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Integration of Hybrid Wind/Solar centered generation For Electrical Vehicle Charging

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Abstract-This paper present and inspect the integration of photovoltaic (PV) power, wind power generation in to a DC micro grid centered electrical vehicle charging station. The main aim aimed at the integration of solar and wind neardeliver asample as likely charging energy for the charging stations. This amenity will be grid associated so that alleging can happenthroughouthazy and wind less days. The grid connected to provide the advantage to transfer the excessive power when generation exceed the demand. The proposed system of Solar and wind integration a for electrical vehicle charging is simulated and analyze in PSIM 9.0 software and simulated results are presented.

I.Introduction

In the currentsituation the main challenge for electrical vehicles establishment in India is charging infrastructure and availability of power in remote locations. For manycausescontainingecologicalworries and vitalityprices- it is desirabletowardusage non-conventional energy source towardscare electrical vehicles. Due to concerns about the atmosphere, power generation based on hybrid renewable energy has become popular. In order to eradicate transmission forfeiture and grid connectivity difficulties, Renewable energy centered power group is performed in Renewable energy. Compared with fossil fuels, wind power systems are less harmful.

As alternating resources include a cumulative proportion of organization generation volume associated to old hydraulic and updraft synchronous generation, novel provocation to the dependability, constancy of the value grid arise. Uniting energy storage bynon-conventional energysources can decrease the adversative effects arrangedservice grids by sinking probability distribution.

The projectedmethod in this manuscript is acombination of wind power, Photovoltaic (PV) solar power, and energy storingkeen on a DC micro grid–centered charging station for EVs.The charging stations are suitable for commercial sites or car parks with networks to municipalconveyance. EVs will be parked at the competence when collective PV and wind sources will normally be capable to supply energy. Organizationdesign is offered in the Subdivision II. Modeling of renewable energy system is offered in subdivision III. Simulation outcomes of the EV charging posting are deliberated in SubdivisionIV. Subdivision Vinclines the Closes.

II. System Architecture

The projected integrated Solar / wind DC mico-grid topology presented in figure 1. A solar PV array and wind turbine joined system deliver energy aimed at EV charging. The complete system is grid linked to allow the transportof vigor as initiated by the regulatorscheme. The keyaim is delivering the EV charging competence, storing excessenergy throughaccusing the second–life batteries.The regulator impartial is to detention the maximum existing energy commencing the daylight and gustthough keeping power output to the network as steadyas conceivable. In

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the figure 1 wind power converted in to AC to DC, and solar PV converted in to DC-DC. Then after integrated DC again converted in to AC.

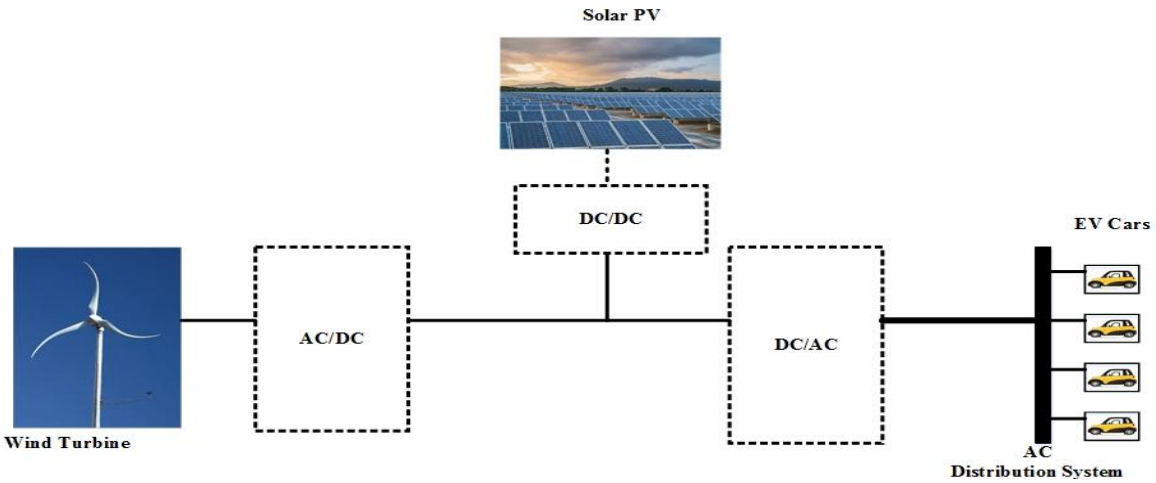

Figure 1. Block Diagram of the EV Charging Station with Wind / Solar Integrated System

III. Modeling of Wind / Solar integrated System

(A) Wind Power Modeling

PSIM simulationsdesigned for the wind power system contains the wind turbine, wind generator, AC-DC Convertor modules, the wind turbine demonstrated form electromechanically point of view. Theexemplaryoffers the smooth characteristics of the rotor, counting pitch control system and MPP characteristics. The characteristic of this wind turbine is that there is no gearbox, but there is a back-to-back converter, whose size is suitable aimed at the entire power, as displayed in the figure. Fig. 2. The wind turbine is mechanically connected to PMSM. The PMSM is connected to three phase rectifier.

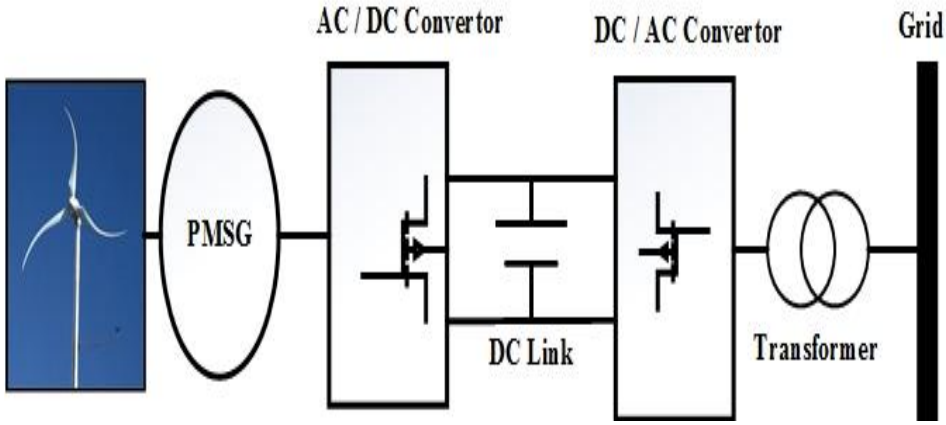

Figure 2. Schematic diagram of a wind power system connected to grid.

(B) PV solar power module

An electrical archetypal proficient of corresponding the Current vs. Voltage (I–V) and Power vs. Voltage (P–V) performance of the PV cell below changed irradiances has stayed employed in the PSIM software. In this archetypal, temperature is taken aspersistent at standard ambient temperature in edict to decrease the performance period of the

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completearchetypal. (It is known that temperature has a important result on the I–V and P–V output characteristic curves of the cell, but examination of the possible influence is out of possibility for this scheme.) The archetypal permits simulating dissimilar collectiontechniques by changing the series/parallel PV cell influences PV.

A PV array with 36 parallel strings of 29 units in series is demonstrated. The arrangement is valued to makearound 1.8 kW power below full sun circumstances.Figure 3 demonstrations the typical I–V and P–V characteristics of a photovoltaic unit. The MPPT algorithm is practical to safeguard that the PV array operates at maximum power output based on irradiance (under the supposition of continuousworking temperature). This research work uses a perturbation and observation (P&O) method-in which the output voltage is regularly changed to notice the bestarrangement voltage. This is the MPPT algorithm commonly used in many photovoltaic systems, easy to appliance, and mechanisms well when the irradiance prepares not alteration rapidly with time.

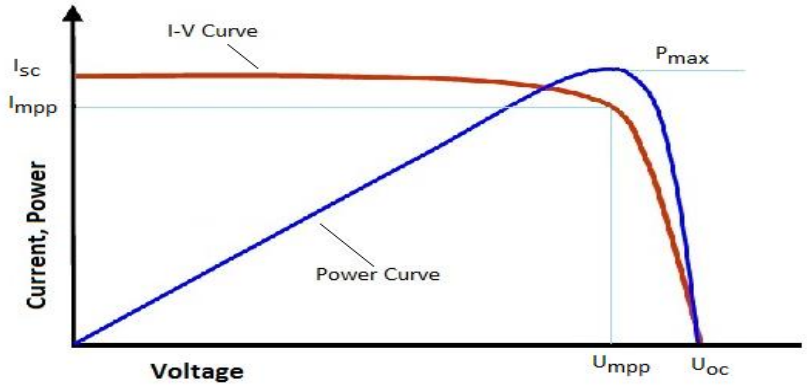

Figure 3. P–V and I–V characteristic of a typical PV cell.

The boost convertor is used for transmission power form PV arrangement to DC bus. The converter output is set to equal the DC bus voltage amplitude, while the contributionpathways the voltage that produces maximum power. Application of the P&O MPPT procedure in PSIM environment.

IV. Simulation and Results

The proposed integrated wind / solar system for EV charging station is simulated in PSIM 9.0 software. Is shown in figure 4.

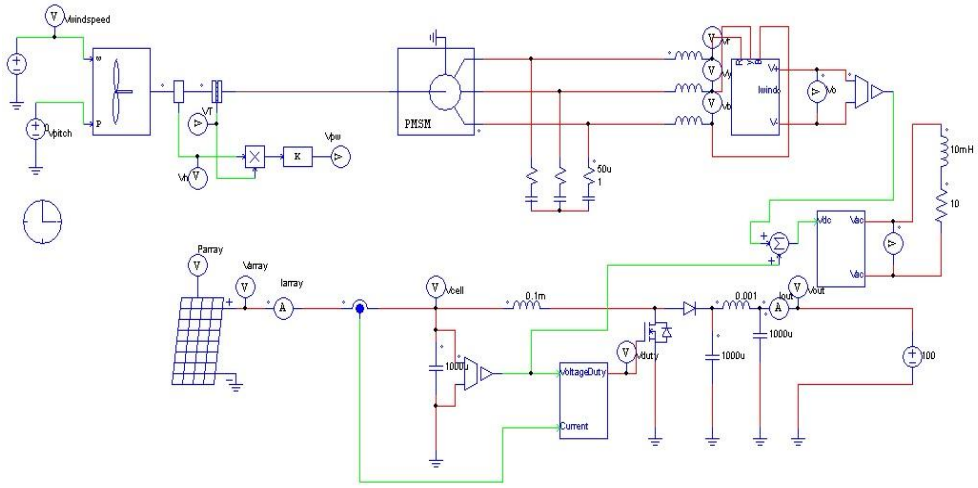

Figure 4.PSIM Model of integrated for Wind / Solar(PV) for electrical vehicle charging station

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Simulations are implemented to display the performance of apiece subsystem. The activereaction of the wind turbine, wind generator, PV subsystem are verified. Comprehensivedemonstrating is achieved on the module and system levels, and the outcomes are showing in Figure. 5-8.

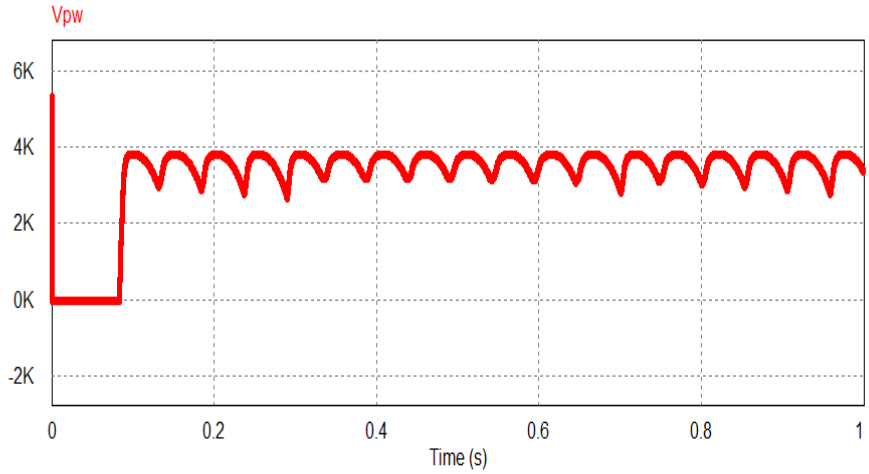

Figure 5. Wind Power

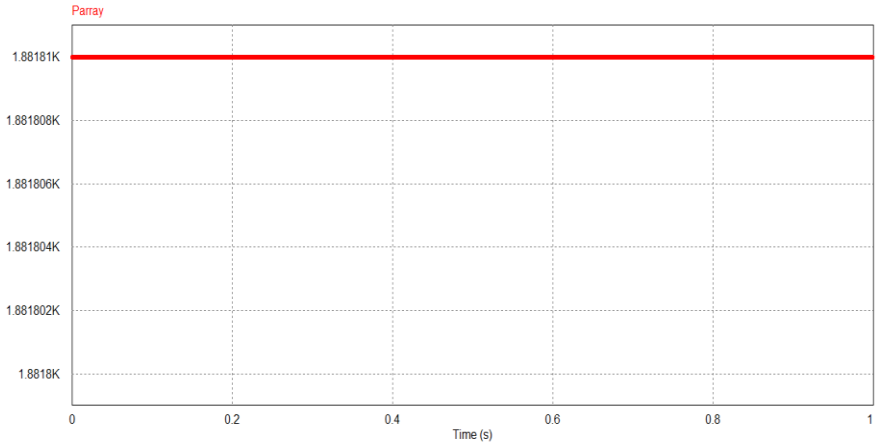

Figure 6. PV Power

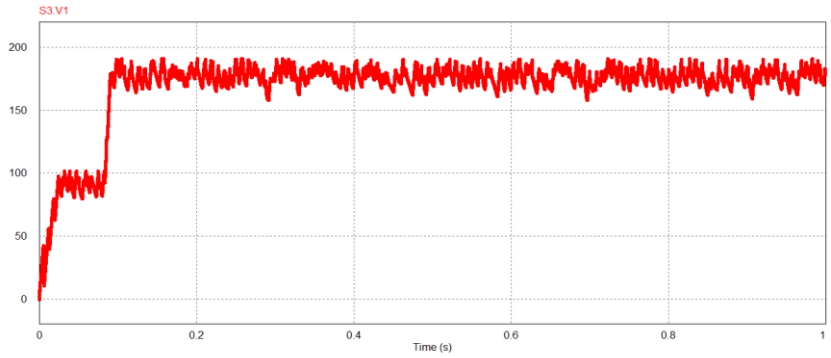

Figure 7. DC Bus Voltage

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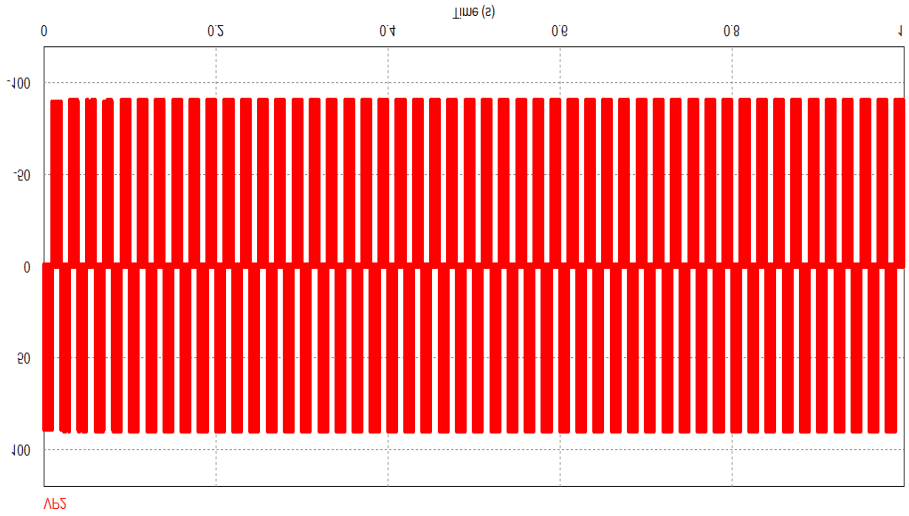

Figure 8. AC grid Voltage

V. Conclusion

In this paper a integrated wind / solar system for EV charging station has been offered. Complete model of wind and solar PV has been developed, as well as applied constrictions and MPPT control algorithms. Control rationality has been active to engross maximum power from the renewable bases and charge the EVs.

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