

{tag}

{/tag}

IJCA Proceedings on National Conference on  
Advancements in Alternate Energy Resources for Rural Applications

© 2015 by IJCA Journal

AERA 2015 - Number 2

Year of Publication: 2015

Authors:

Kruti Gupta

Kamal Kant Sharma

Balwinder Singh

{bibtex}aera2140.bib{/bibtex}

## Abstract

In this paper, a comparative study of various standalone and grid connected hybrid systems is done and analyzed. The hybrid system consists of wind, mini hydro, solar, fuel cell, biogas plants along with diesel generator as a backup source. The comparison between standalone and grid connected systems is done in detail. Various hybrid systems incorporate different controlling strategies for wind farms, hydro turbines, conventional generators etc. are also

included. An in-depth study of hybrid system comprising of wind and hydro turbines connected to conventional generators is also done. Islanding operation is also considered a special concern in this paper, which also include various works by hydraulic turbine and controller of governor system in smart distribution systems.

## Refer

## ences

- L. L. Lai and T. F. Chan, "Distributed Generation", in Distributed Generation: Induction and Permanent Magnet Generators, 1st ed. , England: West Sussex: John Wiley and Sons Ltd. , 2007, pp. 1–20.
- P. P. Sharma, S. Chatterji and B. Singh, "Matlab Based Simulation of Components of Small Hydro-Power Plants", VSRD International Journal of Electrical, Electronics & Communication Engineering, Vol. 3 Issue 8, (2013), pp. 37
- V. Ramakrishnan and S. K. Srivatsa, "Mathematical Modeling of Wind Energy Systems", Asian Journal of Information Technology, vol. 6, pp. 1160-1166, 2007
- S. Vlastimil, "Model of wind power plant with asynchronous generator in Simulink platform", Intensive Programme Renewable Energy Sources, May 2011
- C. Guowei, Qi Sun, L. Cheng et. al. , "A new control strategy to improve voltage stability of the power system containing large-scale wind power plants", Electric Utility Deregulation and Restructuring and Power Technologies (DRPT), 2011 4th International Conference on , vol. , no. , pp. 1276,1281, 6-9 July 2011
- Q. Yang, Z. Jianhua, W. Ziping et. al. , "Analysis on Stability of Integration of Wind Farms into Power Systems", Power and Energy Engineering Conference, 2009. APPEEC 2009. Asia-Pacific, Vol. 1, no. 4, pp. 27-31, March 2009
- T. T. Chuong, "Voltage stability investigation of grid connected wind farm", World Academy of Science, Engineering and Technology, 2008
- F. Ardanuy, J. , et. al. , "A dynamic model of adjustable speed hydro plants", Proceedings of the 9th Congreso Hispano Luso de Ingeniería Eléctrica, Marbella, Spain, Vol. 30, 2005.
- A. H. A. , B. H. Mohamad, H. W. Ping, H. Mokhlis, "An Adaptive Controller of Hydro Generators for Smart Grid Application in Malaysia", presented at the International Conference on Power System Technology (POWERCON),
- R. Nazir, "Modelling and simulation of an induction generator-Driven-Micro/Pyco hydro power connected to grid system", Andalas University-Institut Teknologi Bandung, Indonesia June (2007): 17-19.
- M. Sattouf, "Simulation Model of Hydro Power Plant Using Matlab/Simulink", Int. Journal of Engineering Research and Applications, ISSN : 2248-9622, Vol. 4, Iss. 1 ( Version 2), January 2014, pp. 295-301.
- B. Bhandari, K. T. Lee, C. S. , Song, et. al. , "A Novel Off-Grid Hybrid Power System Comprised of Solar Photovoltaic, Wind, and Hydro Energy Sources", Applied Energy, Vol. 133, pp. 236-242, 2014
- A. K. Daud, M. Ismail, W. Kukhun and M. M. Mahmoud, "Simulation of a Hybrid Power System Consisting of Wind Turbine, PV, Storage Battery and Diesel Generator: Design, Optimization and Economical Evaluation", International Journal of Energy Engineering

(IJEE) Vol. 1, No. 1, 2011, pp. 56-61

- Y. Zhou, J. A. Ferreira and P. Bauer, "Grid-connected and islanded operation of a hybrid power system", Power Africa 2007, Johannesburg, South Africa, 16-20 Jul 2007, pp. 1-6
- Bic?, D. , Dumitru, C. D. , et. al. , "Isolated Hybrid Solar-Wind-Hydro Renewable Energy Systems", Renewable Energy, T. J. Hammons (Ed. ), InTech, 2009
- B. Bhandari, S. R. Poudel, K. T. Lee and S. H. Ahn, "Mathematical Modeling of Hybrid Renewable Energy System: A Review on Small Hydro- Solar-Wind Power generation", International Journal of precision engineering and manufacturing-green technology vol. 1, no. 2, pp. 157
- A. Menshsari, M. Ghiamy, MMM Mousavi and HA Bagal, "Optimal design of hybrid water-wind-solar system based on hydrogen storage and evaluation of reliability index of system using ant colony algorithm", Int Res J Applied and Basic Sci 2013;4:3592–600
- P. K. Goel, B. Singh, B. Murthy, S. S. Kishore, "Autonomous hybrid system using PMSGs for hydro and wind power generation", Industrial Electronics, 2009. IECON &apos;09. 35th Annual Conference of IEEE, vol. , no. , pp. 255,260, 3-5 Nov. 2009
- B. Revanth, M. Ramesh, P. Jenish, "Simulation of Isolated wind-hydro hybrid system using cage generators and battery storage", International Journal of Env. Sci. : Development and Monitoring (IJESDM), vol. 4, no. 2, 2013, pp. 58-62
- S. Nirmal, S. Rinku, "Isolated Wind Hydro Hybrid Generation System with Battery Storage", International OPEN ACCESS Journal Of Modern Engineering Research (IJMER), Vol. 4, Iss. 3, Mar. 2014, pp. 36-43
- C. Marinescu, C. Ion, I. Serban, L. Clotea, D. Marinescu, "Controlling a stand-alone power system", Power Electronics, Electrical Drives, Automation and Motion, 2006. SPEEDAM 2006. International Symposium, vol. , no. , pp. 525,530, 23-26 May 2006
- S. S. Murthy, S. S. ; Jha, C. S. ; Rao, P. S. N. , "Analysis of grid connected induction generators driven by hydro/wind turbines under realistic system constraints", Energy Conversion, IEEE Transactions, vol. 5, no. 1, pp. 1,7, Mar 19
- P. S. Nagendra Rao and S. S. Murthy, "Performance analysis of grid connected induction generators driven by hydra/wind turbines including grid abnormalities", in Proc. 24th Intersociety on Energy Conversion Engineering Conference, 1989, pp. 2045-2050
- B. Stefan, et al. , "Study of a grid-connected hybrid wind/micro-hydro power system", Optimization of Electrical and Electronic Equipment, OPTIM 2008. 11th International Conference on. IEEE, 2008.
- Kruti Gupta, Kamal Kant Sharma "Modelling & Stability Issues in Mini/Micro Hydro Power Plant- A Survey " International Journal of Modern Computer Science vol. 3, issue 2, pp. 31-41, 2015.

Computer Science

### Index Terms

Power Systems

## **Keywords**

Distributed Generation (dg) Doubly Fed Induction Generator (dfig) Hybrid Systems  
Hydraulic Turbine And Governor (htg)

Renewable Energy Sources (res)

Small Hydro Power Plant (shpp)

Wind Turbine (wt)