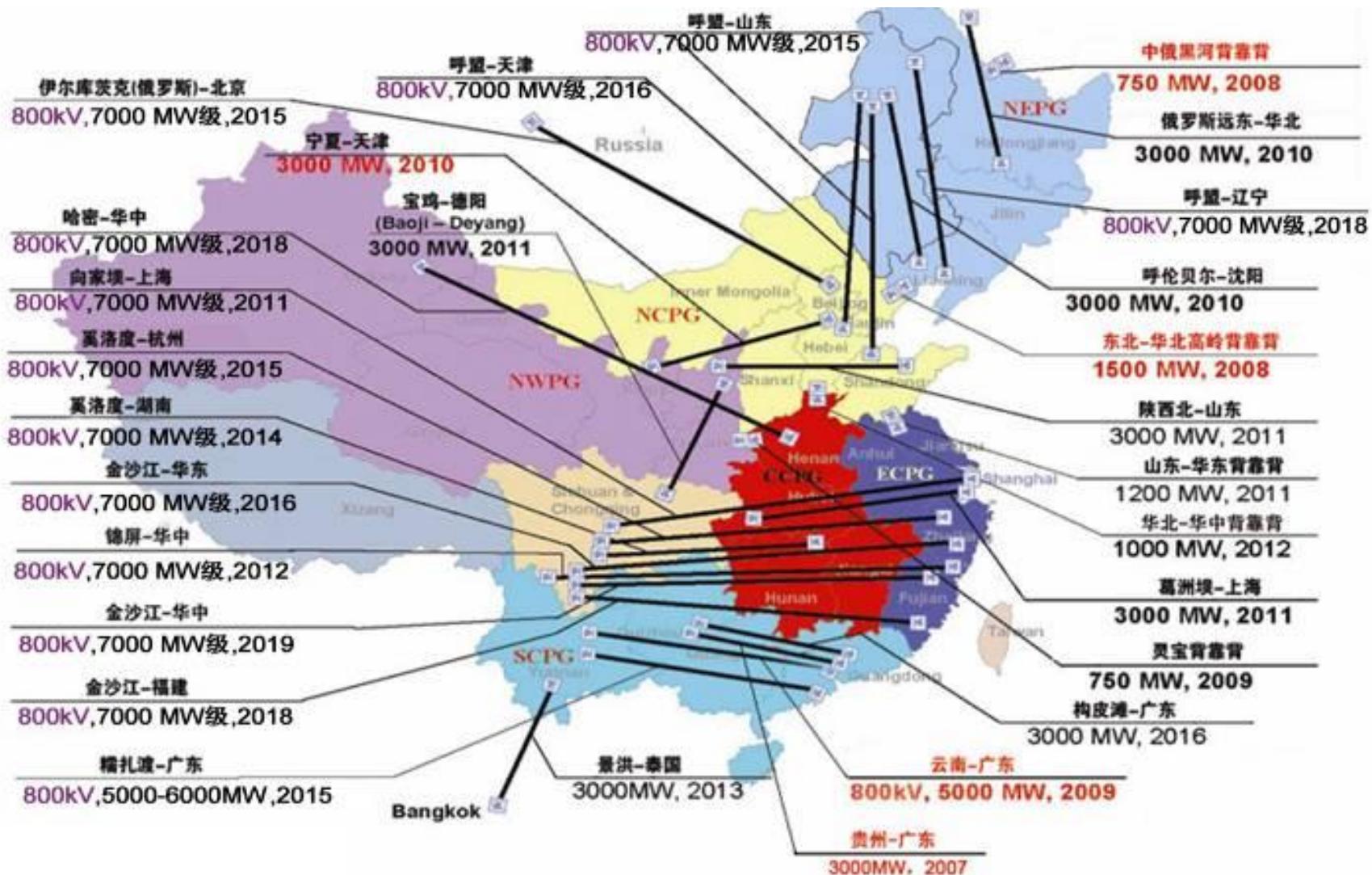
Identified transmission channels



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中国直流输电工程规划图 (2020) China DC transmission project plans (2020)



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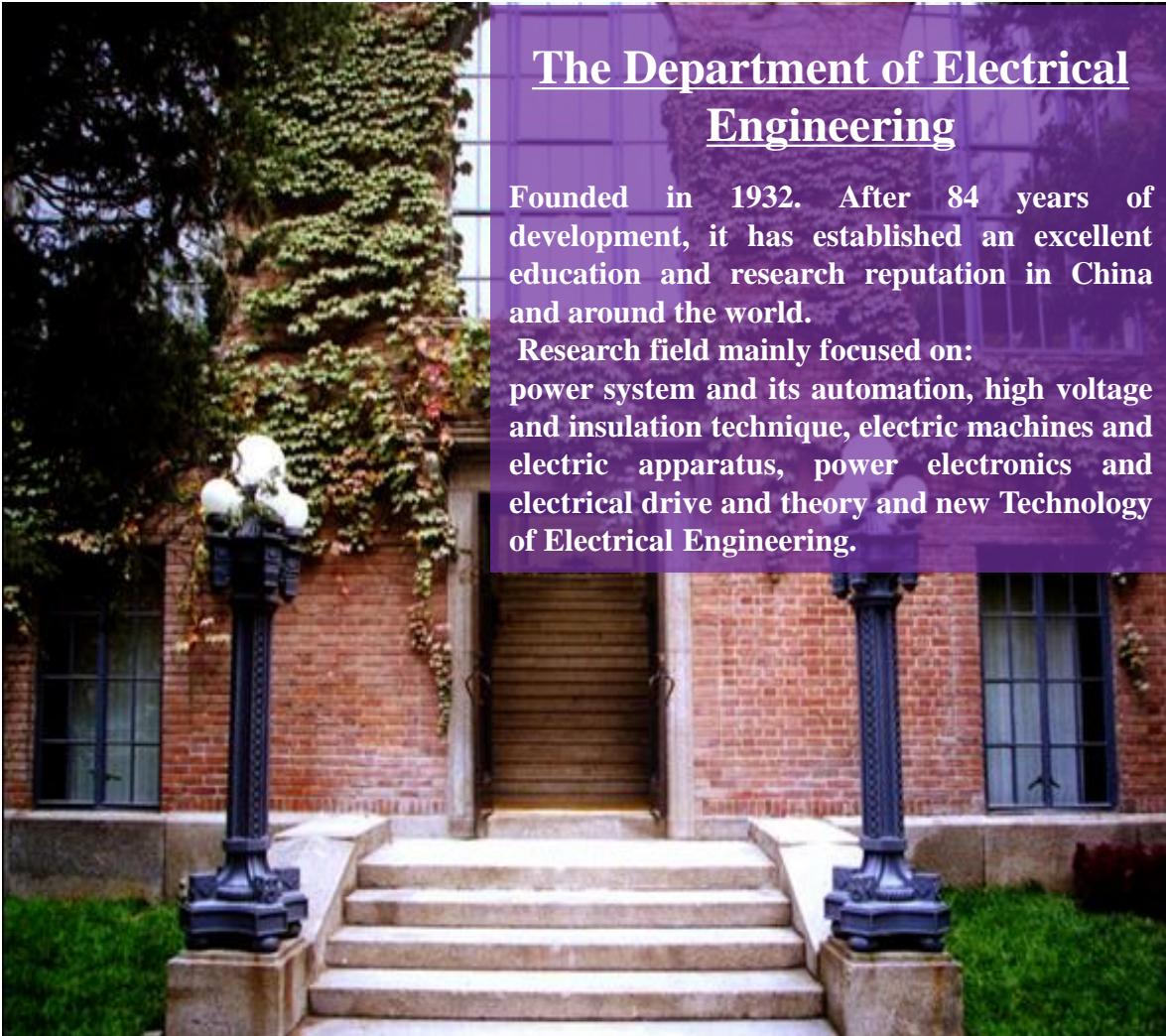
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The Department of Electrical Engineering

Founded in 1932. After 84 years of development, it has established an excellent education and research reputation in China and around the world.

Research field mainly focused on: power system and its automation, high voltage and insulation technique, electric machines and electric apparatus, power electronics and electrical drive and theory and new Technology of Electrical Engineering.



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Thanks for your attention !