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DETERMINATION OF ACCEPTABLE LOCATION AND RATING OF FAULT CURRENT LIMITER CIRCUIT WITHIN THE SMART GRID

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Abstract: The broad incorporation of appropriated vitality assets in power matrix causes increment in the estimation of the fault current. Expanded blame current is a genuine inconvenience which must be defeated for fruitful achievement of keen networks. conducting Fault Current Limiter is inventive hardware which can possibly constrain the fault current in the keen lattice. It lessens the estimation of the blame current inside first pinnacle of the blame current. The appropriate place of SFCL in the shrewd framework must be depicted to get the advantage of its consolidation in the keen matrix. In this paper the working of SFCL under ordinary and blame condition has been clarified utilizing matlab reproduction and consequence of recreation is appeared for deciding its proper area in the brilliant matrix 10 MVA wind cultivate is coordinated with the circulation system of the traditional power network and three stage to ground blame is made at three distinct areas in the savvy framework.

I. INTRODUCTION

Now a days, consumption of energy is increasing, idea of exploring renewable energy sources are also growing. Due to our limited energy sources, renewable energy sources are the future energy sources. Significant processes are made over the later years in development and research of the renewable power systems such as sea, wind, solar energy and wave systems. With these resources, the sun power energy can be used nowadays as most reliable, and environmental friendly energy source. Although sun power energy systems can be suffer with high costs and low efficiencies. To control these problems, maximum power can be extracted from PV panel while using the MPPT methods to optimize an efficiency of all the PV system. Photovoltaics offer consumers the ability to generate electricity in a clean, quiet and reliable way. Photovoltaic systems are comprised of photovoltaic cells, devices that convert light energy directly into electricity. Because the source of light is usually the sun, they are often called solar cells. The word photovoltaic comes from “photo,” meaning light, and “voltaic,” which refers to producing electricity. Therefore, the PV process is “producing electricity directly from sunlight.”.The photovoltaic technology can be made attractive option because the features various merits like as low maintenance requirement, environmental friendliness and absence of fuel cost. The efficiency of converting energy from PV generation system may low because sun power cell exhibits to the nonlinear voltage and current and power versus voltage characteristics. These nonlinear characteristics contain weather functions conditions like as panel temperature and solar insolation. This is used to maintain the maximum power point tracking algorithm, efficient operation which can quick response and extract the maximum power from PV arrays in the real time becomes important in PGSs. Photovoltaic (PV) cells are made up of at least 2 semi-conductor layers. One layer containing a positive charge, the other a negative charge. Sunlight consists of little particles of solar energy called photons. As a PV cell is exposed to this sunlight, many of the photons are reflected, pass right through, or absorbed by the solar cell. When enough photons are absorbed by the negative layer of the photovoltaic cell, electrons are freed from the negative semiconductor material. Due to the manufacturing process of the positive layer, these freed electrons naturally migrate to the positive layer creating a voltage differential, similar to a household battery. When the 2 layers are connected to an external load, the electrons flow through the circuit creating electricity. Each individual solar energy cell produces only 1-2 watts. To increase power output, cells are combined in a weather-tight package called a solar module. These modules (from one to several thousand) are then wired up in serial and/or parallel with one another, into what’s called a solar array, to create the desired voltage.

The global energy deficiency has directly foiled the economics, society, development of the nations, and environments through greenhouse gases (GHGs) and by gaining carbon credits. The growing demand of power across the globe is being envisaged and logged to be exponential. Lack of asset with outdated network infrastructure, climate change, rising fuel costs, has resulted inefficient and increasingly unstable electric system. With this, the global concern has raised certain critical points upon which the energy revolution for a green and sustainable future are guaranteed and ensued.

Fossil fuel deadlock:Raising energy demand is knocking pressure on fossil fuel supply and now oil exploration towards “unconventional” oil resources. Switching from fossil fuels to renewable also offers substantial benefits such as independence from world market fossil fuel prices and the creation of millions of new green jobs. It can also provide energy to the two billion people currently without access to energy services. A closer look at the measures required to phase-out oil faster in order to save the Arctic from oil exploration, avoid dangerous deep sea drilling projects and to leave oil shale in the ground are wellthought- out. The changeover from the fossil-driven based energy sources to the renewable energy sources (RES) is being addressed globally according to significant benchmarks. The dynamic characteristics of the RESs and its developing sparingly sustainable means to produce energy with less environmental challenges, is one of its foremost.

Climatic change threat:The threat of climate change, caused by rising global temperatures, is the most significant environmental challenge being encountered by the world since the beginning of the 21st century. It has major implications for the world's social and economic stability, its natural resources and in particular, the way we produce our energy. In order to avoid the most catastrophic impacts of climatic change, the global temperature increase must be kept as far below 2°C as possible. The main greenhouse gas is carbon dioxide (CO2) produced by using fossil fuels for energy and transport. Keeping the global temperature until 2°C is often referred to as a 'safe level' of warming; beyond which unacceptable risks to the world's key natural and human systems might occur. Even with a 1.5°C warming, increase in drought, heat waves and floods, along with other adverse impacts such as increased water stress for up to 1.7 billion people, wildfire frequency and flood risks, are projected in many regions. Partial de- glaciationsof the Greenland ice sheet, and possibly the West Antarctic ice sheet, could even occur from additional warming within a range of 0.8 – 3.8°C above current levels. If rising temperatures are to be kept within acceptable limits then we need to significantly reduce our GHG emissions.

Global negotiation:In 1961 to stimulate economic progress and world trade, a forum of countries committed to democracy and the market economy, providing a platform to compare policy experiences, seek answers to common problems like global warming, and identify good practices and co-ordinate domestic and international policies of its members, like fortification of renewable energy. This lead to the formation of the Organization for Economic Co-operation and Development (OECD), and the member nations are high income economies with a very high Human Development Index (HDI) and are regarded as developed countries. Also, recognizing the global threats of climate change, the signatories to the 1992 UN Framework Convention on Climate Change (UNFCCC) agreed to the Kyoto Protocol in 1997. The Protocol entered into force in early 2005 and its 193 members meet continuously to negotiate further refinement and development of the agreement. In 2009, the UNFCCC were not able to deliver a new climate change agreement towards ambitious and fair emission reductions. At the 2012 Conference, therewas agreement to reach a new agreement by 2015 and to adopt a second commitment period at the end of 2012. The proposed mitigation pledges put forward by governments are likely to allow global warming to at least 2.5 to 5 degrees temperature increase above pre-industrial levels.

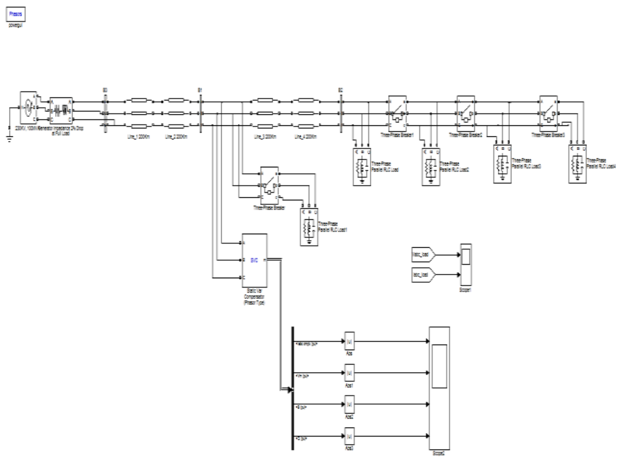
Nuclear issues: To both climate protection and energy security, however their claims are notsupported by data. The most recent Energy Technology Perspectives report published by the International Energy Agency (IEA) includes a Blue Map scenario including a quadrupling of nuclear capacity between current years and 2050. To achieve this, the report says that on average 32 large reactors (1,000 MW each) would have to be built every year from now until 2050. According to the IEA's own scenario, such massive nuclear expansion would cut carbon emissions by less than 5%. More realistic data analysis shows the past development history of nuclear power and the global production capacity make such expansion extremely unviable. With a temperament of its catastrophic aftermath and its indispensable biohazard activities, during the past situations and the future valuations, many reactors has been terminated andslowdown in various expanses across the sphere. Japan's major nuclear accident at Fukushima in March 2011 following a tsunami came 25 years after the devastating explosion in the Chernobyl Nuclear Power Plant, illustrating the inherent risks of nuclear energy. Nuclear energy is simply unsafe, expensive, has continuing waste disposal problems and cannot reduce emissions by a large enough amount. In contrast, renewable energy is also a viable solution for replacing the world's elusive, hazardous and intolerably expensive nuclear energy.

Climate change and security of supply:Access to both supplies and financial stability is now at the top of the energy policy agenda. Rapidly fluctuating oil prices are lined to a combination of many events, however one reason for these price fluctuations is that supplies of all proven resources of fossil fuels are becoming infrequent and more expensive to produce. Some 'non-conventional' resources such as shale oil have become economic, with devastating consequences for the local environment. Uranium, the fuel for nuclear power, is also a finite resource. By contrast, the reserves of renewable energy that are technically accessible globally are large enough to provide more than 40 times more energy than the world currently consumes, forever, according to the latest IPCC Special Report Renewables (SRREN). Cost reductions in just the past two years have changed the economics of renewables fundamentally, especially wind and solar photovoltaic (PV) along with the common features like, emission of little or no GHG andare a virtually inexhaustible fuel. Some technologies are already competitive; the solar and the wind industry have maintained double digit growth rates over 10 years now, leading to faster technology deployment worldwide.

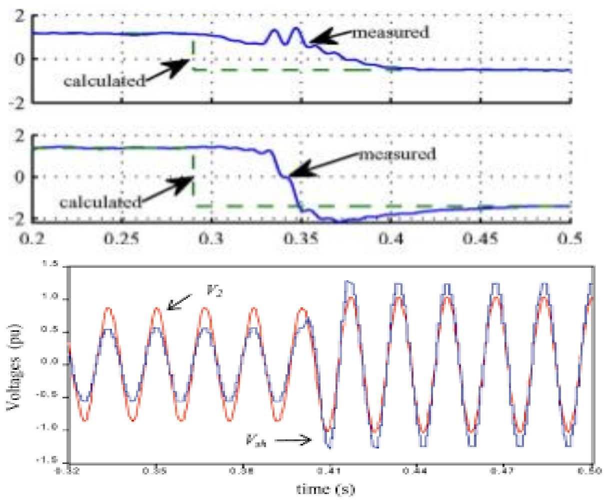
Energy efficiency:The most cost competitive way to reform the energy sector. There is enormous potential for reducing our consumption of energy, while providing the same level of energy services. New business models to implement energy efficiency must be developed and must get more political support. The challenge ahead will require an innovative power system architecture involving both new technologies and new ways of managing the network to ensure a balance between fluctuations in energy demand and supply. The key elements of this new power system architecture are micro grids, smart grids and an efficient large scale super grid, which could play a dynamic role in remodeling the global energy scenario with factors like policies, regulation, and efficiency of market with costs, benefits and services which also normalizes the power and energy market with the reduction of carbon footprints and foot dragging the GHG emissions.

Modelling considered in MATLAB

Displaying OF SMART GRID IN MATLAB Fig. 11 above exhibits the keen network demonstrate made in matlab. The power framework demonstrate comprises of a 100 MVA traditional power age plant, utilizing 3 stage synchronous generator is creating power at 11 kV which is ventured upto 220 kV for transmission reason. The power is at that point transmitted to the getting station utilizing 200 km long line at 33 kV by means of venture down transformer. Presently from the getting station control is transmitted to the substation where the voltage is further advance down to 6.6 kV .For mass load like processing plants and ventures control is provided straightforwardly from the substation. At last for appropriation reason voltage is step down to 400 V. The 10 MVA wind cultivate is associated through transformer with the conveyance matrix and is providing power to the local burdens. The 10 MVA wind cultivate comprises of doubly encouraged acceptance generator driven by wind turbine. Reenacted blame and places of SFCL are demonstrated in the control framework display. Three distinct areas where blame is considered are-



II. RESULTS AND DISCUSSION



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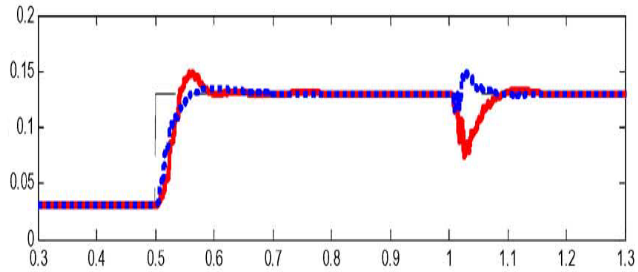

The smart grid will stimulate the development of many industries. Magnetics, as a traditional and still fast-growing branch of science, can significantly contribute to the development of smart grid. The operation mode of smart grid may present many challenges, which may require the use of magnetics related technologies to optimize the design or operation practice. Magnetic-field-based noncontact measurement can revolutionize some of the monitoring practices in the power systems. PM motors and generators can greatly enhance the energy efficiency while current limiters and energy storage systems based on magnetism are important enablers for system reliability and renewable energy.

III. CONCLUSION

A comprehensive study of various configurations of microgrid systems has been carried out. These MGs are classified and presented on the basis of number of energy sources along with their control, selection criteria, performance simulation and experimental validation. The presented simulated performance and its experimental validation on prototypes, verify the applications of MG configurations at desired conditions. These configurations, control algorithms and applications are expected to augment new ideas for extraction of various renewable energy sources and their applications for sustainable development in rural and isolated regions.

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