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"QUANTIFIED ANALYSIS METHOD FOR OPERATIONAL FLEXIBILITY IN POWER SYSTEMS"

Sanjiv Kumar[1], Dhiraj Gupta[2], Dilip Kumar[3]

[1]P.G Student, Department of Electrical Engineering, A.N.A. College of Engineering & Management, Bareilly, AKTU, U.P India
[2]Assistant Prof., Department of Electronic and Communication Engineering, A.N.A. A.N.A. College of Engineering & Management, Bareilly, AKTU, U.P India
[3]Assistant Prof., Department of Mechanical Engineering, KIT Kanpur AKTU, U.P India

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Abstract - The power distribution systems are those systems in the state, power transmitted from the passive to active networks. The rising penetration from the Distributions generator (DGs) this is a technical challenger, of the Activation Networks is the maintain Resaving voltage level. There are conventional power distribution active network are made by the assumptions of one directional power flow in the active power level balance in the each bus, Active power level balance in the each bus, schedule voltage at all common Generator, scheduled Rejection factor at all the active distribution Networks (ADNs), A planning development model for active distribution network (ANDs), planning is the proposed considering the planning the planning goals, the Mechanical model Technical and Economical Contributions. The power in balance and the voltage deviation are even more severe by the high sheared Distribution Generator (DG) integration the indexes of flexibility from magnitude, frequency and the intensity dimensions are founded in (ADNs) operation. The temporal regulations of power flow various controllable electronic devices, such as soft open points (SOPs) and the power storage system (ESS) and improve the index of the systems are flexibility and under the unified and analytical work the potential benefits of the system controllability are fully utilized to provide effective.

Key Words: Distribution Networks (ADNs), Economical Contributions, Operational flexibility, power storage system, Distributions energy resource (DER)

1. INTRODUCTION

There are conventional power distribution active network are those made by the Assumptions of the one directional power flow active power level in the each bus, scheduled voltage at all common generator bus, scheduled Rejection factors at all the active distribution network (ADNs).To achieve more factor in the research work in the project work Economics, may competitive Sustainable, economics entities and the increase the renewable energy sources (RES) in their generation of the maximum the first all of substitution of distribution of dispatch able generation it is the capacity with (RES) has imposed the considerable challengers on the planning and the operation of the power systems cause the substantial in the power generation load balance and the effective utilization of the renewable energy source.

These challengers of these technical problems effectiveness is an emerging the research area concerning the power system in the flexibility is the required and the attached much research work in the uncertainty and the renewable energy resource in the present, different properties of the power system in the characterizations and the various time scales this paper aims to propose a method to quantify the into hour flexibility.

The analysis Perouse in the distribution Network with the various distributions energy resource (DER) into the consideration together with load growth and the increased consumers expending have a significantly changed the existing distribution networks. The work flexibility in the active distribution network (ADNs), of power control switched ability of (AND) has been significantly and the improvement by the used of power stored and energy electronic devices which as the Technical problem in the coordination of the various controllable resources and the power source and energy source controllability con not be full Transforms into the system flexibility in the Research work an analytical work for Economical Contributions of the active distribution network (ADNs) is the proposed by the quantifier the node flexibility.

1.1. Active Distribution Networks (ADNs)

Active distribution network (ADNs) are those distribution network, is used and advantage of information and communication Electrical and Electronic technologies to work proactively the access to the large-scale distributed energy distribution network,

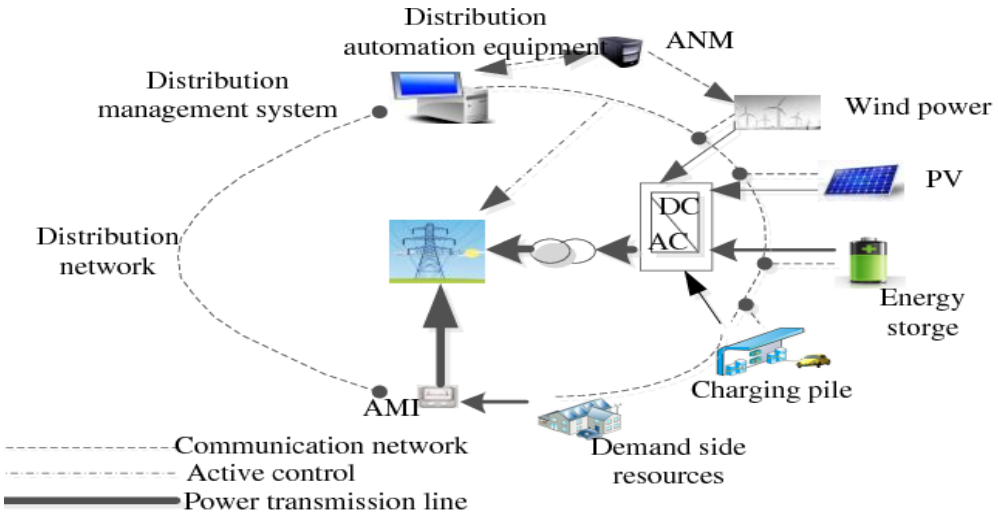

Figure: 1. Active Distribution Network

, It can coordinate intermittent renewable energy and energy storage devices and other distributed energy units to achieve safety and transportation systems that receive inventories of goods and then deliver them to customers. Place to control the power Generations systems in power a combination of distributed energy source (generators, loads and storage)."

1.2: Operation flexibility

Operational flexibility is most important device property of electric power generation systems and essential for mitigating disturbances in a power system such as outages or forecast deviations of either power in-feed, that is from wind turbines or Photovoltaic (PV) units, or power out-feed, i.e. load demand.

The balancing supply and availability of sufficient operational flexibility is Transmission of power resource necessary prerequisite for the effective grid integration of large shares of fluctuating power in-feed from variable RES.

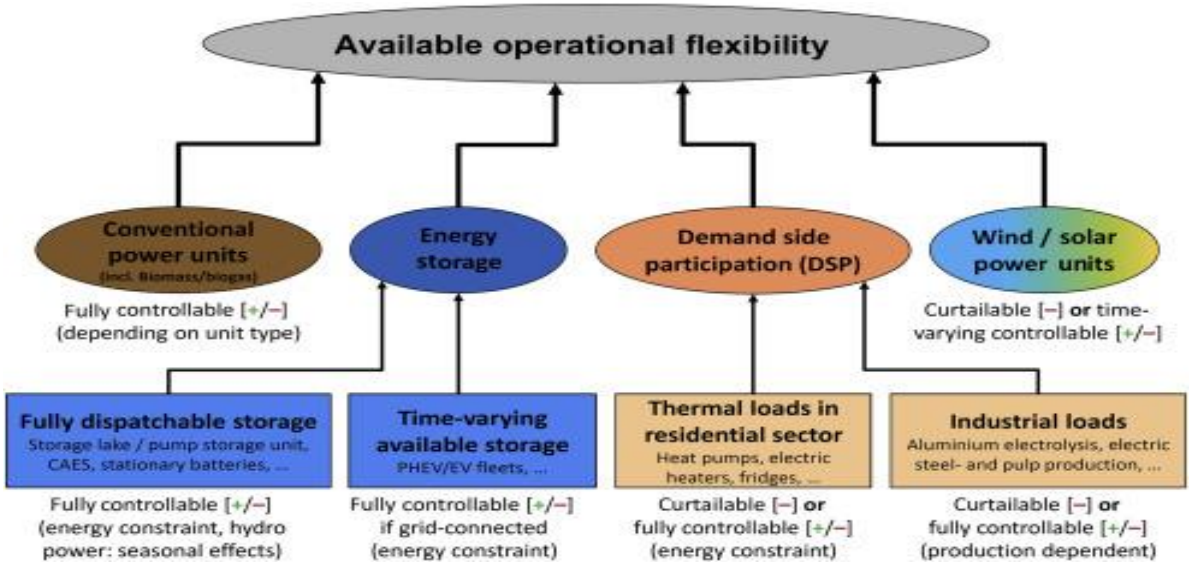

Figure: 2. Operation of Flexibility in Electric power Transmission system

The balancing supply and availability of sufficient operational flexibility is Transmission of power resource necessary prerequisite for the effective grid integration of large shares of fluctuating power in-feed from variable RES.

1.4. Power Storage System

Electricity cannot itself be stored on any scale, but it can be converted into other forms of energy it is can be stored and later reconverted to electricity on the demand Storage systems for electricity include battery, flywheel, compressed air, and pumped hydro storage. Electric Energy Storage system (EESSs) plays three main roles—lowering the electricity supply costs by storing energy at off-peak rates, improve reliability at times of unexpected failures or disasters, and maintain and improve power quality (frequency and voltage).

Power storage system (PSS) are three types of Applications (A) Transportation Application –Batteries, Flywheel, Ultra capacitor (B) Emergency Application- Batteries, Compressed air in vessels, flywheel, Hybrid Systems,

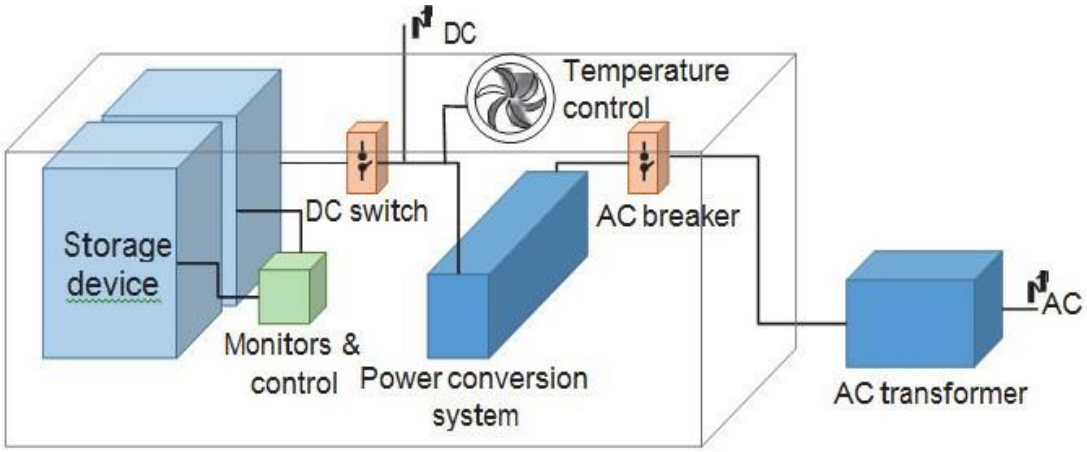

Figure: 3. Electric power Storage System

Thermal energy storage, ultra capacitor (C) Large Scale Application- Batteries energy storage systems (BESS), Compressed air energy storage (CAES), Flywheel energy storage systems (FESS), Pumped Hydroelectric, Superconducting magnetic energy storage (SMES), Ultra Capacitor.

1.5. Distributions Energy Resource (DER)

The Distributed generation of an energy, it is also distributed energy, one site generation or district and decentralized energy, an electrical energy generation and storage in by the variety of small, grid-connected to the transmission distribution system-connected devices referred to as the distribution energy resources.

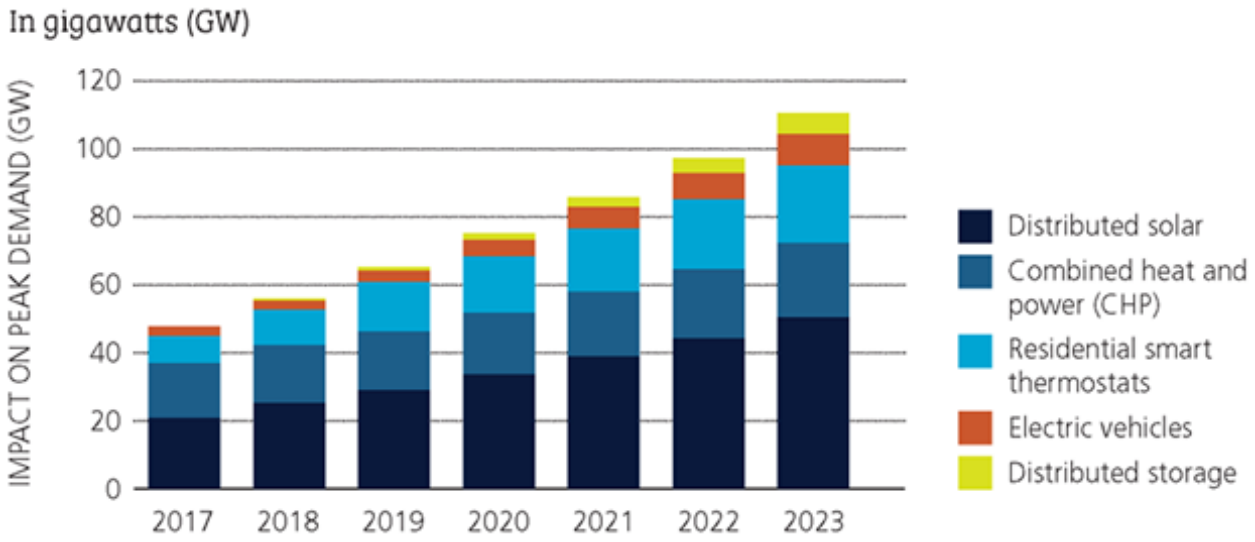

Figure: 4. Distributions Energy Resource

2. RESULTS AND DISCUSSION

The result and discussion in the Research paper in all values in practically analysis Active distribution network (ADNs), Operation Flexibility in the transmission systems, and the Power storage Systems, and Distribution Energy Recourse

2.1: Active Distribution Networks (ADNs)

Table.1: Distribution Transmission Parameters and values is optioned

Sr	250 - 310	KWA
Po	200 - 575	Watt
Pc	3000 - 3815	Watt
Us	3 – 8%	%

2.2: Operation flexibility In Energy Transmission Systems

According to the hub of an International Energy Agency, the flexibility of a power system refers to "the extent to which a electric Transmission power system can modify electricity production or consumption in response to variability, expected or otherwise".

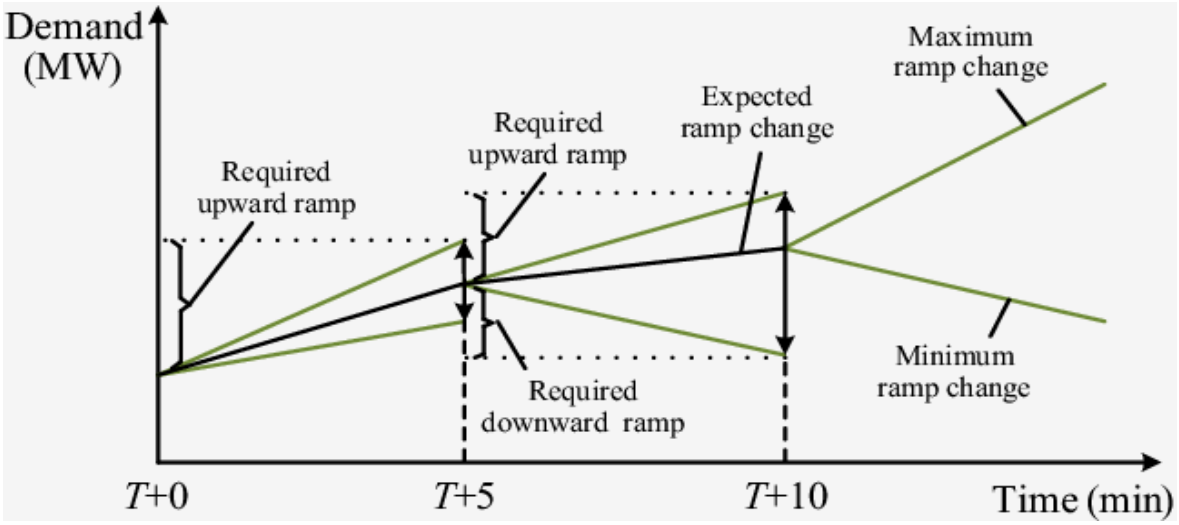

Figure: 4. Operation flexibility In Energy Transmission Systems

Flexibility services are where a Distribution Network Operator (DNO), in the graph between demands of power is increase and time is also increase like us, pays a third party to operate assets in a way that's beneficial to our network.

2.3: Distributions Energy Resource (DER)

The Electric Distributed energy resources are small, and medium electric energy transmission line and dependence on the country energy marketing modular, energy generation and storage technologies that provide electric capacity or energy where you need it. DER systems may be defending the transmission of power system in the Indian either connected to the local electric power grid or isolated from the grid in stand-alone applications.

The distribution of energy in the Application of transmission line wire and closed cable and open cable Closed cable is efficiency is very high (90 – 95%) transfer of electric energy in the villages, industries, and medium level of plants in application.

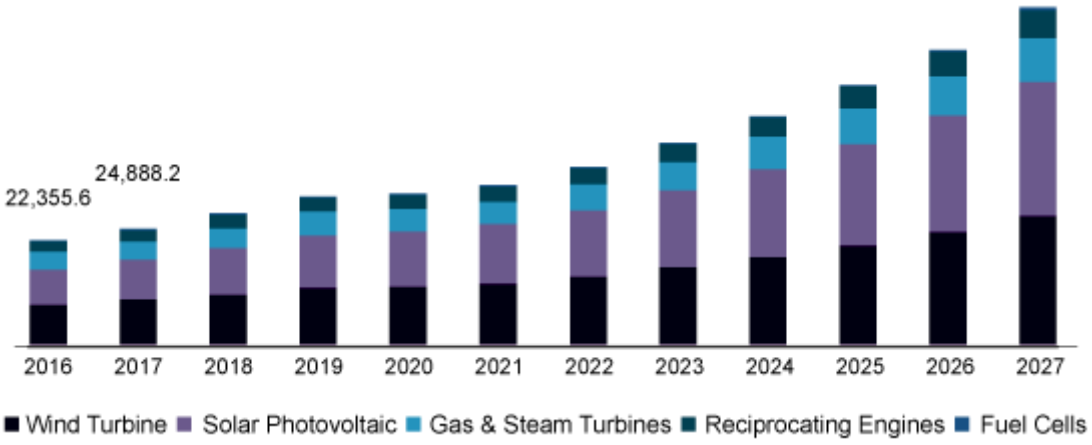

Figure: 5. Distributions Energy Resource (DER)

2.4: Power Storage Systems (PSS)

These are energy storage mechanical devices fuel cells in specific energy is storage time is (5 to 2.5 hr), storage batteries in energy (15 to

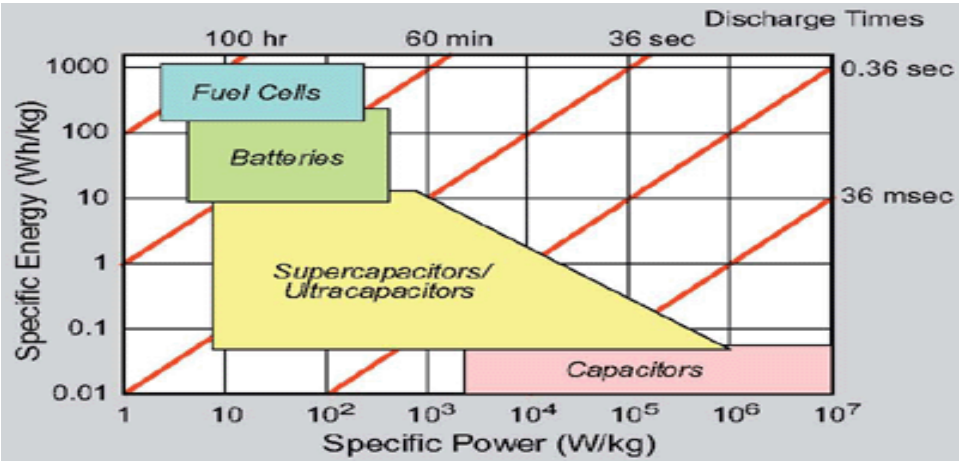

Figure: 4. Energy Storage System (ESS)

Table.2: Power Storage Systems

Techniques	Power	Efficiency
Super Capacitors	0.8MW - 1 MW	85 – 95%
Flywheel	4KW – 92MW	80 – 96%
Pumped Hydro	100MW- 2GW	70 – 80%
SMES	165KW -100MW	80 -94%

3. CONCLUSION:

This is the analytical research and compressions of the Quantified Analysis method for operational Flexibility in the electric power systems is used in transportations electric vehicles and industrial, and factories plants and other sectors. It is the main Applications of Health Sectors, Medical industries and colleges and Education sectors, small industries workshops in applications in the village's areas.

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BIOGRAPHIES

SANJIV KUMAR P.G Student, Department of Electrical Engineering, A.N.A. College of Engineering & Management, Bareilly, AKTU, U.P India

DILIP KUMAR Assistant Prof., Department of Mechanical Engineering, KIT Kanpur AKTU, U.P India