

A2. Grid Connection Criteria and Protection Practices for DG in Spain

- [61] OM May, 9th 1985, *Administrative and Technical Specifications for Grid Connection and Required Performance of Hydraulic Power Plants up to 5000 kVA, and Electrical Self-Generation.*
- [62] RD 2018/1997 *Procedure for the Measurement of Electrical Energy Consumed and Transmitted.*
- [63] OM April 12th 1999 *Technical details for the Measurement of Energy Consumed and Transmitted.*
- [64] RD 1663/2000, *Connection Requirements for Photovoltaic Installations to the Low Voltage Grid.*
- [65] REBT ITC-BT-40, *Low Voltage generation facilities*
- [66] Law 54/1997 09/27/1997. *Law of Electrical Sector.*
- [67] RD 436/2004, *Methodology for payment of the Special Regime.*
- [68] Red Eléctrica de España, *Technical conditions for non dispatchable generators of the Special Regime. January 2004.*
- [69] Ministry of Economy. *Planning for electricity and gas sectors..* September 2002.
- [70] UNE Report 206005 *Calculation of wind farm reactive power regulation capacity.* September 2004.

A3. Grid Connection criteria and Protection Practices for DG in Italy

A4. Grid Connection Criteria and Protection Practices for DG in Canada

Bibliography

- [71] IEEE Std. 1547 – Standard for Interconnecting Distributed Resources with Electric Power Systems
- [72] IEEE Std. 519 – IEEE Recommended Practice and Requirements for Harmonic Control in Electric Power Systems
- [73] IEEE Std. 929 – IEEE Recommended Practice for Utility Interface of Residential and Intermediate Photovoltaic (PV) Systems
- [74] IEEE Std. 242 – Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems
- [75] CSA C235 – Preferred Voltage Levels for AC Systems, 0 to 50,000 V
- [76] CSA C22-1 - Canadian Electrical Code
- [77] CEA 128 D 767 - Connecting Small Generators To Utility Distribution Systems (June 1992)

Internet Reference

British Columbia

<http://www.bchydro.com/policies/opentrans/opentrans796.html>

<http://www.bchydro.com/info/ipp/ipp992.html>

Alberta

http://www.energy.gov.ab.ca/ele/docs/alberta_dg_finalguide_july2002.pdf

[http://www.aquilanetworks.ca/downloads/regulation_ab/Current%20Tariff/Aquila%20\(Alberta\)%202003-08-01%20Terms%20and%20Conditions.pdf](http://www.aquilanetworks.ca/downloads/regulation_ab/Current%20Tariff/Aquila%20(Alberta)%202003-08-01%20Terms%20and%20Conditions.pdf)

<http://www.epcor-group.com/EPCOR+Companies/EPCOR+Distribution+and+Transmission/Edmonton+Distribution+Services/Distributed+Generation+Information/default.htm>

Saskatchewan

http://www.oatioasis.com/SPC/SPCdocs/spc_tradetariff.doc

<http://www.saskpower.com/services/nug/NUG25kV.pdf>

Manitoba

<http://oasis.midwestiso.org/documents/Mheb/queue.html>

Ontario

http://www.oeb.gov.on.ca/html/en/industryrelations/ongoingprojects_ministersdirective_connection.htm

Quebec

A5. Grid Connection Criteria and Protection Practices for DG in Greece

- [78] “Technical requirements for the connection of independent generation to the grid”. Public Power Corporation (PPC) of Greece, 2004.
- [79] S.A. Papathanassiou, N.D. Hatziargyriou, “Technical Requirements for the Connection of Dispersed Generation to the Grid”. *Proc. of IEEE-PES Summer Meeting 2001*, June 2001, Vancouver, Canada.
- [80] IEC 61000-1-1 (1992), Part 1: General – Section 1: Application and interpretation of fundamental definitions and terms.
- [81] European Norm EN 50160, “Voltage characteristics of electricity supplied by public distribution systems”. CENELEC, 1999.
- [82] N.Hatziargyriou, T.Karakatsanis, M.Papadopoulos, “Probabilistic load flow in distribution systems containing dispersed wind power generation”, *IEEE Trans. Power Systems*, Vol. 8, No. 1, February 1993.
- [83] N.G. Boulaxis, S.A. Papathanassiou, M.P. Papadopoulos, “Wind turbine effect on the voltage profile of distribution networks”. *Renewable Energy*, Vol. 25, No. 3, March 2002, Pages 401-415.
- [84] IEC 868-0 (1991), Part 0: Evaluation of flicker severity.
- [85] IEC 868 (1986): Flickermeter. Functional design and specifications. Amendment No. 1 (1990).
- [86] IEC 61000-4-15 (1997), Part 4: Testing and measurement techniques – Section 15: Flickermeter-Functional and design specifications.
- [87] IEC 61000-3-3 (1994), Part 3: Limits – Section 3: Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current $\leq 16A$.
- [88] IEC 61000-3-5 (1994), Part 3: Limits – Section 5: Limitation of voltage fluctuations and flicker in low-voltage power supply systems for equipment with rated current greater than 16 A.
- [89] IEC 61000-3-11 (2000), Part 3: Limits – Section 11: Limitation of voltage changes, voltage fluctuations and flicker in low voltage supply systems for equipment with rated current $< 75 A$ and subject to conditional connection.
- [90] IEC 61000-3-7 (1996), Part 3: Limits – Section 7: Assessment of emission limits for fluctuating loads in MV and HV power systems – Basic EMC publication.
- [91] IEC 61400-21 (2001): Wind turbine generator systems - Measurement and assessment of power quality characteristics of grid connected wind turbines.
- [92] ANSI/IEEE Std. 519 (1992): Recommended Practice and Requirements for Harmonic Control in Electric Power Systems.
- [93] IEC 61000-3-2 (2000), Part 3: Limits – Section 2: Limits for harmonic current emissions (equipment input current $\leq 16A$ per phase).
- [94] IEC 61000-3-4 (1998), Part 3: Limits – Section 4: Limitation of emission of harmonic currents in low - voltage power supply systems for equipment with rated current greater than 16A.
- [95] IEC 61000-3-6 (1996), Part 3: Limits – Section 6: Assessment of emission limits for distorting loads in MV and HV power systems.
- [96] IEC 61000-2-2 (1990), Part 2: Environment – Section 2: Compatibility levels for low-frequency conducted disturbances and signalling in public supply systems.
- [97] “Recommendation for the Connection and Parallel Operation of Generating Facilities at the MV Network”, VDEW, 2nd Edition, 1998 (in German).
- [98] IEC 725 (1981): Considerations on reference impedances for use in determining the disturbance characteristics of household appliances and similar electrical equipment.
- [99] Woyte, R. Belmans, J. Nijs, “Testing the islanding protection function of photovoltaic inverters”. *IEEE Transactions on Energy Conversion*, Vol. 18, No. 1, March 2003, pp. 157 –162
- [100] M.E. Ropp et. al., “Determining the Relative Effectiveness of Islanding Detection Methods Using Phase Criteria and Non-detection Zones”. *IEEE Trans. on Energy Conversion*, Vol.15, No.3, Sept. 2000, pp. 290-296.
- [101] W. Bower, M. Ropp, “Evaluation of Islanding Detection Methods for Utility-Interactive Inverters in Photovoltaic Systems”. Report SAND2002-3591, Sandia National Laboratories, 2002.
- [102] M.P. Papadopoulos, S.A. Papathanassiou, S.T. Tentzerakis, “Operating Problems in Wind-Diesel Power Systems with Extended MV Networks”. *Proceedings of EUWEC'96*, May 1996, Goteborg, Sweden.

- [103] S.A. Papathanassiou, M.P. Papadopoulos, "Mechanical Stresses in Fixed Speed Wind Turbines due to Network Disturbances". *IEEE Trans. on Energy Conversion*, Vol. 16, No. 4, Dec. 2001, pp. 361 –367.
- [104] E.ON Netz GmbH, "Supplementary Grid Connection Regulations for Wind Energy Converters", Dec. 2001. Available at <http://www.eon-netz.de>.
- [105] Consortium for Electric Reliability Technology Solutions (CERTS), "White Paper on Integration of Distributed Energy Resources - The CERTS MicroGrid Concept", 2002. Available at <http://certs.lbl.gov/>.
- [106] Georgakis, S. Papathanassiou, N. Hatziaargyriou, A. Engler, C. Hardt, "Operation of a prototype Microgrid system based on micro-sources equipped with fast-acting power electronics interfaces". *Proceedings of PESC'04*, June 2004, Aachen, Germany.

A6. Grid Connection Criteria and Protection Practices for DG in Croatia

A7. Grid Connection Criteria and Protection Practices for DG in Portugal

A8. Grid Connection Criteria and Protection Practices for DG in the Netherlands

A9. Grid Connection Criteria and Protection Practices for DG in Germany

A10. Grid Connection Criteria and Protection Practices for DG in Austria

- [107] Ministry of Economy and Labour, Section Energy and Mining, "ElWOG – "Elektrizitätswirtschafts- und Organisationsgesetz", *BGBl I 149/2002*, 2002, Available at <http://www.e-control.at>.
- [108] "Richtlinie 96/92/EG des Europäischen Parlaments und des Rates vom 19. Dezember 1996 betreffend gemeinsame Vorschriften für den Elektrizitätsbinnenmarkt", *Amtsblatt der Europäischen Union Nr. L 027*, S. 0020 – 0029, 30.1.1997.
- [109] Energie Control GmbH, "Technische und organisatorische Regeln für Betreiber und Benutzer von Übertragungs- und Verteilernetzen gemäß ElWOG – Teil D, Hauptabschnitt D2: Richtlinie für die Beurteilung von Netzzrückwirkungen, Version 2.0", *Marktregeln für Teilnehmer im Elektrizitätsmarkt*, 1 June 2004, Available at <http://www.e-control.at>
- [110] Verband der Elektrizitätsunternehmen Österreichs, "Technische und organisatorische Regeln für Betreiber und Benutzer von Übertragungs- und Verteilernetzen gemäß ElWOG – Teil D, Hauptabschnitt D4: Parallelbetrieb von Erzeugungsanlagen mit Verteilernetzen", *Marktregeln für Teilnehmer im Elektrizitätsmarkt*, 2001, Available at <http://www.e-control.at>
- [111] Österreichischer Verband für Elektrotechnik, "ÖVE/ÖNORM E2750 – "Photovoltaische Energieerzeugungsanlagen, Errichtungs- und Sicherheitsanforderungen", 2004, Available at <http://www.on-norm.at>.
- [112] Communication with the Austrian Utilities Association from 31.8.2004.
- [113] Discussions with various Austrian DNOs, 5.2004 – 6.2004.
- [114] Website of Energie Control GmbH, <http://www.e-control.at>
- [115] Website of the Austrian Energy Agency, "Erneuerbare Energie in Österreich: Wasserkraft, Österreichs bedeutendste Stromquelle", <http://www.eva.ac.at>.
- [116] CIGRE TF 38.06.03 Report "Economic and Technical Interaction between Dispersed Generation and Power System", Convener Goran Strbac

A11. Grid Connection Criteria and Protection Practices for DG in Norway

A12. Grid Connection Criteria and Protection Practices for DG in United States

- [117] IEEE Standard 1547-2003 for Interconnecting Distributed Resources with Electric Power Systems.
- [118] Lawrence, R.; Middlekauff, S.: The new guy on the block. *IEEE Industry Applications Magazine*. Volume 11, Issue 1, Jan-Feb 2005 Page(s):54 – 59.
- [119] Energy Policy Act of 2005, United States, August 2005.
- [120] Strunz, K.; Brock, E. K.: Hybrid plant of renewable stochastic source and multi-level storage for emission-free deterministic power generation. *Proceedings of the CIGRE/IEEE PES International Symposium on Quality and Security of Electric Power Delivery Systems*, Montreal, Canada, October 2003.