

REFERENCES

- [1] CEB Transmission and Generation Planning Branch, “Long term Generation Expansion Plan 2020-2039,” Sri Lanka, 2019.
- [2] X. She, A. Q. Huang and R. Burgos, “Review of Solid-State Transformer Technologies and Their Application in Power Systems,” *Ieee Journal Of Emerging And Selected Topics In Power Electronics*, vol. 1, no. 3, pp. 186-198, 2013.
- [3] J. Smith, S. Rönnerberg, M. Bollen and a. M. B. J. Meyer, “Power quality aspects of solar power – results from CIGRE JWG C4/C6.29,” in *International Conference & Exhibition on Electricity Distribution (CIRED)*, 2017.
- [4] IEEE Power and Energy Society, *IEEE 519-2014 : IEEE recommended practise- the limits*, 2014.
- [5] D. Chathurangi , U. Jayatunga, M. Rathnayake and A. Wickramasingha, “Potential power quality impacts on LV distribution networks with high penetration levels of solar PV,” in *International Conference on Harmonics and Quality of Power*.
- [6] Rooftop Solar Power Generation Project, “Potential technical impacts of rooftop solar generation,” 10 Aug 2019. [Online]. Available: <https://www.adb.org/sites/default/files/linked-documents/50373-002-sd-03.pdf>. [Accessed March 2020].
- [7] R. Dugan, *Electric power systems quality*, London: McGraw-Hill, 2002.
- [8] *IEC 60038: IEC standard voltages*, 2002.
- [9] *IEEE 929-2000, IEEE Recommended practice for utility interface of photovoltaic (PV) systems*, 2000.
- [10] V. Salasa, E. Oliasa, M. Alonsob and F. Chenlo, “Overview of the legislation of dc injection in the network for low voltage small grid-connected pv systems in Spain and other countries,” *Renewable and Sustainable Energy reviews*, vol. 12, pp. 575-583, 2008.

- [11] Public Utility Commission of Sri Lanka, “Distribution Code of Sri Lanka, 2012,” 2012. [Online]. Available: https://www.ceb.lk/front_img/img_reports/1532500020Distribution_Code.pdf. [Accessed March 2020].
- [12] *BS EN 50160: 2000, Voltage characteristics of electricity supplied by public distribution systems*, 2000.
- [13] *IEC 61000.3.7.2012, EMC Limits- Assessment of emission limits for the connection of fluctuating installations to MV, HV, and EHV power systems*, 2012.
- [14] D. Perera, P. Ciufu, L. Meegahapola and S. Perera, “Power quality emission assessment of photovoltaic inverters based on IEC Technical Report 61000-3-15:2011,” in *Australasian Universities Power Engineering Conference (AUPEC)*, 2013.
- [15] N. W. A. Lidula and A. D. Rajapakse, “Microgrids research: A review of experimental microgrids and test systems,” *Renewable and Sustainable Energy Reviews*, vol. 15, no. 1, pp. 186-202, 2011.
- [16] J. E. Huber and J. W. Kolar , “Applicability of Solid-State Transformers in Today’s and Future Distribution Grids,” *IEEE Trans on Smart Grid*, vol. 10, 2019.
- [17] A. Q. Huang, M. L. Crow, G. T. Heydt and J. P. Zhe, “The Future Renewable Electric Energy Delivery and Management (FREEDM) System: The Energy Internet,” in *Proceedings of the IEEE 99*, 2011.
- [18] X. She, A. Q. Huang, S. Lukic and M. E. Baran, “On integration of Solid State Transformer with zonal DC microgrid,” *IEEE Trans on Smart Grid*, vol. 3, no. 2, p. 975–985, 2012.
- [19] W. A. Rodrigues, L. M. F. Morais, T. R. D. Oliveira and W. W. A. G. Silva, “Analysis of Solid State Transformer based microgrid system.,” in *IEEE International Conf. on Industry Applications (INDUSCON)*, 2017.
- [20] S. Bifaretti, P. Zanchetta, A. Watson and L. Tari, “Advanced power electronic conversion and control system for universal and flexible power Management,” *IEEE Trans on Smart Grid*, vol. 2, no. 2, p. 231–243, 2011.

- [21] M. O. Khan, S. Z. Jamali, C. H. Noh and G. Y. Gwon, “A Load Flow Analysis for AC-DC Hybrid Distribution network incorporated with distributed Energy Resources for different Grid Scenarios,” *Energies*, vol. 11, no. 2, 2018.
- [22] C. Leung, S. Dutta, S. Baek and s. Bhattacharya, “Design considerations of high voltage and high frequency transformer for solid state transformer application. 421–426.,” in *Annual. IEEE IECON*, 2010.
- [23] S. Falcones, X. Mao and R. Ayyanar, “Topology comparison for Solid State Transformer implementation,” in *IEEE PES General Meeting*, 2010.
- [24] M. Sanduleac , J. F. Martins, I. Ciornei , M. Albu and L. Toma , “Resilient and Immune by Design Microgrids Using Solid State Transformers,” *Energies*, vol. 11, no. 12, 2018.
- [25] X. She, X. Ni , a. q. Huang and x. Yu, “System Integration and Hierarchical Power Management Strategy for a Solid- State Transformer interfaced Microgrid System,” *IEEE Trans on Power Electronics*, vol. 29, no. 8, pp. 4415-4425, 2013.
- [26] C. Hunziker and N. Schulz , “Potential of solid-state transformers for grid optimization in existing low-voltage grid environments,” *Electric Power Systems Research*, pp. 124-131, 2017.
- [27] T. Guillod, F. Krismer, R. Färber and C. Franck, “Protection of MV/LV Solid-State Transformers in the Distribution Grid,” *IEEE Industrial Electronics Society*, pp. 3531-3538, 2015.
- [28] W. A. Rodrigues, “Integration of solid state transformer with DC microgrid system. IEEE 2nd Annual Southern Power Electronics Conference.,” 2016.
- [29] T. Gajowik, K. Rafał and M. Malinowski, “Review of multilevel converters for application in solid state transformers,” in *Przegląd Elektrotechniczny*, 2017.
- [30] M. Liserre, G. Buticchi, M. Andresen and G. D. Carne, “The smart transformer: Impact on the electric grid and technology challenges. 10 (2): 46-58.,” *IEEE Industrial Electronics Magazine*, vol. 10, no. 2, 2018.
- [31] L. Wang, D. Zhang and Y. Wang , “Power and voltage balance control of a novel three-phase solid-state transformer using multilevel cascaded H-Bridge

- inverters for microgrid applications,” *IEEE Trans on Power Electronics*, vol. 31, no. 4, pp. 3289-3301, 2016.
- [32] D. Das, V. M. Hrishikesan and C. Kumar, “Smart Transformer based hybrid LVAC and LVDC interconnected Microgrid,” in *IEEE 4th Southern Power Electronics Conf.*, 2018.
- [33] R. Gao, I. Husain, F. Wang and A. Q. Huang, “Solid-state transformer interfaced PMSG wind energy conversion system,” in *IEEE Applied Power Electronics Conf. and Exposition*, 2015.
- [34] E. Unamuno and J. A. Barrena, “Hybrid ac/dc microgrids—Part I: Review and classification of topologies,” *Renewable and Sustainable Energy Reviews*, vol. 52, pp. 1251-1259, 2015.
- [35] B. Zhao, Q. Song, W. Liu and Y. Sun, “Overview of Dual-Active-Bridge Isolated Bidirectional DC–DC Converter for High-Frequency-Link Power-Conversion System,” *IEEE Trans on Power Electronics*, vol. 29, no. 8, pp. 4091-4106, 2014.
- [36] X. She, A. Huang, X. Yu and Y. Xu , “Control of solid-state transformer-enabled DC microgrids. , 2018.,” *DC Distribution Syst and Microgrids IET*, vol. 6, 2018.
- [37] H. H. H. D. Silva, D. K. J. S. Jayamaha and L. N. W. Arachchige, “Review on design and control of solid state transformer based microgrids,” *AIMS Energy* , vol. 7, no. 6, pp. 901-923, 2019.
- [38] J. Zhang, Z. Wang and S. Shao , “A three-phase modular multilevel DC–DC converter for power electronic transformer applications,” *IEEE Journal of Emerging and Selected Topics in Power Elect*, vol. 5, pp. 140-150, 2017.
- [39] B. Liu , Y. Zha , Y. Zhang and T. Zhang, “Fuzzy logic control of dual active bridge in solid state transformer applications,” in *Tsinghua University-IET Electrical Engineering Academic Forum*, 2017.
- [40] H. Açıkgöz , O. F. Kececioglu and I. Karadöl, “Adaptive Control of Solid State Transformer Using Type-2 Fuzzy Neural System,” *Studies in Informatics and Control*, vol. 26, no. 2, pp. 171-182, 2017.

- [41] G. Z. G. Abdelmessih, "Design of a Three- port Solid State Transformer for High Power Applications," Universidad De Oviedo MSc. Thesis, 2015.
- [42] X. Gao , G. D. Carne, M. Liserre and C. Vournas, "Increasing Integration of Wind Power in Medium Voltage Grid by voltage support of Smart Transformer," in *EWEA 2016*, 2016.
- [43] M. J. Reno, R. Broderick and S. Grijalva, "Formulating a Simplified Equivalent Representation of Distribution Circuits for PV Impact Studies," SAND2013-2831, 2013.
- [44] E. Australia, "Electrifying Sydney: 100 years of Energy Australia," 11 Nov 2018. [Online]. Available: <https://www.worldcat.org/title/electrifying-sydney-100-years-of-energyaustralia/oclc/61460770>. [Accessed March 2020].
- [45] C. Venkatesh, D. S. Kumar and D. Sarma, "Modelling of nonlinear loads and estimation of harmonics in industrial distribution system," in *Fifteenth National Power Systems Conference*, Bombay, 2008.
- [46] L. Lupano and G. Abayasekara, "Technical Assistance Consultant's Report Final Report : SRI LANKA: Clean Energy and Network Efficiency Improvement project," 2013. [Online]. Available: <https://www.adb.org/sites/default/files/project-document/151003/43576-012-tacr-03.pdf>. [Accessed March 2020].
- [47] P. S. A. Pieris, "Designing of a grid tie inverter for commercial and household solar power installations based on a SST topology," 2018.
- [48] ABB, "ABB string inverters PVI-5000/6000-TL-OUTD 5 kW," 2015. [Online]. Available: <https://library.e.abb.com/public/056a93c2644e4f15b55475647c6e0156/PVI-5000-EN-Rev%20E.pdf>. [Accessed March 2020].
- [49] T. Instruments, "Basic Calculation of a Boost Converter's Power Stage," Texas Instruments, 2014.
- [50] L. Hassaine, L. Olias, E. Quintero and V. Salas, "Overview of power inverter topologies and control structures for grid connected photovoltaic systems," *Renewable and Sustainable Energy Reviews*, vol. 30, p. 796–807, 2014.

- [51] R. Venkatapathy, A. Karthik and Varadha, “Low Cost, High Efficient SPWM Controller for Photovoltaic Inverter,” in *2012 International Conference on Clean and Green Energy*, Singapore, 2012.
- [52] A. Algaddafi, K. Elnaddab, A. Al and N. Esgiar, “Comparing the Performance of Bipolar and Unipolar Switching Frequency to Drive DC-AC Inverter,” 2016.
- [53] A. Reznik, M. G. Simões, A. Al-Durra and S. M. Muyeen, “LCL Filter Design and Performance Analysis for Grid Interconnected Systems,” *IEEE Transactions on Industry Applications*, vol. 50, no. 2, pp. 1225 - 1232, 2014.
- [54] S. V. Araújo, A. Engler, B. Sahan, V. U. Kassel, F. Luiz and M. Antunes, “LCL Filter design for grid-connected NPC inverters in offshore wind turbines,” in *International Conference on Power Electronics*, 2007.
- [55] B. Crowhurst, E. F. El-Saadany and L. E. Chaar, “Single-phase grid-tie inverter control using DQ transform for active and reactive load power compensation,” in *PECon2010 - 2010 IEEE Int. Conf. Power Energy*, 2010.
- [56] E. S/P2/00233/REP, “Co-ordinated experimental research into power interaction with the supply network – Phase 1,” Department of Trade and Industry- Halcrow Gilbert Associates Ltd, 1999.
- [57] M. Patsalides, D. Evagorou and G. Makrides, “The Effect of solar irradiance on the power quality behaviour of grid connected photovoltaic systems”.
- [58] “IEEE 929-2000, IEEE recommended practice for utility interface of photovoltaic (PV) systems,” 2000.
- [59] W. W. J. B. W.G.Hurley, “Optimized Transformer Design: Inclusive of High-Frequency Effects,” *IEEE Transactions on Power Electronics*, vol. 13, no. 4, pp. 651-660, July 1998.
- [60] S. Kulasekaran, R. Ayyanar and S. Atcitty, “Switching frequency optimization of a high-frequency link based energy storage system,” 2014.
- [61] K. George, “Design and Control of a Bidirectional Dual Active Bridge DCDC Converter to Interface Solar , Battery Storage , and Grid-Tied Inverters”.

- [62] M. Salcone and J. Bond, "Selecting Film Bus Link Capacitors for High Performance Inverter Applications," in *Electrical Machines and Drives conference*, 2009.
- [63] D. Salomonsson, L. Soder and A. Sannino, "Protection of Low-Voltage DC Microgrids. Power Delivery," *IEEE Transactions on Power Delivery*, vol. 24, pp. 1045 - 1053, 2009.
- [64] J. Mohammadi, F. Badrkhani and G. Stevens, "Grounding the AC Microgrid," *IEEE Transactions on Industry Applications*, vol. 55, no. 1, pp. 98-105, 2019.
- [65] A. Sannino, G. Postiglione and G. Bollen, "Feasibility of a DC network for commercial facilities," *IEEE Trans. nd. Appl.*, vol. 39, p. 1499–1507, 2003.
- [66] V. A. Prabhala, B. P. Baddipa, P. Fajri and M. Ferdowsi, "An Overview of Direct Current Distribution System Architectures & Benefits," *Energies*, 2018.
- [67] I. Alsaidan, A. Khodaei and W. Gao, "A Comprehensive Battery Energy Storage Optimal Sizing Model for Microgrid Applications," *IEEE Transactions on Power Systems*, 2017.
- [68] S. Dhundharaa, Y. P. Vermaa and A. Williams, "Techno-economic analysis of the lithium-ion and lead-acid battery in microgrid systems," *Energy Conversion and Management*, vol. 177, no. 1, pp. 122-142, 2017.
- [69] E. Solutions, "Specification sheet High Capacity Lithium Ion 24V Battery Pack," [Online]. Available: https://www.energysolutions.co.uk/assets/uploads/pdf/HC_Lithium_Ion_ES_-_400AH.pdf. [Accessed March 2020].
- [70] T. A. T. Tameghe, R. Wamkeue and I. Kamwa, "Diesel Generator Modelling for Microgrid Power Plant Parameters Assessment.," in *EIC Climate Change Technology Conference*, Canada, 2015.
- [71] A. G. Ltd, "Technical Specification: Diesel/Gas Engine Industrial Application Series," 2012.
- [72] L. B. Kehler, A. M. Kaminski and D. P. Bemardon, "A Strategy for Increasing SST's Efficiency at Low Load Operation Sarajevo, 2018," in *IEEE PES Innovative Smart Grid Technologies Conference Europe (ISGT-Europe)*, 2018.

- [73] G. Guerra and J. A. M. Velasco, "A Solid State Transformer model for power flow calculations," *Electrical Power and Energy Systems*, pp. 40-51, 2017.
- [74] "The smart transformer: Impact on the electric grid and technology challenges. *IEEE Industrial Electronics Magazine* 10 (2): 46-58.," 2018.
- [76] J. H. a. J. Kolar, "Solid-State Transformers On the Origins and Evolution of Key Concept," *IEEE Industrial Elec. Magazine*, pp. 19-28, September 2016.
- [77] D. Kumar, F. Zare and A. Ghosh, "DC Microgrid Technology: System Architectures, AC Grid Interfaces, Grounding Schemes, Power Quality, Communication Networks, Applications, and Standardizations Aspects," *IEEE Access* , vol. 5, pp. 12230-12256, 2017.
- [78] B. Hanumantha Rao, S. L. Arun and M. P. Selvan, "An electric power trading framework for smart residential community in smart cities," *IET Smart Cities*, vol. 1, no. 2, pp. 40-51, 12 2019
- [79]]M. H.J. Bollen, S.K. Ronberg, "Hosting Capacity of the Power Grid for Renewable Electricity Production and New Large Consumption Equipment," *Energies* 2017 10(9) ,2017