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Authors: Devesh Singh, Manish Kumar Singh, Rakesh Sharma

Paper Title: An Overview and Issues of Smart Grid and its Integration with Renewable Energy

Abstract: Global Energy Sector largely relies on combustion of energy sources viz. fuel-oil and natural gas. However, these energy sources are becoming scarce day by day. On the other hand, global energy consumption is at its verge and is believed to triplicate by 2050. Hence, transformation of power networks into intelligent system is a viable option that can save energy, utilize renewable energy and ensure supply security. The energy sector encourages the use of renewable energy sources as it aims at reducing carbon footprint and promoting clean energy. Keeping these facts together with the issues of climate change and socio-economic challenges of current century, the need of hour is to use electric network as a Smart Grid. This paper highlights various Smart grid initiatives and their implications along with the issues involved with the development of Smart Grid Technology.

Keywords: Smart grid, Wind energy, Solar energy, Power quality, Renewable energy integration.

References:

1. Eric Miller, "Renewables and the smart grid", Renewable Energy Focus, Volume 10, Issue 2, pp. 67-69, March-April 2009.
2. IRENA- Smart Grids and Renewables. http://www.irena.org/documentdownloads/publications/smart_grids.pdf
3. European Technology Platform, "SMART GRIDS"— Strategic Deployment Document for Europe's Electricity Networks of the Future, September 2008.
4. http://www.smartgrids.eu/documents/SmartGrids_SDD_FINAL_APRIL2010.pdf
5. http://www.powergridindia.com/_layouts/PowerGrid/User/ContentPage.aspx?PId=154&LangID=English
6. Adam Brown, et al: Renewable Energy: Markets and Prospects by Technology, International Energy Agency Information Paper, 2011.
7. N. Miller, C. Loutan, M. Shao,and K. Clark, "Emergency Response: U.S. System Frequency with High Wind Penetration", IEEE Power and Energy Magazine, Vol.11 , Issue- 6, pp.-63-71, Nov.-Dec. 2013.
8. http://www.altenergy.org/renewables/renewables.html
9. http://science.howstuffworks.com/environmental/energy/solar-cell1.html
10. Perez-Arriaga: Managing Large Scale Penetration of Intermittent Renewables, MITEI Symposium on Managing Large-Scale Penetration of Intermittent Renewables, Cambridge/U.S.A, 20 April 2011.
11. IEC white paper - Grid integration of large-capacity Renewable Energy sources and use of large-capacity Electrical Energy Storage http://www.iec.ch/whitepaper/pdf/iecWP-gridintegrationlargecapacity-LR-en.pdf
12. F. Blaabjerg, R. Teodorescu, M. Liserre and A.V. Timbus, " Overview of control and grid synchronization for distributed power generation systems", IEEE Trans. On Industrial Electronics, vol. 53, no. 5, pp.-1398-1409, Oct. 2006.
13. J.He, Y. W. Li, and M. S. Munir, "A flexible harmonic control approach through voltage controlled DG-grid interfacing converters," IEEE Trans. Ind. Electron., vol. 59, no. 1, pp. 444-455, Jan.2012.
14. J. M. Carrasco, L. G. Franquelo, Jan T. Bialasiewicz, E. Galván, R. C. P. Guisado, Ma. Á. M. Prats, J. I. León, and N. Moreno-Alfonso, "Power-Electronic Systems for the Grid Integration of Renewable Energy Sources: A Survey", IEEE Trans. On Industrial Electronics, vol. 53, no. 4, pp. 1002-1016, Aug. 2006.
15. F. Blaabjerg, Z.Chen, S.B.Kjaer, "Power Electronics as efficient interface in dispersed power generation System."IEEE Trans. On Power Electron. Vol.19, No.5, pp.1184-1194., Sept.2004.
16. Fu. Sheng Pai, Shyh-Iier Hung, "Design and Operation of Power Converter for Microturbine Powered Distributed Generator with Capacity Expansion Capability."IEEE Trans. on Energy Conversion, Vol. 3, No.1, pp.110-116, March 2008.
17. P. Siemes, H.-J. Haubrich, H. Vennegeerts, S. Ohrem, "Concepts for the improved integration of wind power into the German interconnected system", IET Renew. Power Gener., 2008, Vol. 2, No. 1, pp. 26– 33.
18. M.I. Milands, E.R. Cadavai and F.B.Gonzalez, "Comparison of control strategies for shunt active power filters in three phase four wire system",IEEE Trans. Power lectron., Vol.22, No.1, pp.229-236, Jan 2007.
19. Sung-Hun,Seong R Lee ,Hooman Dehbonei, Chemmangot V. Nayar, "Application Of Voltage-and Current–Controlled Voltage Source Inverters for Distributed Generation System.," IEEE Trans. On Energy Conversion, Vol.21, No.3, pp. 782-788, Sept. 2006.
20. Tatsuto Kinjo, Tomonobu Senjyu, "Output Leveling of Renewable Energy by Electric Double – Layer Capacitor Applied for Energy Storage System", IEEE Trans on Energy Conversion, Vol.21, No.1, March 2006.
21. S.W.Mohod, M.V.Aware, "A STATCOM-Control Scheme for Grid Connected Wind Energy System for Power Quality Improvement", IEEE System Journal , Vol.4, Issue-3, pp.-346-352,Sept-2010.
22. Sadhana A. Bhonde, Sanjay B. Bodkhe, "Integration of Renewable Energy - Challenges in Smart Grid", International Journal of Innovative Science and Modern Engineering, Vol.3 Issue-1, pp.-11-15, Dec. 2014.
23. S.A. Bhonde, S.B. Bodkhe, S.W.Mohod , "Smart Grid Integration for Power Quality in Grid system", International Journal of Innovative research in Electrical, Electronic, Instrumention,Control Engineering, Vol.1, Issue 6, Sept.2013 .
24. http://www.nrel.gov/electricity/transmission/energy_management.html
25. http://www.nrel.gov/electricity/transmission/variability.html

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2.

Authors: Kumar Kartikeya, Manish Kumar Singh, Devesh Singh

Paper Title: Analysis of Inter-Area Oscillations and A Case Study of Two Area System

Abstract: The inter-area oscillations are highly non-linear and complex in nature. They are not easily damped by the conventional Power System Stabilizers. They cause the interruptions in the flow of bulk power in between two areas and sometimes they may cause the breaking of power system, if not damped sufficiently. Inter-Area oscillations contribute significant importance because they involve various units belonging to different areas in power system. They may cause greater oscillations in the tie line connecting various units. To analyse these inter-area oscillations, the entire power system has to be represented in detail. The analysis has also be done on how the certain quantity of power is transferred from one area to another which are interconnected by tie- line.

Keywords: Inter-Area Oscillations, Oscilltions, Power System Stabilizer (PSS), Static Var Compensator (SVC), Unified Power Flow Controller (UPFC).

References:

1. Aboul Ela, M.E., A.A. Sallam, J.D. McCalley and A.A. Fouad " Damping Controller Design for Power System Oscillations using Global

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Signals", IEEE Transactions on Power Systems, vol.11, Issue pp 767, May 1996.
2. P. Kundur, M. Klein, G.J. Rogers and M. Zwyno, " Application of Power System Stabilizers for Enhancement of Overall System Stability", IEEE Trans., Volume: 4, Issue: 2, PS-4, pp614-621, May 1989.
3. Y. Mansour, " Application of Eigenvalue Analysis to the Western North American Power System", Eigenanalysis and Frequency Domain Methods for System Dynamic Performance, IEEE 90TH0292-3PWR, 1989.
4. J. Paserba, P. Kundur, J. Sanchez –Gasca and E. Larsen, "Small Signal Stability and Power System Oscillations", Article 11.3 "The Electric Power Engineering Handbook", Florida: CRC Press LLC and IEEE Press, 2001.
5. Md. Jan-E-Alam "A Study on the Presence of Inter-Area Oscillation Mode in Bangladesh Power System Network", Journal of Electrical Engineering, The Institution of Engineers, Bangladesh, Vol. EE-36, No.II, December 2009.
6. W. Fairney, A. Miles, T.M. Whitelegg and N.S. Murray, "Low Frequency Oscillations on the 275 kv Interconnected System between Scotland and England", CIGRE Paper 31-08, September 1982, Paris.
7. R.L. Cressap and J.F. Hauer, "Emergence of a New Swing Mode in the Western Power System", IEEE Trans, Volume: PER-1, Issue: 4 PAS-100, pp 2037-2043, 1981.
8. G.J. Rogers and P. Kundur, "Small Signal Stability Analysis of Power System", in Eigen Analysis and Frequency Methods for System Dynamic Performance, IEEE 90TH0292-3PWR, 1989.
9. Cai, Deyu ; Yang, Dechang ; Ding, Lei and Terzija, Vladimir "The application of SVC and TCSC for damping Inter-Area Oscillations." http://ipsitransactions.org/journals/papers/tir/2015july
10. R.D. Saxena, K.D. Joshi, "Application of Unified Power Flow Controller (UPFC) for Damping Power System Oscillations- A Review", International Journal of Engineering Research and Technology, Vol.1 - Issue 4, June- 2012, ISSN:2278-0181.
11. S.A. Nabavi Niaki, M. Reza Irvani "Application of Unified Power Flow Controller (UPFC) for damping Inter-Area Oscillations", Volume :1, IEEE Transactions, 2001.
12. H. Behbehani, Z. Lubosny and J.W. Bialek "Survey of Supervisory Power System Stabilizers For Enhancement of Power System Stability" Universities Power Engineering Conference, IEEE Publications Conference, 2007 (DOI:10.1109/UPEC.2007.4468985).
13. P. Kundur, "Power System Stability And Control", pg no. 769, McGraw-Hill, 1994.

3.

Authors: **Abdisalam M Issa-Salwe**

Paper Title: **Survey of Information Systems Undergraduate Programmes Taught at Saudi Arabian Universities**

Abstract: This paper is the result of a survey of 25 Saudi Arabian university's colleges teaching undergraduate programmes in Information Systems (IS). Many of these universities are in the process of making their courses accredited by external creditors, such as ABET. This paper attempts to examine the common characteristics of these ABET accredited-oriented Information Systems (IS) undergraduate programmes. The paper also looks at the common trends in the courses of the Information Systems programmes of these universities. As a result of this analysis, the paper will also briefly explore how Information Systems design in many Saudi Arabian is designed to be more science-oriented than business-oriented programmes because of ABET accreditation influence.

Keywords: ABET, Computing Accreditation Commission (CAC), Association for Information Systems (AIS), NCAAA, accreditation, information systems, and curriculum.

References:

1. ABET Computing Accreditation Commission (2004), Criteria for Accrediting Computing Programs, November 1, 2004.
2. ABET Computing Accreditation Commission, Criteria for Accrediting Computing Programs, Effective for Evaluations During the 2015-2016 Accreditation Cycle.
3. Gill, G., & Hu, Q. (1999) The evolving undergraduate information systems education: A survey of U.S. institutions. Journal of Education for Business. 74, 1-13.
4. Gorgone J.T., P. Gray, E. A. Stohr, J.S. Valacich, and R. T. Wigand, MSIS 2006 (January 2006): Model Curriculum and Guidelines for Graduate Degree Programs in Information Systems, ACM, AIS.
5. Jeffry S. Babb and Amjad Abdulla (2013): Communicating the Value of Program-Level Accreditation for Information Systems in a College of Business. 2013 Proceedings of the Information Systems Educators Conference. Volume 30, Number 2570. San Antonio, Texas, USA.
6. King Abdulaziz City for Science and Technology (KACST): The Strategic Bases, [WWW Document] URL http://www.kacst.edu.sa/en/about/stnp/pages/strategicbases.aspx, [20 June 2015].
7. Kohum, F. G., & Wood, D. F. (2003). The ABET CAC Accreditation Experience – Intent and Reality – the Information Systems Perspective. Information Systems Education Journal, 1 (43), 3-11.
8. Lee, D., Trauth, E., & Farwell, D. (1995). Critical skills and knowledge requirements of IS professionals: A joint academic/industry investigation. MIS Quarterly 19, 313-340.
9. Lending, D. and Mathieu, R.G. (2010). "Workforce preparation and ABET assessment". Proceedings of the 2010 Special Interest Group on Management Information System's 48th annual conference on Computer personnel research on Computer personnel research ACM, New York, NY, USA, 136-14
10. M. Basel Al Mourad (January 2014): On the Design of a Curriculum that Meets ABET and AIS Requirements: Case of Web Design and Development Program, International Journal of Computer and Communication Engineering, Vol. 3, No. 1.
11. Stephen Larson and Maria C. R. Harrington (2012): A Survey of ABET Accredited Information Systems Undergraduate Programs in the USA. 2012 Proceedings of the Information Systems Educators Conference. New Orleans Louisiana, USA. Vol 29 , 1961.
12. Stevens, G. E. (2000). The art of running a business school in the new millennium: A dean's perspective. SAM Advanced Management Journal, Summer: 21–28.
13. Sundaram Nataraja, Abdullah M. Alharbi and Waleed Idirs (February 2014): Challenges and Benefits of Accreditation for Business Colleges in the Middle East. 1st Conference of the Consortium of Business Schools in the Gulf Cooperation Council (GCC) Region, February 16 - 18, 2014.
14. Szanto, T. R. (2005). Evaluations of the third kind: external evaluations of external quality assurance agencies. Quality in Higher Education, 11, 183–193. Retrieved from www.un.org
15. Topi Heikki, Joseph S. Valacich, Kate Kaiser, J.F. Nunamaker, Janice C. Sipior, GJ de Vreede and Ryan T. Wright, "IS 2010: Curriculum Guidelines for Undergraduate Degree Programs in Information Systems", Association for Computing Machinery (ACM) and Association for Information Systems (AIS).
16. Zammuto, R. (2008). Accreditation and the Globalization of Business. Academy of Management Education and Learning, 7 (2), 252-268.

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4.

Authors: **Devesh Singh, Manish Kumar Singh, Rakesh Sharma**

Paper Title: **Performance Study of Integrated Solar/Wind Energy Conversion System into Smart Grid**

Abstract: The limited global stock of fossil and nuclear fuel resources has coerced an urgency for alternative sources of energy. The utilization of distributed energy resources is accrediting day by day and is being pursued as a supplement and an alternative to large conventional central power stations. Hybrid renewable energy systems

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such as wind-solar energy based sources are feasible and reliable options. Smart grid system embodies three key characteristics namely: performance optimization, system reliability and operational efficiency. In the present communication a novel model of smart grid-connected PV/WT hybrid system has been developed. It consists of photovoltaic array, DFIG wind turbine, controller and converters. The proposed model has been executed using MATLAB/SIMULINK software package. Perturb and Observe (P&O) algorithm has been applied for maximizing the generated power based on maximum power point tracker (MPPT) implementation. The proposed model and its control strategy offer a proper tool for smart grid performance optimization.

Keywords: Solar Photovoltaic systems, Smart grids, Wind power generation, Maximum power point tracking (MPPT), dc/dc converter, dc/ac converter, doubly fed induction machine(DFIG), hybrid system.

References:

1. J. Carrasco, L. Franquelo, J. Bialasiewicz, E. Galvan, R. Guisado, Ma. A. M. Prats, J. Leon, and N.Moreno-Alfonso, "Power-electronic systems for the grid integration of renewable energy sources: A survey," IEEE Trans. Ind. Electron., vol. 53, no. 4, pp. 1002–1016, Aug. 2006.
2. E. M. Natsheh, A. Albarbar and J. Yazdani, "Modeling and Control for Smart Grid Integration of Solar/Wind Energy Conversion System," IEEE PES International Con- ference and Exhibition on Innovative Smart Grid Tech-nologies, Manchester, 5-7 December 2011, pp. 1-8.
3. Giordano, V. and Bossart, S. (2012) Accessing Smart Grid Benefits and Impacts: EU and U.S Initiatives.
4. Emodi Nnaemeka Vincent, Samson D. Yusuf, "Integrating Renewable Energy and Smart Grid Technology into the Nigerian Electricity Grid System," Smart Grid and Renewable Energy, 2014, vol. 5, pp. 220-238
5. E. Miller, "Smart grids – a smart idea?," Renewable Energy Focus Magazine, vol. 10, pp. 62-67, Sep.-Oct. 2009.
6. J. Yao, H. Li, Y. Liao, and Z. Chen, "An improved control strategy of limiting the DC-link voltage fluctuation for a doubly fed induction wind generator," IEEE Trans. Power Electron., vol. 23, no. 3, pp. 1205–1213, May 2008.
7. G. Tapia, A. Tapia, and J. Ostolaza, "Proportional-integral regulator-based approach to wind farm reactive power management for secondary voltage control," IEEE Trans. Energy Convers., vol. 22, no. 2, pp. 488–498, Jun. 2007.
8. J. Costa, H. Pinheiro, T. Degner, and G. Arnold, "Robust controller for DFIGs of grid-connected wind turbines," IEEE Trans. Ind. Electron., vol. 58, no. 9, pp. 4023–4038, Sep. 2011.
9. C. Liu, F. Blaabjerg,W. Chen, and D. Xu, "Stator current harmonic control with resonant controller for doubly fed induction generator," IEEE Trans. Power Electron., vol. 27, no. 7, pp. 3207–3220, Jul. 2012.
10. H. Xu, J. Hu, and Y. He, "Operation of wind-turbine-driven DFIG systems under distorted grid voltage conditions: Analysis and experimental validations," IEEE Trans. Power Electron., vol. 27, no. 5, pp. 2354–2366, May 2012.
11. H. Nian and Y. Song, "Direct power control of doubly fed induction generator under distorted grid voltage," IEEE Trans. Power Electron., vol. 29, no. 2, pp. 894–905, Feb. 2014.
12. Yazdani, A. Di Fazio, H. Ghoddami,M. Russo,M. Kazerani, J. Jatskevich, K. Strunz, S. Leva, and J. Martinez, "Modeling guidelines and a benchmark for power system simulation studies of three-phase singlestage photovoltaic systems," IEEE Trans. Power Del., vol. 26, no. 2, pp. 1247–1264, Apr. 2011.
13. Z. Dejia, Z. Zhengming, M. Eltawil, and Y. Liqiang, "Design and control of a three-phase grid-connected photovoltaic system with developed maximum power point tracking," in Proc. Appl. Power Electron. Conf., Austin, Feb. 2008, pp. 973–979.
14. H. Yang, Z. Wei, and L. Chengzh, "Optimal design and technoeconomic analysis of a hybrid solar-wind power generation system," Applied Energy, vol. 86, pp. 163-169, Feb. 2009.
15. J.P. Reichling, and F.A. Kulacki, "Utility scale hybrid wind-solar thermal electrical generation: a case study for Minnesota," Energy, vol. 33, pp.626-638, Apr. 2008.
16. S. Dihrab, and K. Sopian, "Electricity generation of hybrid PV/wind systems in Iraq," Renewable Energy, vol. 35, pp. 1303-1307, Jun. 2010.
17. O. Ekren, B.Y. Ekren, and B. Ozerdem, "Break-even analysis and size optimization of a PV/wind hybrid energy conversion system with battery storage – A case study" Applied Energy, vol.86, pp. 1043-1054, July-August 2009.
18. S.K. Kim, J.H. Jeon, C.H. Cho, E.S. Kim, and J.B. Ahn, "Modeling and simulation of a grid-connected PV generation system for electromagnetic transient analysis, "Solar Energy, vol.83, pp. 664 - 678, May 2009.
19. H.L Tsai, "Insolation-oriented model of photovoltaic module using Matlab/Simulink," Solar Energy, vol. 84, pp. 1318-1326, July 2010.
20. J.A. Gow, and C.D. Manning, "Development of a photovoltaic array model for use in power-electronics simulation studies," IEE Proceedings- Electric Power Applications, vol. 146, pp. 193-199, Mar. 1999.
21. M.J. Khan, and M.T. Iqbal, "Dynamic modeling and simulation of a small wind fuel cell hybrid energy system," Renewable Energy, vol. 30, pp. 421-439, Mar. 2005.
22. N. Chayawatto, K. Kirtikara, V. Monyakul, C. Jivacate, and D. Chenvidhya, "DC–AC switching converter modelings of a PV grid-connected system under islanding phenomena," Renewable Energy, vol. 34, pp. 2536-2544, Dec. 2009.
23. O.C. Onara, M. Uzunoglua, and M.S. Alam, "Dynamic modeling, design and simulation of a wind/fuel cell/ultra-capacitor-based hybrid power generation system, "Journal of Power Sources, vol. 161, pp. 707-722, Oct. 2006.
24. J.C.H. Phang, D.S.H. Chan, and J.R. Philips, "Accurate analytical method for the extraction of solar cell model parameter," IEEE Electronics Letters, vol. 20, pp.406-408, May 1984.
25. M.G. Villalva, J.R. Gazoli, and E.R. Filho, "Comprehensive approach to modeling and simulation of photovoltaic arrays," IEEE Transactions on Power Electronics, vol. 24, pp 1198 - 1208, May 2009.
26. H. De Battista, R.J. Mantz, F. Garelli, "Power conditioning for a wind-hydrogen energy system," Journal of Power Sources, vol. 155, pp. 478-486, Apr. 2006.
27. E. Muljadi, C.P. Butterfield, "Pitch-controlled variable-speed wind turbine generation," IEEE Trans. Industry Appl., vol. 37, pp. 240–246, Jan.-Feb. 2001.
28. W. Qiao, W. Zhou, J. M. Aller, and R. G. Harley, "Wind speed estimation based sensorless output maximization control for a wind turbine driving a DFIG," IEEE Trans. Power Electron., vol. 23, no. 3, pp. 1156–1169, May 2008.
29. W. Qiao, G. K. Venayagamoorthy, and R. G. Harley, "Real-time implementation of a STATCOM on a wind farm equipped with doubly fed induction generators," IEEE Trans. Ind. Appl., vol. 45, no. 1, pp. 98–107, Jan./Feb. 2009.