Cost Analysis of PV or Wind Hybrid Power Generation

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Abstract: *Both the optimization PV alone and hybrid PV-hydro is compared. The first module consists of PV panel, battery for Storage and power converter. The Second module consists of PV panel, battery for Storage, hydro unit and power converter. All the data of (senha and (pahadgawn) pali) KORBA is taken from NASA (National Aeronautics and space Administrator). Also the flow rate data of hydro is taken from the madwa plant champa and darri plant KORBA. The same capacity hybrid system is developed in HOMER software and a complete cost analysis is compared for both the systems.*

Keywords: *HOMER PRO, PV system, Wind generation.*

1. HYBRID SYSTEM

Hybrid energy system may be a combination of various styles of renewable energy conversion systems at the side of standard so as to meet the load demand with additional reliability currently this diagram mix for solar\wind, fuel and power learning and cargo. The diagram mix for hybrid system has a tendency to use during this project.

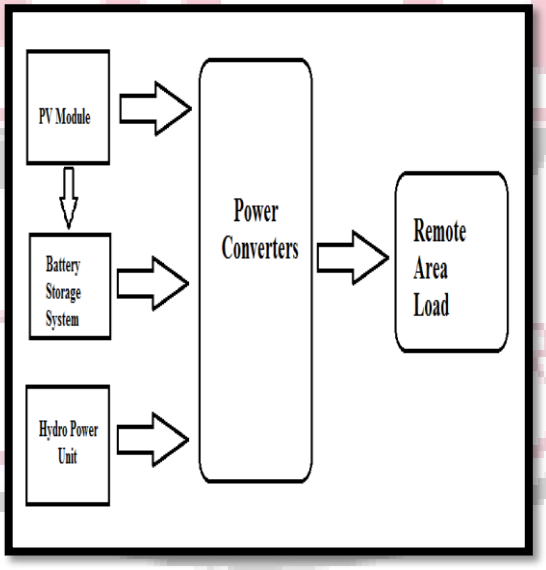

Figure 1: Solar and hydro Hybrid system

1.1 PHOTOVOLTAIC:

This is the method of generation of electrical power by converting solar radiation into direct current electricity by

means of using semiconductors is called the photovoltaic effect. In photovoltaic power generation system consisting of solar panels. Each solar panel composed of number of solar cells containing a photovoltaic material. Presently materials used for manufacturing of photovoltaic cell consisting of mono crystalline silicon, polycrystalline silicon, amorphous silicon, cadmium telluride, and copper indium gallium. The best Si PV modules currently on the market commercially have associate degree potency of over eighteen, and it's expected that in regarding ten yrs. Time module efficiencies might rise over twenty fifth. Alternative energy beaming light-weight and warmth from the sun, is controlled employing a vary of ever-evolving technologies like star heating, star photovoltaic's, star thermal electricity, star design and artificial chemical action.

Solar technologies area unit broadly speaking characterized as either passive star or active star reckoning on the method they capture, convert and distribute alternative energy. Active star techniques embrace the utilization of electrical phenomenon panels and star thermal collectors to harness the energy. Passive star techniques embrace familiarizing a building to the Sun, choosing materials with favorable thermal mass or light-weight dispersing properties, and coming up with areas that naturally flow into air.

1.2 POWER CONDITIONER:

It is conjointly referred to as a line conditioner or transmission line conditioner, may be a device supposed to boost the standard of the ability that's delivered to electrical load instrumentation. Whereas there's no official definition of an influence conditioner, the term most frequently refers to a tool that acts in one or additional ways that to deliver a voltage of the right level and characteristics to alter load instrumentation to operate properly. In some uses, power conditioner refers to a transformer with a minimum of one different operate to boost power quality (e.g. power issue correction, noise suppression, transient impulse protection, etc.). The terms "power conditioning" and "power conditioner" will be deceptive, because the word "power" here refers to the electricity typically instead of the additional technical power. Conditioners specifically work to sleek the curved A.C. wave type and maintain a relentless voltage over variable hundreds.

2. *ADVANTAGES OF THE HYBRID SYSTEMS*

a. Improved Economics

Hybrid power systems contain PV cell array and storage batteries to support the expected load profile and a diesel generator that runs to charge the batteries also used to provide power during bad weather conditions. This means that hybrid power systems are cheaper to run compared to the conventional stand-alone systems.

b. Lower initial Cost

A hybrid systems consisting of a diesel engine generator, wind generator system and PV cell modules cost less than a PV stand-alone system to equal size.

c. Increased Reliability

Hybrid system consist more than one sources so it always ready to supply power to load. So hybrid system is reliable than single source system.

d. Design Flexibility

Hybrid systems are very flexible in terms of design as it contains more than one power sources. System designers strive the best load mix between connected systems.

2.1 WORKING OF HOMER

HOMER simulates the operation of a hybrid system by creating energy balance calculations in on every occasion step of the year. For every time step, HOMER compares the electrical and thermal demand in this time step to the energy that the system will offer in this time step, and calculates the flows of energy from every element of the system. For systems that include batteries or diesel engine generators, HOMER also decides in each time step how to operate the diesel generators and whether to charge or discharge the storage batteries.

2.2 OPTIMIZATION

After simulating all of the attainable system configurations in hybrid system, HOMER displays an inventory of configurations, sorted by internet gift value, that's use to check system style choices.

2.3 SENSITIVITY ANALYSIS

When sensitivity variables are defines as inputs, HOMER repeats the optimization process for each sensitivity variable that is specified. For example, if wind speed defines as a sensitivity variable, HOMER will simulate system configurations for the range of wind speeds that is specify as input.

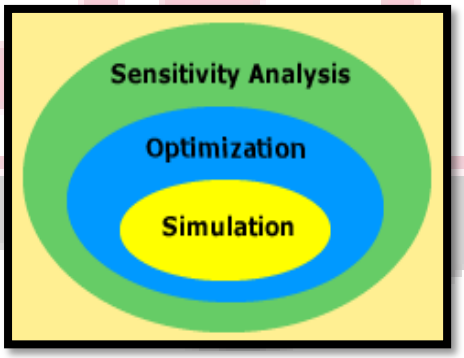

Figure 2 : Diagram for optimization steps of Homer

3. SOURCE OF ENERGY PRESENT

The graphical representation of available solar resources according to the survey data from the proposed zone is shown in figure 3.

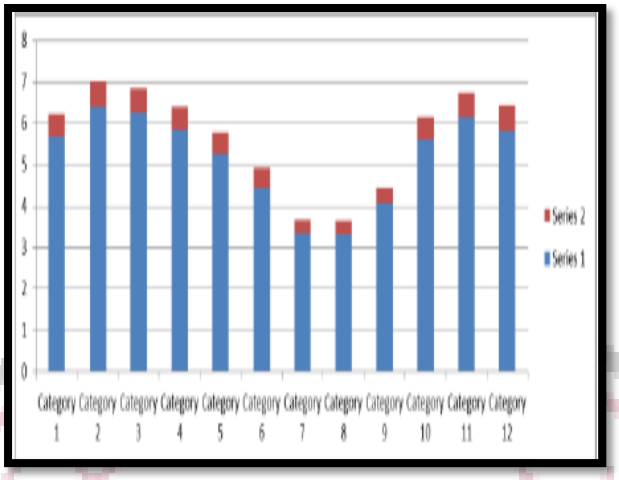

Figure 3.1:- Available Solar Resources of Proposed Zone

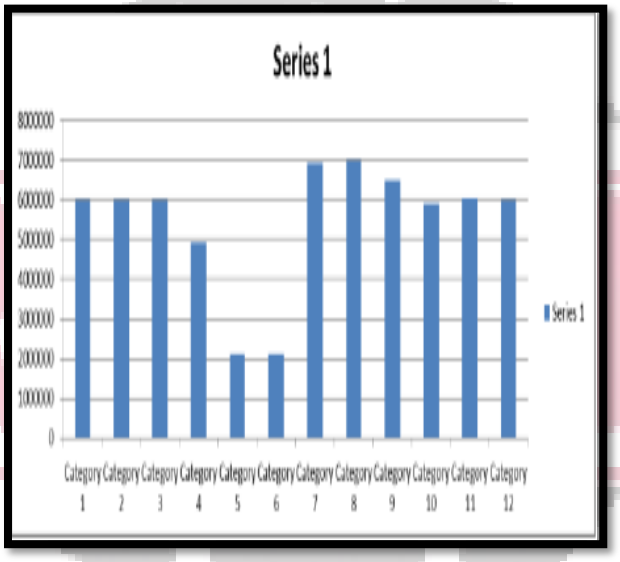

Figure 3.2:- Available Hydro Energy based on Flow Rate of Proposed Zone

4. RESULTS

4.1 COMPARATIVE OPTIMIZED COST ANALYSIS

The major power produce in the Chhattisgarh as energy solution run by thermal units and now its reservations is also under the threat. The availability of coal and CO_2 emission is a great threat to the power sector thus an alternative energy solutions are necessary to adopt. Economy of the country tremendously affected by electricity crises and resource of energy as well. To moderate the dependency on conventional source and to decentralize the power system, RET could play vital role in this regard. There are lots of locations and opportunities to establish RES based power plants- which can solve the major electricity problem in INDIA. In this work, through analysis and development the autonomous hybrid renewable energy system power plant can provide a better solution towards developing a sustainable energy solution for rural INDIA. The comparative cost analysis is performed and it is

clearly observed from the figure 5.6. From the figure for all the four systems of two rural sites NPC, COE, Operating cost, Initial Cost and fuel cost is compared individually. The overall cost of the hybrid system (PV/Hydro) is less compare to the alone PV system and Hydro System i.e. approx 1,111,832 Rs.

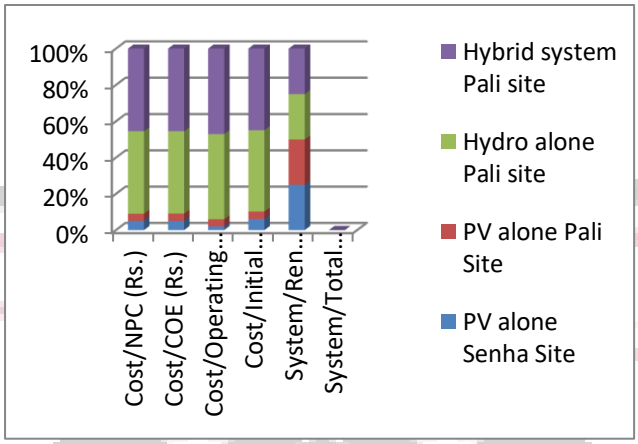

Figure 4:: Optimized comparative cost analysis of proposed system

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