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A REVIEW OF ISOLATED AND GRID-CONNECTED HYBRID RENEWABLE ENERGY SYSTEM

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ABSTRACT
In this study, we will look at how grid-connected systems have distinct perspectives on optimization, and using the peer-to-peer approach may help us to save money. The SSA method has also been developed for the optimal size of renewable energy. With rising load, optimal sizing of these sources may reduce cumulative MG (micro-grids) expenditures. To achieve a clean, dependable, and cost-effective energy system by combining renewable energy sources in the most efficient way possible. The micro-grid is linked to determining the best size of photovoltaic, wind turbine, and other renewable energy sources. The optimal capacities are determined in the form of a cost ratio based on the optimal capacities. The integration of a PV grid-connected EV charging system and a EUS has been discussed. And the PV is linked to the inverter through a battery super-capacitor hybrid energy storage system, indicating that there may be undesirable variations that can be mitigated by using energy storage devices. This study also discusses the several types of renewable energy systems available, such as hybrid renewable energy systems and integrated renewable energy systems. Based on a micro-grid system, such as a DC micro-grid system, which explains the multiple benefits and environmentally friendly power.

Keywords:*Salp Swarm Algorithm (SSA), Photo-Voltaic (PV), Electric vehicle (EV), Energy Unit System (ESU), mitigated.*

1.Introduction

P2P energy trading is a transaction characterized as direct energy exchange between peer prosumers. Depending on the load increases, an optimal installation & location of a stated sources may decrease the costs of MG. The idea of using renewable energy sources to charge EVs has recently been explored. It is expected to benefit EV customers & electric power utilities because it tackles charging expenses, environmental issues, and grid overburden. Nevertheless, the intermittency of the RE sources causes uncertainties that necessitate complicated scheduling solutions. There are several approaches for optimising PV, WT, and BESS capacity, which we shall briefly examine. The size of the a freestanding PV, WT, and BESS system is provided iteratively based on total yearly cost minimization. The traditional electricity generation business, which lacks storage capacity, relevant and valuable content Energy Storage Systems (ESS). Energy is transported from major power facilities to customers in a one-way system. The main disadvantage of such SPV system is it can supply the load requirement on sunny

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days.Renewable energy sources (RES) considered for this study are photovoltaic (PV), wind, & biomass electrical power using forest wood pellets. This paper suggests an enhancement to the authors' earlier grid-connected solar PV-wind HRES. In order to protect the environment and preserve fossil fuels for coming generations, renewable energy sources such as wind turbines and solar PV are increasingly being used (PV). As part of such a sustainable, reliable, & cost-effective energy system, the appropriate blend between renewable energy resources with DGs should be addressed. It is based on the load profile, energy storage, and meteorological conditions. Obtained from the simulation findings, two SAPS were analyzed with and without load-management.

2. Optimal gird connecter

2.1.Optimal peer-peer Energy

Their cost-sharing method for internal energy transactions is being considered. Incorporating the new optimum P2P solution can help grid-connected prosumers conserve money on their energy expenditures. Unlike many other research, each prosumer's operating and lifespan expenses are calculated separately. So prosumers can properly evaluate P2P. To storage technological expertise, the dual track PV system as well as a ceiling PV system were incorporated in the proposed system that includes residential and business consumers. The study's usage of divergent and also comparable mode forms in both residential and commercial sectors helps P2P inclusion among South African prosumers.

2.2.Optimal sizzing of a gird-connected hybrid renewable energy system

Using Salp Swarm Algorithm to maximise the scale or grid-connected renewable energy systems including pumped storage (SSA). This method examines numerous sources of energy and their permutations to get the best hybrid system configuration. International rules aimed at reducing greenhouse gas emissions & meeting rising demand support increased usage of renewable energy in the electrical grid. The results also show that saltwater hydroelectric power plants can increase the capacity of the electric system to allow for significant RES penetration.

2.3. Optimal sizzing and sitting of smart micro-grid

In this section, the scale and location of renewable energy resources in micro - grids (MGs), which could be the topic of this section, are examined (RERs). AEkbatan residential complex in Tehran, Iran, serves as the pilot case study. Phases 1, 2, as well as 3 of the Ekbatan complex are referred to as "smart micro-grids." Optimal sizing of the these sources may slow it down cumulative MG costs with increasing load, as proven by simulation results of WT/PV/fuel cell/hydrogen storage systems. The specifications and location for Energy storage technologies and PV systems were investigated as demand grew, the original investment of RERs changed,

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and controllable loads responded. Optimal sizing of the these sources may slow it down cumulative MG costs with increasing load, as proven by simulation results of WT/PV/fuel cell/hydrogen storage systems.

2.4. Types of grid-connected micro-grids

Grid-connected PV, WT, and BESS arrays can be optimised using two sophisticated restriction iterative search algorithms presented here. Based on the annual cost of the system, an iterative method is provided for sizing a standalone PV, WT, and BESS system There are two processes involved in determining the optimal capacity. The first stage of the proposed algorithm constructs a search space comprising every conceivable combinations of PV modules and WTs, starting from an appropriate minimum value to a fair maximum value. In the second stage, the optimal BESS capacity for each solution in the provided search space is calculated, and in the final stage, the ideal capacities are determined based on the dependability to cost ratio.

2.5. PV grid-connected electric vehicle charging system

The grid-connected PV charging systems for EVs that used particle swarm to find the optimum PV as well as (ESU) measurements (EV). Energy storage unit (ESU) integration into the PV grid-connected charging system (referred to as PV-ESU grid system) is a potential solution to compensate for the intermittency. There is a lack of evidence on the effects of component sizing on the power system and EV users due to the fact that grid charging of PV and ESUs is a relatively new concept. Predicated on an economic model that incorporates this same grid tariff, EV desire, and even the making purchases rates of electricity from PV as well as ESU, its PSO's task is defined. Calculation of Photovoltaic module and ESU battery packs (Npv and Nbat) can be done for quite a provided number of vehicles by the PSO. When it comes to the design of charging stations, this work serves as a guideline for installers.

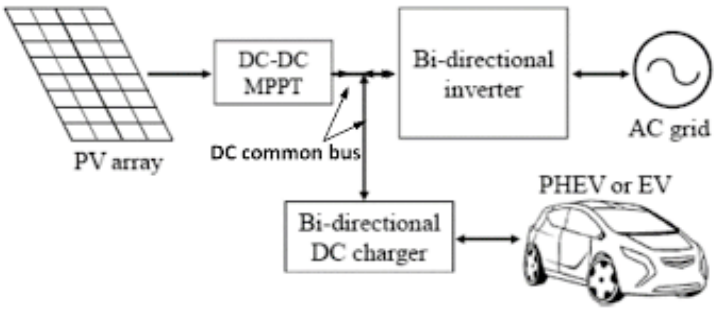

Fig.(2.5) PV gird-connected EV charging system

2.6. Photovoltaic Inverter with Battery-Super capacitor Hybrid Energy Storage

Renewable energy generation is changeable and may contain unconscionable fluctuations, that could be mitigated through using energy storage, an innovative control method and a consolidated structure were indeed suggested to handle this same power sharing among batteries

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and super-capacitors. cost of and their limited lifetime are serious disadvantages. Generation from renewable sources is highly variable and may contain unacceptable fluctuations that can also be alleviated through using energy storage device.

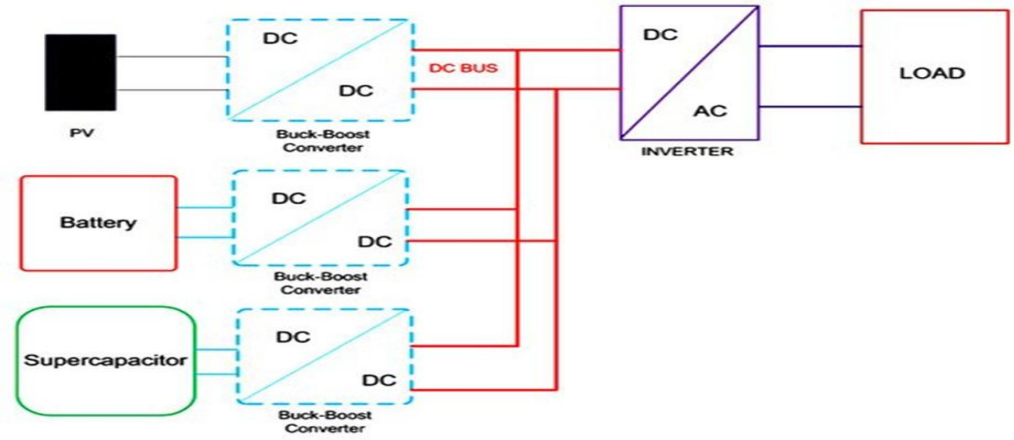

Fig.(2.6): PV Inverter with Battery-super capacitor HES

3. Optimal sizzing different combination

3.1.Optimization of electric vehicles charging station

An application to that same CS deployment problem is presented in this paper. Because of the growing popularity of EVs, this same implementation of charging infrastructure (CS) becomes a key issue in many cities. In addition to this, Evolutionary Algorithms is being used to deal with many different of quality-of-service evaluation criteria (EAs). Sincere optimization is compared to an alternative strategy using four main expert systems (EAs) through Milan. Integration and high-quality solutions are evident from the results.

3.2.Renewable-Energy

Renewable energy sources, including it includes (PV) and also (WT) generators, have inconsistent output. This research suggests and evaluates the effectiveness of hydraulic vessels in the location for electrolytic storing inside the energy storage device using 2 distinct (IOD) models. Irregular renewable energy (RE) supplies are more challenging to integrate and operate in the electric power system because of their high costs and unpredictable nature. It is constraint-based recurrent search algorithms for optimal sizing of a (WT), solar (PV) & (BESS) in such a micro-grid's grid-connected architecture. PV, WT, and BESS line outage prices are also considered. A sufficiently scaled worldwide PV-WT-Hydraulic storage server is required to ensure an uninterrupted and dependable electric grid in this remote area.

3.3. Hybrid renewable energy system

In this section, an approach for reducing the life - cycle costs of an HRES using solar

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photovoltaic, wind, and biomass energy. Hybrid renewable energy (HRES) are a popular way to boost the global development of renewable energy. The proposed methodology is ideal for designing a small-scale system with low biomass resource requirements, making it easily repeatable in various rural settings. Biomass power takes advantages of locally accessible forest wood biomass resources of wood chips to produce electricity when Photovoltaic / wind power generation are insufficient to meet demand. As a way to increase renewable energy deployment, hybrid renewable energy systems (HRES) are becoming increasingly popular. To minimize life-cycle costs, the methodology uses Net Present Value to size systems (NPV). Solar, wind, and biomass power can all be used to produce a low-cost, long lived HRES, according to this study. The results are based on the treatment of data with a precision of one hour both for renewable energy generation and electricity demand patterns, so they are reliable.

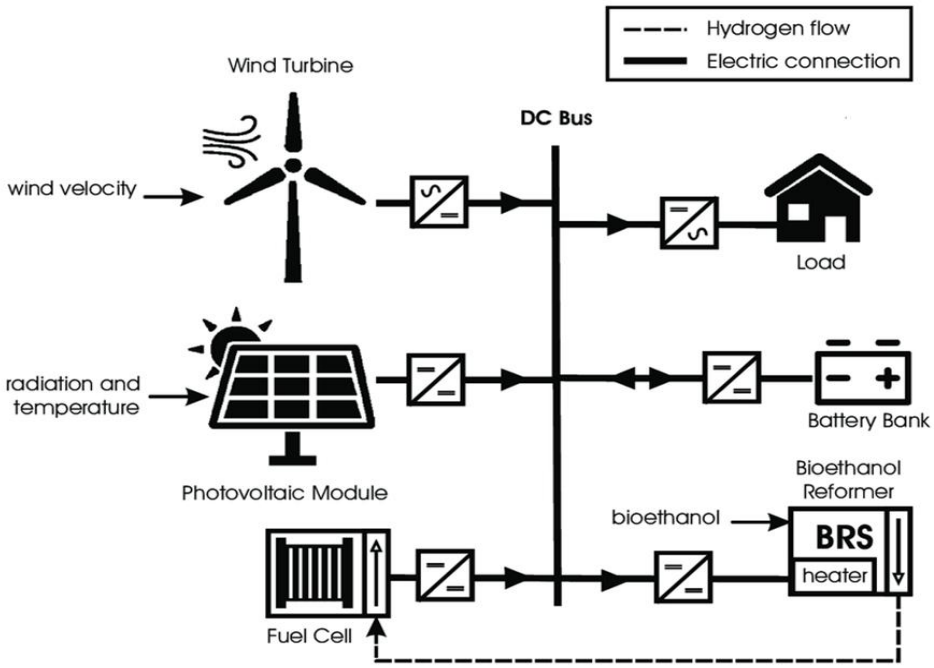

Fig (3.3): Hybrid Renewable Energy system

3.4. Integrated renewable energy system

In the contemporary context of energy availability to isolated rural households, locally power production solutions were highlighted as an expense and effective choice. IRES (Integrated Renewable Energy System) is a self-contained system that uses micro hydro power (MHP), bio - gas (bio-methane), biomass, solar, and wind energy. An appliance-based demand response (DR) method is proposed and modeled. DR strategy will reduce device performance and costs when especially in comparison to no DR strategy.

3.5. DC micro-grid system

The suggested DC micro-grid system for telecommunication towers was already simulated in a number of different circumstances to determine its viability. Use of wind-photovoltaic (PV) micro-grids for distant telecom towers seems to provide numerous advantages, including reliable, relatively inexpensive, and environment benign power. Consequently, this same proposed DC micro - grid is evaluated for its advisability and cost per kilowatt-hour of electricity generated (COE).

4. Conclusion

In this paperpeer-to-peer solution can be related to grid-connected prosumers conserve money on their energy expenditures. And also using Salp Swarm Algorithm to maximize the scale or grid-connected renewable energy systems including pumped storage (SSA).Due to optimal sizing where MG costs with increasing load, as proven by simulation results of WT/PV/fuel cell/hydrogen storage systems.With diverse EV fleet sizes, weather conditions, operation periods, and the ESU's LCOE, the system's reliability in providing constant price charging (which is lower than the price of typical grid electricity) is proven. Further-more, the standard deviation demonstrates that the proposed method is stable. Hybird Renewable energy system has an improvement to a grid-connected solar PV-wind HRES, which was proposed in a previous work of the authors. Therefore, preventing environmental impact and conserving fossil fuels for future generations are two important reasons for using sources of renewable energy, especially wind turbines (WT) and solar photo-voltaic (PV).

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