EPH - International Journal Of Science And Engineering
ISSN (Online): 2454 2016
Volume 07 Issue 04 December 2021

DOI: https://doi.org/10.53555/ephijse.v7i4.184

RENEWABLE ENERGY – SECURITY, SIGNIFICANCE AND NEED OF SMART ENERGY SYSTEM

Survesh Saini[1*]
*[*1]Design Engineer, Electrical Department, Takalkar Power Engineers & Consultants Pvt. Ltd. Address Takalkar Power Engineers & Consultants Pvt. Ltd., Wing-B-424-430, Monalisa Commercial Complex, Manjalpur, Vadodara, Gujarat-390011, India*

Corresponding author:
Email: surveshsaini@gmail.com

Abstract:-

"*Energy Policies can provide far long productive development in developing countries like India and can generate amount of employment in the sector. However, limited policies can mean loss of development of new technologies and untenable growth. Good and prolific energy policies are already in place in India, but for supernumerary energy opportunities, it is required to have continuous expansion and examination of supporting system which will promote growth and lead us to secure imminent energy requirements. Smart energy system is required while integrating various different sectors to utilized 100% renewable energy present in different renewable energy infrastructure.*"

Energy security and sustainable growth

With increase in energy demand and less available resources, energy security has originated on demand. To ensure this, vital parts like stable and secure energy infrastructures are required. Renewable energy, which is capable of increasing Energy security will require careful and systematic development for reliability.

Energy infrastructures are required to account for all available renewable energy and utilize it very carefully and systematically. If environmental and climatic effects are also taken into account, renewable energy would come up competitive and can contribute to energy security in a longrun.

Saving energy is another way which also contributes to our very environmental objectives and also reduces energy cost and losses. Good for Country like India, where individuals and corporate sectors accept such responsibilities. When implementing energy savings, renewable energy and more efficient conversion technologies can have positive economic effects and potentially lead to large earning on exports.

Towards 100% renewables

In Today's scenario, it is impossible to replace all the fossil fuels which currently have already been used. In order to save further burning of fossil fuels, more and more renewable energy has to be introduced into the energy system. Use of biomass will stay controversial due to its high transporting cost. But for future use, it is equally important to save biomass as saving fossil fuels.

There is also emphasis on climate change in recent decades. Excess utilization of fossil fuels has played major part in it by emitting carbondioxide gases due to burning of fossil fuels known as anthropogenic gases along with other hazardous gas. This highlights the standing of using renewable energy. If factors such as health effects are also studied, wide-ranging benefits can be observed.

Although, 100% renewable energy system is technically possible and practically tough but is economically beneficial compared to easily available raw based energy system.

Smart grid and integration of renewable energy

Smart-grid is intelligent, self-healing and efficient system with high end communication and information system, integrated all together. Efficient integration of renewable energy system is possible as system itself can act and plan the flow of electricity or say energy. Smart-grid is the requirement of today as the grid stability is much more dependent on coal based generation

Management Science

supplies. In short, Smart-grid scilicet "Grid for Smart People and Smart Use". While integrating renewable energy to the power grid system, stability and control issues arises when renewable energy generation is in huge quantity as variation in generation always results to variation or fluctuation of mechanical spinning (torque). This has a direct impact on forecast management and planning systems. When safety of the grid operation and operation capabilities are to be to be ensured, it is vital for a system operator to anticipate by foreseeing the next few hours.

Forecasting is required to give appropriate information to the grid managing system in advance. This is done based on historical data, topological features around the area and a continuous day-to-day tracked data. Forecasting methods have been gradually improving day by day over the years. Good forecasting can result to improvement in integration of grid at regional, state and national level. The aim here is, increase of grid's capability, reliability and its stability.

Energy transportation

To utilized all the energy generated from renewable energy, the consumers have to be cognizant about the available alternative energy resources or say fuel. To present it to users, tactics are to be planned to boost the use of alternative fuels and energy and its transport. This task of educationalization won't be easy as the use of alternative energy is itself a non-stop evolving activity.

Use of alternate energy vehicle will be helpful in arriving to this destination to realize or comprehend the full extent of its likely benefits. An awareness cum information center can be putup to help users understand availability and full potential of benefits of using alternative energy and alternative vehicles.

Biomass

Principally in renewables, solar energy was the method to fulfil human being's basic needs. Using biomass-energy was turning out insufficient. Although fuel for biomass was cheap and comparatively free, but what actually governed the economics was the cost of transportation of fuel. This diverted the focus onto hydropower, oil and gas, wind, tidal energy and so on. The search was so intense and strong that nuclear based energy was developed and introduced in to the system. This never changed the fact that best available form of renewable energy we have is still biomass irrespective of the problems related to it such as its development and transportation along with its sustainability due to consuming most of the nutrients / energy present in soil which may contribute to soil erosion in a later date.

Smart energy system - towards the future

Renewable energy's beneficial effects are wideranging and a much intense economic impact may have to be looked upon. This may include development of a domestic industries by developing or creating opportunities for employment in both urban as well as rural areas. This can be achieved when renewable energy is hooked up with traditional source of energy supply.

A cost effective smart energy system has to be presented by means of developing & testing new technologies. Information and communication technologies will play a vital part as grids are not just required to be interconnected but also coordinate in the manner that operation of the grid can proceed by making decision on the basis of data collected and by analyzing the same.

With renewable energy connected with the grid, the increase in prices of energy (electricity in particular) can be controlled. Alternate energy vehicles can directly assist as they will have the liberty of using fuel based on its price and availability. Renewable energy can also generate revenue for farmers in the rural region affected with soil erosion by creating employment opportunities.

Irrespective of various challenges in using renewable energy, a more strategic and organized approach on energy security will be required for managing and productively using all the available types of renewable energy present at all the different places