VENPA
GLOBAL TECHNOLOGIES

Date: 10.09.2021

To

Dr. M.SIVASUBRAMANIAN / Assistant Professor,
Department of Electrical and Electronics Engineering,
Sri Venkateswara college of Engineering and Technology,
Tiruvallur. 631 203

Respected Sir,

Sub : Acceptance of Financial Assistance for your Funded Project –Reg

We are happy to announce that the proposal submitted on Project work titled on **"Implementation of PV-Wind based Micro grid System using Whale Optimization Algorithm"** has been approved by our company and sanctioned amount Rs. 4,81,788 (Four Lakhs Eighty one Thousand Seven Hundred Eighty Eight Rupees only) through online payment. We expect to complete this project within specified duration.

SL.NO	Project Title	Investigation Officer	Duration
1.	Implementation of PV-Wind based Micro grid System using Whale Optimization Algorithm	Dr. M.Sivasubramanian, AP/EEE	13-09-2021 TO 14-01-2022

Thanking you

PRINCIPAL
Sri Venkateswara College of
Engineering and Technology,
Thirupachur, Thiruvallur - 631 203

Yours Sincerely,
For VENPA STAFFING SERVICES INDIA PRIVATE LIMITED.,

A PUSHPARATHINAM
DIRECTOR

Old No: 449, New No: 972, PVC Complex, Landmark: Vasan Eye Care Hospital, TH Road,
Old Washermenpet, Chennai, Tamil Nadu 600021
Contact Numbers: 96007 80349 Email ID : mdvenpaglobalgroups@gmail.com

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Approved by AICTE New Delhi & Affiliated to Anna University, Chennai
(A Telugu Minority Institution)

Abstract

Recently, Micro Grids (MGs) have become extremely popular due to their advantages of effective power conversion and high transmission efficiency. The MG and Nonlinear Loads (NL) are being incorporated into the electricity network. MGs are connected by Voltage Source Converters (VSCs), and NL infuses harmonics into the utility grid using power devices. However, the emergence of stability problems in the MG is caused by the nonlinear characteristics of Renewable Energy Sources (RESs), the rising use of power electronic devices and unexpected variations in load. This paper aims to suggest a microgrid that employs RESs comprising wind and Photovoltaic (PV) systems. This method is established to distribute stable power to loads without any interruptions. A Doubly Fed Induction Generator (DFIG) is deployed as a wind system. To stabilize the PV input voltage, the Boost converter is implemented. Furthermore, intended for enhancing the microgrid's performance, a constant output without distortion is attained from the converter with the deployment of a Whale Optimized Proportional Integral (WOPI) controller. The 3ϕ inverter is utilized to sustain the DC link voltage, and it combines PV, wind, and battery output at a single point and feeds it to the grid. The results are implemented using the MATLAB platform, and simulation outcomes show that the suggested control technique is effective with a THD of 2.33% and reduced overshoot issues.

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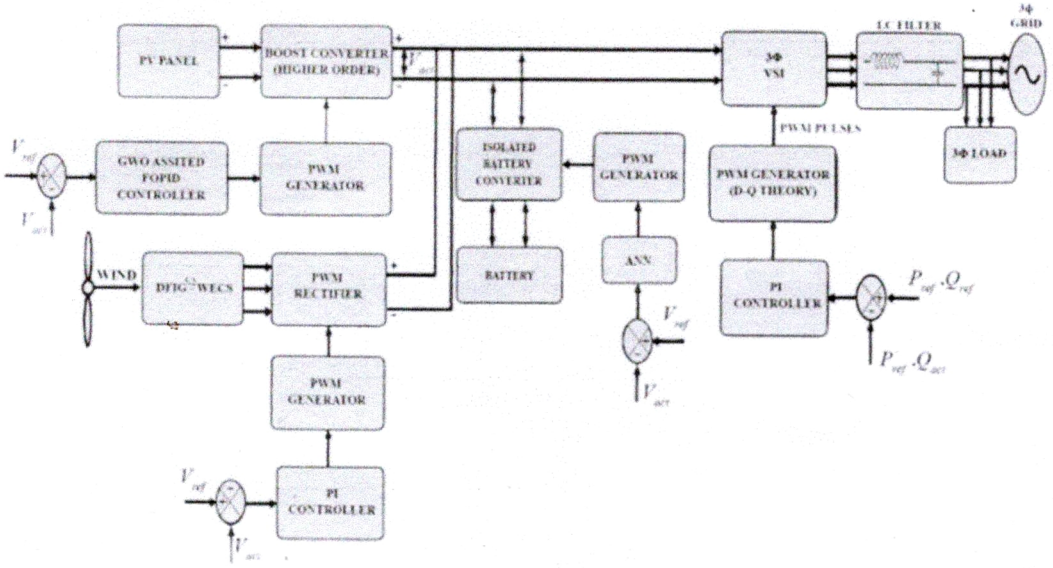
PROPOSED MODEL



This project provides a reliable operating approach for a solar and wind hybrid power systembased MG system. Three primary components can be identified: the battery storage systems, PV and wind systems interconnected to the DC-link. The bi directional converter is incorporated to provide optimal load management using a dynamical modelling and control system powered by a PV system and wind. Using bidirectional converters, the DC bus is linked to the battery.

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CONCLUSION

Currently, the RES is being employed increasingly to facilitate and fulfil the enhanced energy demands resulting from economic development and population explosion. The MG is grid-connected. The reliable operation enforces common bus conditions (voltage and frequency) and organizes any imbalance between generation and consumption. In this paper, the suggested approach efficiently manages the switching between the wind turbine and battery storage system while obtaining more power from the PV panel. Here, intending to separate the excess power from WT, the DFIG is used. Depending on an optimization process, the established technique assists in attaining the system's overall expenses while assuring a quite reliable source of load power. The designed PI controller involves ensuring smooth power output. By utilizing the whale-optimized PI controller, the constant output voltage is attained successfully without interruptions. The attained outcomes show that the proposed method is efficient compared to other control approaches with a reduced THD of 2.33%.

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Name	: SIVASUBRAMANIAN M	Branch Name	: Thiruvallur
Communication Address	: 2/10, S-2, BALASUBRAMANIAN APPARTMENT,1ST CR, OSS,4TH STREET,SHANTHIPURAM,,, , TAMIL NADU, INDIA-600062	Branch sol ID	: 1838
Address Last Updated On	: 13-10-2021	Account Number	: 18380100064514
Regd. Mobile Number	: 918610826198	Customer ID	: 138762411
Email ID	: null	Account Open Date	: 13-10-2021
Type of Account	: Savings Account	Account Status	: ACTIVE
Scheme	: SB FEDSALARY	Mode of Operation	: SINGLE
IFSC	: FDRL0001838	Joint Holders	: NIL
MICR Code	: 600049025	Nomination	: REGISTERED
SWIFT Code	: FDRLINBBIBD	Currency	: INR
Effective Available Balance	: 18853.10	Date of Issue	: 15/11/2021

Statement of Account for the period 2021-11-15 to 2021-11-23

Date	Value Date	Particulars	Tran Type	Tran ID	Cheque Details	Withdrawals	Deposits	Balance	DR /CR
		Opening Balance						150	Cr
15-NOV-2021	15-NOV-2021	UPIOUT/221048046893/euronetgpay. pay@icici/UP/5411	TFR	S58787435		19.00		131.00	Cr
17-NOV-2021	17-NOV-2021	UPI IN/220933577921 /plramu1975@okaxis/UPI/0000	TFR	S45611246			100.00	231.00	Dr
18-NOV-2021	18-NOV-2021	UPI IN/220201841849 /shankarishiva2014-1@okhd/0000	TFR	S88661615			500.00	731.00	Cr
22-NOV-2021	22-NOV-2021	NFT/Venpa Global Technologies /456258159325/AXIS BANK	TFR	S12074852			481788.00	482519.00	Cr
23-NOV-2021	23-NOV-2021	UPIOUT/220318073916 /svel5008@okaxis/UPI/0000	TFR	S96661149		400.00		482119.00	Cr
		GRAND TOTAL				419.0	482388.00		

Abbreviations Used:

CASH	: Cash Transaction	TFR	: Transfer Transaction
FT	: Fund Transfer	CLG	: Clearing Transaction
SBINT	: Interest on SB Account	MB	: Mobile Banking

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DISCLAIMER: This computer generated statement contains the particulars of the transaction(s) in the account that have been updated till the close of day end operations of the CBS System of the Bank on the previous working day and the same will not reflect the transaction(s) that have occurred in the account, if any, subsequent thereto. The Federal Bank Ltd. shall not be liable for/responsible in any way for the transaction(s) at the time of the generation of this statement.

This is a computer generated statement which need not normally be signed. Contents of this statement will be considered correct if no error is reported within 21 days of the statement date.

****END OF STATEMENT****

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Original Article

Implementation of PV-Wind based Microgrid System using Whale Optimization Algorithm

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Abstract *- Recently, Micro Grids (MGs) have become extremely popular due to their advantages of effective power conversion and high transmission efficiency. The MG and Nonlinear Loads (NL) are being incorporated into the electricity network. MGs are connected by Voltage Source Converters (VSCs), and NL infuses harmonics into the utility grid using power devices. However, the emergence of stability problems in the MG is caused by the nonlinear characteristics of Renewable Energy Sources (RESs), the rising use of power electronic devices and unexpected variations in load. This paper aims to suggest a microgrid that employs RESs comprising wind and Photovoltaic (PV) systems. This method is established to distribute stable power to loads without any interruptions. A Doubly Fed Induction Generator (DFIG) is deployed as a wind system. To stabilize the PV input voltage, the Boost converter is implemented. Furthermore, intended for enhancing the microgrid's performance, a constant output without distortion is attained from the converter with the deployment of a Whale Optimized Proportional Integral (WO-PI) controller. The 3ϕ inverter is utilized to sustain the DC link voltage, and it combines PV, wind, and battery output at a single point and feeds it to the grid. The results are implemented using the MATLAB platform, and simulation outcomes show that the suggested control technique is effective with a THD of 2.33% and reduced overshoot issues.*

Keywords *- PV system, Wind system, Boost converter, WO-PI controller, MG, DFIG.*

1. Introduction

RESs have recently taken substantial importance as a consequence of the increasing need for electricity. Using innovative, clean energy sources has become essential due to the demand for fossil fuels for power generation [1-3]. As a result, the construction of clean energy using wind and PV input power is projected to be a feasible option in the future. Solar and wind energies are affordable to use and produce no emissions. Also, it brings electricity to isolated locations not handled by electricity companies or connected to the grid. Furthermore, it can provide a remedy for nations experiencing a shortage of fossil fuel energy [4, 5].

Unfortunately, the accessibility of these sources is intermittent and weather-dependent. The power system has challenges while using these resources because of the unpredictable nature of power output and its variations [6]. The utility grid's stability and standalone applications ultimately depend on incorporating clean energy sources [7]. So, adopting Energy Storage Systems (ESS) offers a fantastic remedy for the intermittent issue. Consequently, hybrid energy systems incorporating ESS are highly suggested to ensure an effective and smooth power transfer. Hence, MGs are a crucial paradigm to combine alongside ESS with distributed and renewable energy sources [9-11].

In the modern world, dealing with the growth of clean energy requires the development of the MG model. It has the potential to enable the final user to store, regulate, produce, and maintain a portion of the energy consumed, turning the client into a contributor to the network instead of a consumer [13]. MG offers numerous benefits to customers and utilities like each other. Reduced power flow on transmission and distribution lines, reduced power losses and lower costs[21,25] for excess energy sources are all benefits of the MG approach. MG can also minimize the load demand on the electrical grid and contributes to lowering pollutants that represent a concern from climate change. Also, it can help in fixing network issues [14].

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Date : 06.09.2021

To

Managing Director,
Venpa Global Technologies,
No - 449/972, PVC Complex, TH Road,
Old Washermenpet,
Chennai- 600 021

Dear Sir,

Subject: Request for Financial Assistance of Funded Project -Reg

I am requesting on behalf of (Sri Venkateswara College Of Engineering And Technology / Department of Electrical and Electronics Engineering), an esteemed institution known for its commitment to excellence in engineering education and research. We are reaching out to explore the possibility of collaborating with your company on a funded project that aligns with both our academic goals and your company's expertise and interests. In this regard we request you to grant the permission for funded project on "**Implementation of PV-Wind based Microgrid System using Whale Optimization Algorithm**"

FACULTY ANALYZER – Dr. M.SIVASUBRAMANIAN / **AP**

Thank you

Warm regards,

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