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A Comparative Analysis of More Stable Sssc To Connected Both Side Motor Load

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Abstract **- The concept of reactive power compensation technologies. By means of reactive power compensation techniques, reactive power is controlled in such a way that the performance of electric power system gets improved. This is gives the brief idea about the principles of operation, design characteristics of various types of compensators etc. These compensation techniques are used to change the performance of AC transmission & distribution systems as per the need. The compensators enhance the stability of the AC system by increasing the maximum active power that can be transmitted. By managing the line reactive power, the working of overall electric power system can be enhanced. In the case study, after implementing series and shunt compensation techniques in the system, results are shown for comparison. This can be achieved by FACTS controllers. Static Synchronous Series Compensator (SSSC) is a series connected FACTS controller, which is capable of providing reactive power compensation to a power system. The output of an SSSC is series injected voltage, which leads or lags line current by 90°, thus emulating a controllable inductive or capacitive reactance. SSSC can be used to reduce the equivalent line impedance and enhance the active power transfer capability of the line. In this series compensation provided by an SSSC is considered.**

Keywords- **AC transmission, Compensation, FACTS, Reactive Power, SSSC.**

I. INTRODUCTION

Now a day, nothing is possible without electricity. Without electricity modern society would cease to function. As the volume of Power transmitted and distributed increases, so do the requirements for a high quality and reliable supply. Thus, reactive power control and voltage control in an electrical power system is important for proper operation for electrical power equipment to prevent damage such as overheating of generators and motors , to reduce transmission losses and to maintain the ability of the system to withstand and prevent voltage collapse. As the power transfer growth, the power system becomes increasingly more complex to operate and the system become less secure. It may lead to large power with inadequate control, excessive reactive power in various parts of the system and large dynamic swings between different parts of the system thus the full potential of transmission interconnections cannot be utilized. In power transmission, reactive power plays an important role work while reactive power supports the voltage that must be controlled for system reliability.

II.NEED OF REACTIVE POWER

- Active power is the energy supplied to run a motor, heat a home, or illuminate an electric light bulb. Reactive power provides the important function of regulating voltage.
- If voltage on the system is not high enough, active power cannot be supplied.
- Reactive power is used to provide the voltage levels necessary for active power to do useful work.
- Reactive power is essential to move active power through the transmission and distribution system to the customer .Reactive power is required to maintain the voltage to deliver active power (watts) through transmission lines.
- Motor loads and other loads require reactive power to convert the flow of electrons into useful work. f) When there is not enough reactive power, the voltage sags down and it is not possible to push the power demanded by loads through the lines.

III.REACTIVE POWER LIMITATIONS

- Reactive power does not travel very far.
- Usually necessary to produce it close to the location where it is needed.
- A supplier/source close to the location of the need is in a much better position to provide reactive power versus one that is located far from the location of the need.
- Reactive power supplies are closely tied to the ability to deliver real or active power.

IV. LITERATURE REVIEW

Related Work

1.Bhim Singh, A. Adya,A.P. Mittal and J.R.P Gupta

This paper [1] manages model of battery energy worked system for a 42.5kVA DG set utilizing Simulink and Power System Square set in MATLAB environment. Battery energy storage System (BESS) is utilized for pay alongside a little synchronous generator of 42.5kVA limit coupled to a diesel motor as a prime mover. The DG set sustains a wide mixed bag of loads. The system execution is reproduced for straight, non-direct adjusted and lopsided loads. Simulation results justify upgraded power quality of the system with BESS application.

2.Bhim Singh, Jitendra Solanki, and Ambrish Chandra

This paper [2] presents the operation of battery energy storage system (BESS) with diesel generator (DG) set. The DG's execution set is watched best when worked at full load or close full load (upto 70-80% burden) condition. For this reason a BESS is utilized which guarantees the load on the generator stays in the middle of 80% to 100% of full load. Under light load condition (stack under 80%) the battery is being charged and in substantial load condition (stack more than 100%) energy from battery is additionally used to nourish additional energy to the load. Alongside load administration, BESS gives the reactive power, consonant and unequal load current remuneration.

The control of BESS is accomplished utilizing slightest mean square (LMS) based Adaline. The Adaline is utilized to separate the parity positive succession genuine principal recurrence segment of burden current. The exchanging of voltage source converter (VSC) forcing so as to function as BESS is accomplished source streams to take after reference ebbs and flows utilizing hysteresis based PWM control. The plan is recreated under MATLAB environment utilizing SIMULINK and PSB square sets. The demonstrating is performed for 3-stage 4-wire star associated synchronous generator, alongside the 4-leg VSC acting as BESS. The outcomes confirm the viability of the Adaline based control of BESS to meet load compensation and ideal operation of DG set.

3.Bhim Singh, JitendraSolankil, Ambrish Chandra, Kamal-A1-Haddad

This paper [3] presents the control of battery energy storage system (BESS) with diesel generator (DG) set. The DG's execution set is watched best when worked at full load or close full load (up to 80-100% load) condition. For this reason a BESS is utilized which guarantees the load on the generator stays in the middle of 80% to 100% of full load. Under light load condition (stack under 80%) the battery is being charged and in substantial burden condition (stack more than 100%) energy from battery is used to bolster additional energy to the load and when burden is in the middle of 80 to 100% battery stay in skimming condition. Alongside burden administration, BESS gives the responsive force, consonant present and lopsided load current remuneration. The control of BESS is accomplished utilizing synchronous reference outline hypothesis (SRF) to remove the parity positive succession genuine essential recurrence segment of load current. The exchanging of voltage source converter (VSC) forcing so as to file in as BESS is accomplished source streams to take after reference ebbs and flows utilizing hysteresis based PWM controller. The complete system is reproduced under MATLAB environment utilizing SIMULINK and PSB piece sets to exhibit the system abilities.

4.Dipesh. M .Patel, Dattesh Y. Joshi, Sameer H. Patel, Hiren S. Parmar

This paper [4] presents SSSC (Dispersion Static Compensator) is utilized for pay of receptive power and unbalance brought on by different burdens in distribution systems. This paper addresses the demonstrating and investigation of custom power controllers, power electronic-based gear went for upgrading the unwavering quality and nature of power streams in low voltage dispersion systems utilizing SSSC. Another PWM-based control plan has been suggested that just obliges voltage estimations and no responsive force estimations are needed. The operation of the proposed control system is exhibited for SSSC. Reproductions and examination are completed in PSCAD with this control strategy for two proposed systems.

5.C. E. Lin, Y. S.Shiao C. L. Huang, P. s. Sung

This paper [5] Battery energy storage system (BESS) consolidates high innovations in battery, converter hardware and continuous PC control, offers high ability for burden administration. It understands a useful strategy for burden administration in power circulation system or interest side burdens. A BESS works in real power supply for load moving: while the BESS can furthermore be stretched out in responsive control for reactive power compensation. Another control method for BESS to work in genuine force mode and reactive power mode is examined. Reproductions for an interest side BESS are exhibited, together with investigations on a working framework set-up in power research facility utilizing constant control usage. It tests the genuine and reactive power control of BESS utilizing a 10 KVA/30 KWHr lab reactive power compensation. There until delineated at the proposed strategy is powerful and simple in this study.

6.N.W. Miller (SM), R.S. Zrebiec (NM), R.W. Delmerico (M), G. Hunt (NM)

This paper [6] portrays the outline and charging of a 5 MVA, 2.5 MWh BESS which is presently in operation at the GNB Battery Reusing Plant in Vemon, California.

The BESS at Vemon gives the obliged power consolidated with both voltage and frequency control to permit the plant to endure detachment from the utility network without agony inadmissible effects on basic loads.

7.K.K. Leung and D. Sutanto

This paper [7] epitomizes late work at the Hong Kong Polytechnic College on the use of energy storage all in all and BESS specifically in four ranges: control of active and reactive power, load leveling, power quality change and force stream controller. The exploration goes for creating novel systems for controlling those dynamic issues and researching the points of interest and constraint of BESS for the applications investigated. This paper will talk about the equipment arrangement and programming innovations presently being utilized to actualize an above's portion targets, specifically, the quick control of dynamic and responsive force interest and era when a Battery energy Storage System is joined with the network. The proposed three-stage multi-reason Battery active and reactive power will give active and reactive power autonomous of the supply voltage with amazing power quality as far as its waveform.

8.VeeraiahKumbha, N. Sumathi

The paper [8] study exhibits the power quality trouble due to installing of wind turbine with the grid. In this projected strategy STATIC COMPENSATOR (SSSC) is attached at a point of common coupling with a battery energy storage system (BESS) to mitigate the power quality issues. The battery energy storage is incorporate to continue the real power source under fluctuating wind power. The SSSC control strategy for the grid affiliated wind energy generation system for power quality betterment is simulated using MATLAB/SIMULINK in power system block set. Finally the projected strategy is applied for some balanced and unbalanced linear non linear loads.

9. M.W. Tsang and D. Sutanto

This paper [9] describes a utilization of an adaptive Artificial Neural Network (ANN) controller to endlessly control the charging and discharging of a Battery Energy Storage System (BESS) to modify the stability of an electric power system. The simulation studies have enclosed a elaborate model of the generator excluding its excitation controller and governor, as well as a comprehensive BESS model, excluding the DC battery model and the switch operation connected with the power converter. An on-line training Artificial Neural Network controller is endlessly disciplined to directly control the BESS activity to dampness power system oscillation in different power system operational conditions. Simulation results display that this ANN controller can adaptively acquire and inform its control strategy to modify the scheme stability under various system operational conditions.

10.GhazanfarShahgholian, Mehdi Mahdavian, Afshin Etesami, SepehrMoalem, MasoudJabbari

This paper [10] analyzes the event of the SSSC on little signal power system stability in a single-machine infinite-system (SMIB). Non-linear and linear frameworks of a single machine have been concluded. The SSSC is modeled as the voltage source converter backside a step down transformer by a first order differential equation. Eventually, the function SSSC showed in enlarging transmission capability and improving transient stability is displayed by simulation outcomes and parameters fluctuation on system effect are discussed.

V. CONCLUSION

It has been studied that the static synchronous series compensator (SSSC) is able to control the power flow in the transmission line. It can also inject fast changing voltage in series with the line irrespective of the magnitude and phase of the line current. The SSSC can also damp out the oscillations of the system. This paper present comparison of SSSC with DSSC which gives a idea that distributed nature of DSSC is more beneficial. Several existing results have been discussed for DSSC which leads to the conclusion that application of DSSC system provides more improved sustaining environment for maximum utilization of existing power. Also system stability standards are improved & a more reliable system can be possible. This concept of DSSC with actual implementation to system will bring new era of power . Flexibility of power system will be extended. At present laboratory testing of DSSC & simulations have been carried out & corresponding results have been compared which indicates that its actual implementation in power system should not be delayed India's power sector should take initiative to get benefits of DSSC device by implementing DSSC in actual power system.

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