

7 Construction of DC Distribution System in Smart City : Challenges and Suggestions

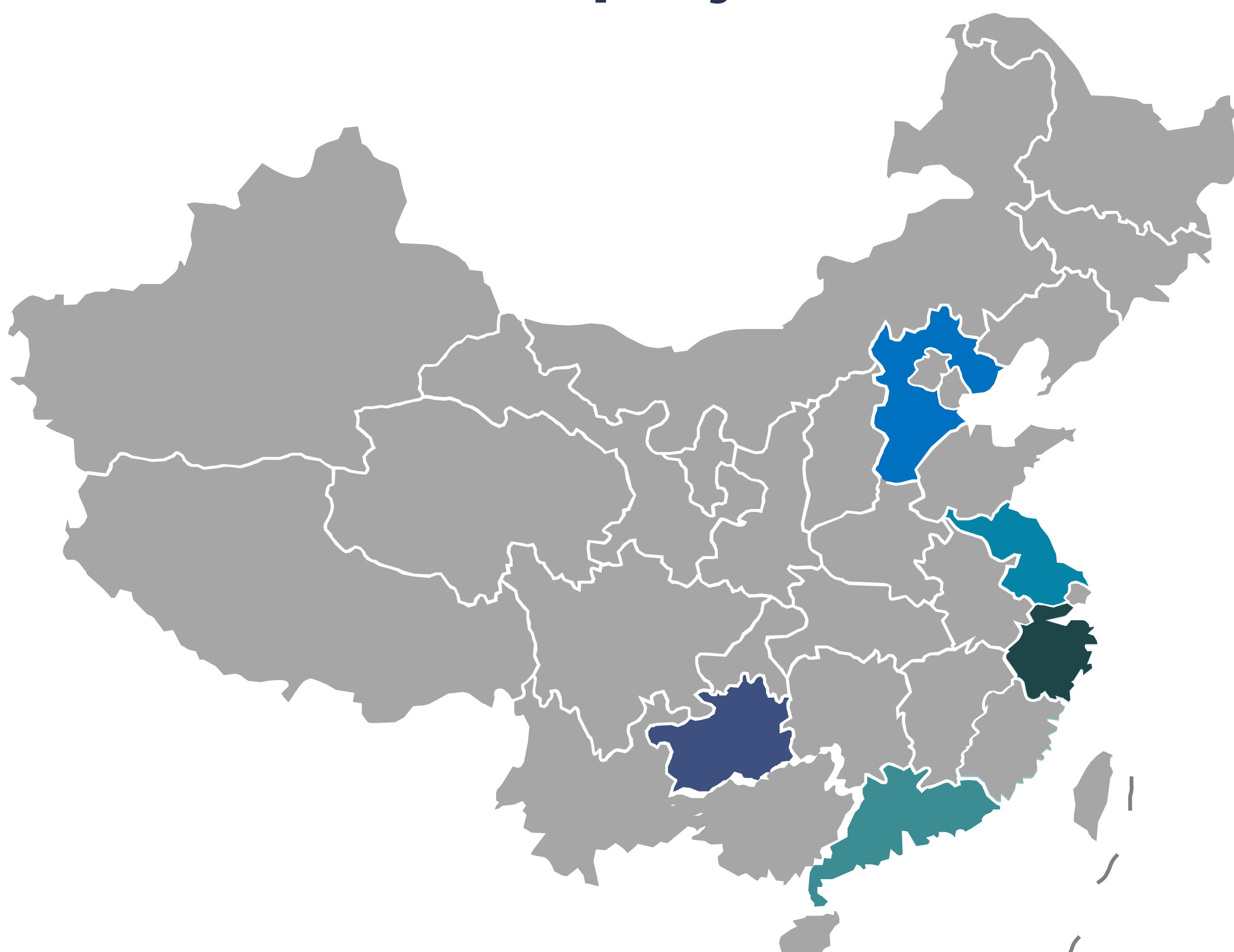
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Introduction

This paper presents the construction of DC distribution system in China, including following three parts:

- The demonstration projects
- Main challenges of promoting DC network in planing and development of smart cities
- Future research tasks and construction suggestions

DC distribution projects in CHINA



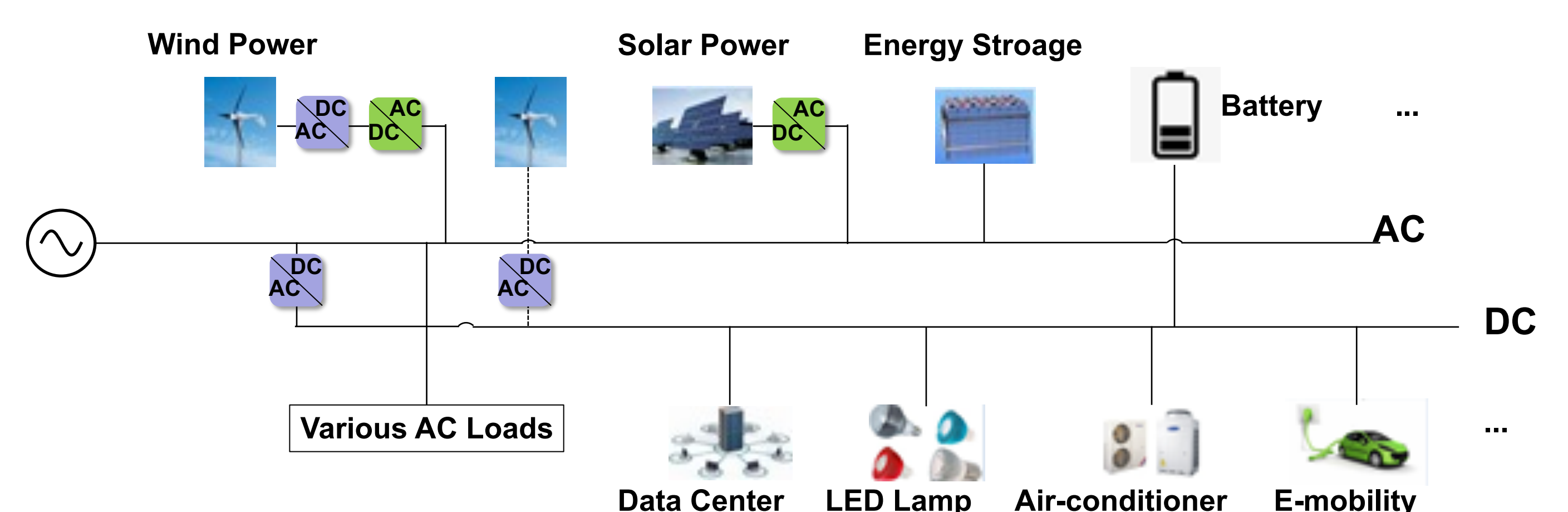
- Zhangbei flexible substation and AC-DC hybrid distribution network demonstration project
- Suzhou AC-DC hybrid active distribution network project
- Shangyu AC-DC hybrid microgrid demonstration project
- Hangzhou Jiangdong flexible DC distribution network project
- Haining Jianshan active distribution network project
- Guizhou five-terminal flexible DC distribution network demonstration project
- Zhuhai 'internet plus' smart energy demonstration project
- Dongguan AC-DC hybrid distribution network demonstration project
- Shenzhen Sino American low-carbon building and community innovation experimental center

Challenges and Barriers of DC distribution systems in smart city

- DC distribution network equipment lacks relevant technical standards
- The domestic relevant manufacturers have no mature products in the DC distribution network equipment and the cost is still high
- The on-site test and maintenance are not standardized
- The investment of DC distribution system is higher than that of conventional AC distribution system

Constructive agendas and prospects development

Following drives the blueprint of DC distribution system in the future:



Technology Research

- Develop multi voltage level protection scheme
- Break through the key technology of fault isolation
- Establishment of power quality evaluation index system

Equipment Development

- Low Cost
- High Reliability
- Low Loss
- More Compact

Project Construction

- All-DC Power Supply for the Park Building
- All-in-one Substation with Data Center
- Low-voltage Flexible Interconnection

Conclusion

It is still a challenge as well as an opportunity to develop DC distribution network in smart city, further work should be taken.