A Tentative Analysis on the Legal Status of Grid-Connected Micro-grid Operators

Jin LIU¹*, Jian-fei LU² and Ming-ming WANG³

¹State Grid Energy Research Institute Co, Ltd, SGCC Administrative area, Future Science and Technology Park North Area, Beiqijia Town, Changping District, Beijing 102209, P.R China
²State Grid Energy Research Institute Co, Ltd, SGCC Administrative area, Future Science and Technology Park North Area, Beiqijia Town, Changping District, Beijing 102209, P.R China
³State Grid Jiangxi Electric Power Co, Ltd; No. 666, Hubin East Road, Qingshan Lake District, Nanchang, Jiangxi 330047, P.R China

*Corresponding author

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Abstract. It is in the key period of the development of micro-grid construction. Deepening the reform of electric power system and technology, the development of micro-grid is rapid. The main body status of grid-connected micro-power grid is becoming more and more clear, and its legal orientation should be fully defined. Based on the analysis of the policy of grid-connected micro-grid and the summary of the pilot situation, this paper makes it clear that the position of the micro-grid in the power law by analyzing the different situation and characteristics of the micro-grid.

Introduction

With the deepening reform of electric power system and the rapid development of micro-grid technology, micro-grid has been gradually cultivated as an independent subject in power market. As a beneficial complementary form of grid system, the micro-grid is efficient to satisfy the diversified power demand of the users in a high-reliability way. Nowadays, Chinese Government has promulgated plenty of policies to cultivate micro-grid operators. Besides, lots of trials have been carried out to support the development of micro-grid. Nevertheless, a legal system for the new micro-grid operators has not been established. The legal relationship between micro-grid operators and grid enterprises, grid supply enterprises, and power grid users urgently awaits to be clarified. And the position of micro-grid operators in law is an important problem needing prompt solution. Also, to embed the policies of micro-grid into existing policy system has become the most prominent problem to be desiderated. This paper focuses on making clear that the legal status of micro-grid operators in Electricity Law based on the analysis of micro-grid policies and trials.

The Analysis of Policies and Pilot Projects of Micro-grid in China

Micro-grid is a small distribution system composed of distributed power supply, electric load, distributing facilities, power monitoring and protection devices. Micro-grid is classified as grid-connected micro-grid and grid-independent micro-grid, which is capable of auto-operating. And grid-connected micro-grid enables to switch from online to offline independently through operating with external grid network. Since the Chinese Government deepened the reform of electric power system in 2015, a plenty of policies have carried out to support micro-grid. Consequently, great results have been achieved which laid a solid foundation for the generalization in the future.

The Analysis of Micro-grid Policies in China

Firstly, the policies encourage the combination of power system reform and micro-grid development. The leading policy document of electric system reform, Several Opinions Of The Cpc Central Committee And The State Council On Further Deepening The Reform Of The Electric...
Power System—also known as Policy No. 9—have made clear that the Chinese Government encourage to develop micro-grid which combines energy storage, information technology and smart grid technology. In the new system, high-tech industrial parks and economic zones, privately-funded retailers, utilities such as water, gas, and heat providers, energy service companies, qualified generation companies, microgrid operators/owners, and others can all take part and fight it out in the future retail market. And the development of micro-grid would satisfy the diverse demands of electricity users in an efficient way.

Secondly, the policies advance the combination between emerging technologies and micro-grid development. According to the Internet Plus Smart Energy Action Plan in 2016, the China Government enhances to establish integrated micro-grid which support renewable energy, interactive energy utilization and distributed energy transaction. It includes making energy infrastructure smart, building a network of multi-energy microgrids and developing big-data services for the energy industry. The Action Plan stays in accordance with the Policy No. 9, and classifies different micro-grid operators and users, which promotes the development of micro-grid.

Thirdly, the policies promote the combination between energy development plan and micro-grid development. According to China’s 13th Five Year Plan On Renewable Energy in 2016, the Chinese Government propel to develop integrated energy system involving wind, solar and other intermittent renewable energy through the pilot projects of integrated energy saving. It is notable in the energy development innovation section that Site-Specific Policy, Integrated Energy System, Technology and Mechanism Innovation would be the proper way to complete the renewable micro-grid technology innovation system and management mechanism. Adhere to China’s 13th Five Year Plan On Energy in 2017, the Chinese Government promotes the integrated micro-grid pilot trials, especially in appropriate areas. The China’s 13th Five Year Plan On Energy indicate the direction of micro-grid development in 13th Five Year.

Fourthly, the policies propel the micro-grid development in practice. According to the Trial Measures For Micro-Grid Development issued by the NDRC (National Development and Reform Commission) and NEA(National Energy Administration), the definition and characteristics of micro-grid are clarified, which laid a solid foundation for micro-grid market development. Regulation of Micro-Grid Connecting into Distribution Network led by China Electric Power Research Institute officially released in 2017, which promotes micro-grid development in a sustainable way.

In summary, the policies related to micro-grid has been increasingly sophisticated. With the release of Trial Measures for Micro-Grid Development and Regulation Of Micro-Grid Connecting Into Distribution Network, the development of micro-grid will be accelerated in the future.

The Analysis of Micro-grid Pilot Trials

With the launching of micro-grid policies, the micro-grid pilot projects have been put into use, which greatly put forward micro-grid development. For instance, 23 pilot projects were issued in The Announcement of First Micro-Grid Projects Pilot Projects in January 2017. 55 Internet Plus Smart Energy projects were issued in The Announcement Of First Internet Plus Smart Energy Pilot Projects in July 2017.

Based on the analysis of the pilot projects, it is shown that most grid-connected micro-grid pilot projects were mainly built in industrial parks. The strong technologies support for the pilot projects from these industrial parks is the main reason. In addition, the micro-grid operators are getting access to grid market with legalized recognized status. Micro-grid Pilot Project with Renewable Resource in Turpan City was authorized the electricity sales license, which was the first micro-grid project with the electricity sales license in China.

The Analysis of Legal Status of Grid-Connected Microgrid

Compared with the traditional type of power grid, as a new type of local power grid, the particularity of technical characteristics of micro-grid determines its special legal positioning.
Micro-grid has the characteristics of integrated operation of source-network-load. Therefore, micro-grid has multiple properties in law:

**Legal Relationship with Internal Users**

For the users in microgrid, the main body of microgrid is the power supply enterprise according to the current electricity Law. Article 25 of *The Electricity Law of China* stipulates that Power supply enterprises shall supply power to the users within their franchised service areas. The division of electricity service areas shall take into account such factors as the structure of power networks and the rationality of power supply. Only one power supply enterprise shall be established in each electricity service area. The establishment or alteration of electricity service areas within the territories of provinces, autonomous regions or municipalities directly under the Central Government shall be applied by power supply enterprises, such application shall be examined by the administrative departments of electric power under the people's governments at the level of provinces, autonomous regions, or municipalities directly under the Central Government in conjunction with relevant departments at the same level, if approved, the said administrative departments of electric power shall issue the Power Supply Business Permits.

*The Implementation Opinions on Promoting the Reform of the Power Sales Side* stipulates that As a power distribution company with the right to operate the distribution network, after the access conditions of the power selling company are met and the admission procedures are fulfilled, the power sales business will be carried out.

*The Measures For Trial Implementation* stipulate that Microgrid has micro characteristics (which mainly reflected in the low voltage level of microgrid, generally in 35 kV and below; the size of system is small, The system capacity (maximum power load) is not more than 20 MW in principle) however, the power supply reliability and power quality of microgrid should meet the requirements of national and industry standards, which is not lower than the power supply service level of similar regional power supply enterprises.

As a result, they shall enjoy the right to collect the electricity charges of users within the microgrid according to law, at the same time they must obtain the power business license (power supply category) within the scope of operation of the microgrid, perform the power supply services, and shall also perform the compulsory contracting obligations, Other basic power supply obligations that the franchisee should undertake, such as emergency repair obligations.

**Legal Relationship with Power Grid Enterprises**

Compared with the grid enterprises, basing on the different functions and characteristics of the microgrid, the microgrid has different legal positioning under different scenarios.

Firstly, Performing the power generation function, the main body of the micro-grid is the power generation enterprises stipulated in the current power law. Article 22 Requests by power production enterprises with the qualifications of an independent legal entity to feed its electricity generated into a power network shall be accepted by the network operation enterprises.

*The Measures For Trial Implementation* stipulate that the micro-grid power supply is given priority to local renewable energy generation, or installations for natural gas and other energy comprehensive utilization for the target type of generating, encourage the new clean technology such as fuel cells. Among them, the installed capacity of renewable energy accounts for more than 50%, or the comprehensive energy utilization efficiency of the natural gas multi-supply system is more than 70%. Therefore, in this case, the main body of the micro-grid is the power generation enterprises, which must comply with the regulations of grid-connected dispatching. At the same time, as an independent power source, compared with other power generation enterprises, and the micro-grid must be clean.

Secondly, when performing power grid functions, the main body of the microgrid is the grid-connected enterprise stipulated in Electricity Law. The Electricity Law stipulates that Article 22 The State advocates parallel operation between power production enterprises and power networks or among networks. Requests by power production enterprises with the qualifications of an independent legal entity to feed its electricity generated into a power network shall be accepted
by the network operation enterprises. Parallel operation must be consisting with the standards of the State or the power industry. The two parties in parallel operation shall sign the parallel operation agreements and stipulate the rights and obligations of each in accordance with the principles of unified dispatch, hierarchical management, equality and mutual benefits, and reaching unanimity through consultation;

The Measures for Trial Implementation stipulate that the government explicitly encourages microgrids to participate in ancillary services transactions as independent auxiliary service providers, enriches the regulatory measures of large power grids, and helps to improve the safe operation of power grids in the context of large-scale distributed renewable energy integration.

For the paid auxiliary service, the microgrid is encouraged to participate in the auxiliary service transaction as an independent auxiliary service provider, and to explore the establishment of a service compensation mechanism such as interruptible load peaking, electricity storage peak shaving and black start that the microgrid can participate as the market entity.

Among them, “the micro-grid integrated into the grid can be regarded as an interruptible system,” which means that the market of the micro-grid as an auxiliary service participating in the peak load reduction of the load can be interrupted, and it will be a paid act.

For the power grid enterprises connected with the micro grid, the micro grid is equivalent to a power grid enterprise. Compared with distributed power supply, micro-grid has the characteristics of autonomy and friendliness.

As a grid-connected entity, the main body of the microgrid operation shall sign a grid-tied scheduling agreement with the grid enterprise, abide by the rules and procedures for operation and management of the dispatching management, and the grid-connected operation and power exchange shall be subject to unified scheduling by the power dispatching agency and report necessary operational information to the power dispatching agency. Through the unified dispatch management of the microgrid, not only the grid-connected impact of distributed renewable energy can be reduced, but also effective active support and reactive support can be provided for the large grid.

Thirdly, micro-grid operators are legally authorized grid users in the context of receiving power in Electricity Law. According to 25th article in Electricity Law, grid suppliers should support power in authorized areas. The Measures for Trial Implementation stipulates grid network enterprises should sign contracts with micro-grid operators which clarify the obligations and rights. The micro-grid operators should properly handle micro-grid assets when they terminate the micro-grid projects. If there were no other subjects, grid network enterprises should be obligated to supply power. Adhere to The Announcement of Micro-Grid Demonstration Projects, the operators of micro-grid with renewable resource projects are obligated to supply power to micro-grid users. And as the user of grid network, micro-grid operators should be supplies power by grid network enterprises.

In conclusion, micro-grid operators are legally authorized grid users in Electricity Law. Micro-grid operators are obligated to pay the electricity bill and grid suppliers are obligated to supply power. The micro-grid operators should properly handle micro-grid assets when they terminate the micro-grid projects. And the grid network enterprises should be obligated to supply micro-grid operators the power.

Summary

Nowadays, the legal status of micro-grid as an independent market subject is being clarified in combination with the development.

Based on the characteristics of micro-grid and the different roles of micro-grid in different situations, the particularity of its legal status is gradually highlighted. Therefore, the main part of the micro-grid is the power supply enterprise stipulated in the current power law to users. For grid enterprises, under the conditions of power generation, power grid and power supply acceptance, the main body of micro-grid is power generation enterprises, grid-connected enterprises and power users as stipulated in the current power law. It is urgent to clarify its rights and obligations, further
confirmation and regulation through the law in future. It will be more conducive to the construction and development of micro-grid enterprises.

References


