

Dispersed Production Sources and its Effectson Distribution Network

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ABSTRACT

Incorporated in electrical systems, electrical energy in the form of large central power stations by takes place. In the early years of the emergence of continuous systems, usually with annual growth of about 6 to 7 percent in electric energy consumption was met. In the 1970's oil crisis issues, such as environmental issues and new problems for the electrical industry expressed, in such a way that in the 1980s the invoices and the economic changes, resulting in a reduction of approximately 1.6 times growth to 3 percent per year, respectively. At the same time the cost of transmission and distribution of electric energy as well as to increased significantly. Therefore, the production of large central power stations by, often due to the cost increase slowdown time, transmission and distribution, getting acute environmental issues and technological changes and different legislation were impractical. In this article, we try to study the general definition has been scattered resources will be carried out in different countries, then the evaluation of the benefits and disadvantages of them.

Keywords: Network, Turbines, Voltage, Production.

Introduction

The major works have been observed during installation and operation of parallel manufacturing resources scattered in distribution network, especially in cases where the capacity of these resources as compared to the capacity of the network that are connected to these sources in the article effects of these resources on a distributed network has been reviewed is notable, are as follows:

Voltage profile along the network, depending on the load units and production levels can be used in the network is undergoing a series of changes. This issue, particularly in the direction of radial, more feeders to the eye eats.

Network losses as a function of production and consumption have to be changed.

Short circuit levels on the network increases.

When connecting or separating dispersed production sources of the network, one conductor and transient flows in the network appear.

The quality and reliability of the system can be challenged.

Coordination and system structure of network security can be challenged.

Transient stability and dynamic network may have to be changed.

The production of energy is not a new term scattered. The start of the days when their need for human handling, to a variety of energy needs, the production is sporadic, because this is the place to stay near the energy consumption is produced. Dispersed production locally is used. Given that these are close to centers of consumption products, there is no need to transfer electrical energy output in the long haul there. The more the consumer is closer to the manufacturer; the electrical energy supply costs also will be reduced. The topics and issues have caused sporadic production as an appropriate choice for production and consumption demand is raised to increase accountability. Research carried out by research centers such as EPRI results represent an advantage over electrical energy production by production in the year 2010. As well as this figure to 30%, according to NGF research also has been announced. In the United States and Europe produce scattered to possible technical and financial solutions for consumers and producers and become a power supplier's credibility and reliability

improvement is waived. In most countries, about 10% of the installed capacity of the DG production makes up, but in countries such as the Netherlands and Denmark this procedure more than 30 to 40 per cent of the installed capacity is included. In some countries such as Australia, about 78percent of the country's electricity produced by the system on the basis of the new energy is. In developing countries a significant population does not have access to electrical energy. Taking advantage of the production is usually sparse for a rapid increase in the quality of life it provides people. In the developing countries and increase the cost of development or villages, distribution and transmission lines, according to the times, the dispersion is very high. One of the obvious examples of utilization of production in developing countries, South Africa. Approximately 20% of the rural population of South Africa hope to have access to the power grid has up to 20 next year. The South African Government the importance of production scattered and electrification plan to 2000t he clinic and school 16800 enjoying sporadic production technology approved. Different definitions used to disperse production, but a comprehensive definition, and without limitation, it is simply "the source of electrical energy distribution network or directly to the consumer can be connected." the nominal amounts of these products vary, but usually their production capacity from a few kW up to 10 MW. These units in posts and on distribution feeders, near fall again. Explain the different countries have offered scattered production, based on the IEEE article is expressed in table 1.

Table 1: definitions of scattered resources in various countries of the world

Countries	definitions
Australia	Production is up to 132 kV distribution network will be connected and able to feed directly into the buyer's time.
France	Connected to the distribution network with more direct feeding voltage levels that loads 4, 15 and 20 kV can be connected.
Denmark	Regional dispatch centers, the production time does not affect.
Czech Republic	The industrial distribution network can be connected to 110 kV.
Finland	The voltages produced 0.4 kV to 20 kV can be connected.
Italy	The top of the network manufacturing, which is 0.4 kV up to 150 kV can be connected.
Portugal	Renewable energy sources and produce at the same time that each level be connected voltage and the rated output power are less than 10 MW.
Germany	There is no specific definition but usually to Sun, wind and small hydroelectric energy is said to be the level of voltage up to 20 kV are connected.
England	Production is up to 132 kV distribution network will be connected and may be in the form of a centralized operation.
USA	Small producers be sources (from a few kW up to 50MW) that to distributed network on behalf of the power company or the consumer can be connected.

Dispersed production units, IEA Institute are taking place or within the distribution network be directly injected to the local distribution network of the DG to introduce them. It should be noted the following definition for CIGRE scattered production resources is provided:

1. Central is not planning (planning is not focused).
2. Central is not transferred (operation is not focused).
3. It is usually connected to the distribution network.
4. Smaller than 50 up to 100 MW, respectively. But this stuff makes ignoring the benefits of this kind are not productive. As table 2 shows, the use of this type of generator is on the rise in the world.

Dispersed production delivery area

The definition of production scattered according to the delivery area is not possible. Despite the importance of the discussion

of the production routing resource location be scattered in distribution networks, but more as a region have been used. Generally, production resources scattered in distribution networks and can be installed in close proximity to consumers. It is clear that with regard to the power distribution network load, in these networks, scattered production units with a capacity of producing tailored to these networks are handled.

Dispersed production units can range

According to the definition of production scattered network of EPRI low production values up to fall below the kW50. But today, scattered production resources, the capacity of a few kW up to several MW can be included. In table 3 Division of the productive capacity of the production units spread based on them is offered.

Table 2. Share of electricity generation in the world of the DG

Year	2000	2004	2008
The installed capacity of power plants and in the world (GW)	3266	3555	3872
Garlic Boosts energy in the world (GW)	11	114	119
Garlic Boosts production of dispersed (GW)	11.2	24	44
Dispersed production share	10%	21%	37%

Table 3. Classification based on scattered production capacity

Be productive	Generators, scattered production type
1W-5KW	Micro
5KW-5MW	Small
5MW-50MW	Medium
50MW-300MW	Great

Dispersed production technology

Generators produce a variety of types are scattered. Dispersed production units can be common to diesel combustion turbines, generators, micro turbines, storage Builder energy, wind turbines, fuel cells and heat the Earth, energy and photovoltaic cells are noted. Of course, any kind of production technology and applied for specific local spread can be used. As an example of wind energy in areas that are windy, we used.

This technology can be divided into three general categories can be:

1. The fossil fuel-based generators work. This category includes combustion turbines, diesel generators and micro turbines can be.

2. The generators using renewable energy work. This category also includes wind turbines,

solar cells, geothermal energy, wave generators are.

3. The technology that are based on energy storage.

This category also includes batteries, save enormous energy-conducting magnetic instruments (SCMES), capacitors, save energy with air compression instruments (CAES), fuel cells and hydro pump is. In table 4 are scattered various types of production technology along with a range of production capacity has been created they can be.

The benefits of distributed generation resources

Many benefits to disperse production sources expressed that including it would be used to reduce energy costs and demand, transmission and distribution network to reduce losses, increase the reliability of the emergency power supply and includes a successor, reducing the revolving

and non-revolving reserve supply, increase job opportunities and considerable loads courier cut, reducing or eliminating the need for the development of the transmission network and distribution and supply of power, reactive power, improve the quality of simultaneous production of electricity and heat capability, original power supply sources, dispersion Reducing pollutants, reduce the density of the lines, the faster the response time and

improve load factor (CP) power company, as well as by increasing the reliability of the sources of energy to stop services where economically not acceptable especially for places that power outage safety issue and the work endangers health and more satisfaction when the occurrence of unexpected events to provide buyers and makes to the buyer, the other choice to satisfy all requirements Have your own energy.

Table 4. Some scattered production technologies and available capacity

Dispersed production technology	Available capacity
Gas turbine combined cycle	35-400MW
Internal-combustion engines	5kW-10MW
Combustion turbines	1-25MW
Micro turbines	35kW-1MW
Small hydro	1-100MW
Micro hydro	25kW-1MW
Wind turbine	200W-3MW
Photovoltaic array	20W-100kW
Solar thermal (Central receiving)	1-10MW
Solar thermal (red system)	10-80MW
Biomass	100kW-20MW
Fuel cell (Prosaic)	200kW-2MW
Fuel cell (Molten Carbonate)	250kW-2MW
Fuel cell (Proton Exchange)	1kW-250kW
Fuel cell (Solid Oxide)	250kW-5MW
Geothermal (geothermal)	5-100MW
The energy waves	100kW-1MW
Sterling engines	2-10 kW
Storage battery	500kW-5MW

On the other hand the company also delayed investment in falling in the distribution and transmission and reduce its losses are compensated with a density of reactive power transmission and production and preparation and commissioning of the network easier to benefit from the benefits produced are scattered. Scattered resources as small scale production unit's that supply the package once the region does have been

known. A wide variety of types of production technology, there are scattered as renewable energy such as wind turbines, photovoltaic panels (PV), micro turbines, fuel cells and battery power saver devices such as various types of scattered production resources can be named. Each distribution company or a consumer can exploit the fragmented production resources investment. Due to the availability of production resources and

flexibility, dispersed as a source of energy used at the level of voltage and the distribution network energy has withdrawn as soon as the consumer. In General, the use of the plant with the production of the following advantages in power grids are the:

- 1- Cut costs related to the power equipment
- 2- Reduce the power transmission losses
- 3- Ease the possibility of recycling the heat power plants
- 4- Installation and operation time short of power plants
- 5- Realization of privatization of big investors to become true with the small investors
- 5- Reduce the environmental pollution and great power audio
- 6- Reduce losses with optimal placement location of production plants scattered in distribution networks
- 7- Release capacity of transmission and distribution system, including lines and posts
- 8- The use of some renewable resources dispersed production sources
- 9- The possibility of a separate application or connected to the network

Disadvantages

of dispersed production sources The use of scattered production has also disadvantages that including them can be pointed to the following two cases:

- 1- Become a complex network and the necessity of the development of network protection
- 2- The complex operation and network controller

Despite all the benefits of DG should pay special attention to possible negative effects it could have on

the distribution network that maybe most of these effects, issues related to the coordination of protection and the level of the voltage. It also will become complex network resulting in the development of network protection system and also the operation and control of the network also makes trouble. Connect DG network creates harmonics in the network and reduce the short circuit impedance. Furthermore, if connected to a network, DG shutdown for an island work can be dangerous for workers network [xiii]

Conclusion

As mentioned in this article in recent decades, restructuring of the power industry as well as the privatization of this industry and is applied in some countries. During this time for the sake of raising operation efficiency and encourage investors, the power industry has undergone fundamental changes in terms of management and ownership has been, so for creating appropriate competitive space, its various departments including production, transmission and distribution have been independent from each other. On restructuring the power industry environment, market actors to convince to invest several billion-dollar projects in the industrial and power transmission is not easy. These changes and developments on the one hand, and as previously mentioned was also the factors such as environmental pollution, problems with the construction of new transmission lines and economic progress in the field of technology to build small-scale productive units, compared with the large industrial units on the other hand increases the use of small production units under the title production dispersed (DG) which is mainly connected to the

distribution network and do not need to do is transfer lines. But these sources are, in turn, with the risk that it's most important clique wielding power on when power cut which must be taken in mind and the way the work to be presented to it.

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