UNIVERSITAS GADJAH MADA
Multi-Year Power System Assessment of the Proposed Sulawesi Transmission Network Expansion under
RUPTL 2025â€“2034
Mofid Narawangsa Adhika Kusuma, Dr. Rian Fatah Mochamad, S.T., M.Eng.; Husni Rois Ali, , S.T., M.Eng., Ph.D., D
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

REFERENCES

[1] Tumiran, L. M. Putranto, R. Irnawan, Sarjiya, A. Priyanto, S. Isnandar, and I. Savitri, "Transmission expansion planning for the optimization of renewable energy integration in the sulawesi electricity system," *Sustainability*, vol. 13, no. 18, p. 10477, Sep. 2021.

[2] Kementerian Energi dan Sumber Daya Mineral Republik Indonesia, "Peraturan menteri energi dan sumber daya mineral republik indonesia nomor 20 tahun 2020 tentang aturan jaringan sistem tenaga listrik (grid code)," Berita Negara Republik Indonesia Tahun 2020 Nomor 1794, Jakarta, Indonesia, Dec. 2020, ditetapkan dan diundangkan pada 30 Desember 2020.

[3] Central Electricity Authority, *Manual on Transmission Planning Criteria*, Central Electricity Authority, New Delhi, India, Mar. 2023.

[4] Western Electricity Coordinating Council, *TPL-001-WECC-CRT-4: Transmission System Planning Performance*, Western Electricity Coordinating Council, Salt Lake City, UT, USA, Jul. 2023, wECC Criterion, effective July 1, 2023.

[5] Power and Water Corporation, *Power Networks: Network Technical Code and Network Planning Criteria*, version 3.1 ed., Power and Water Corporation, Darwin, NT, Australia, Dec. 2013.

[6] H. Ritchie, P. Rosado, and M. Roser, "Data page: Electricity demand," Our World in Data, 2023, part of the publication Energy. Data adapted from Ember. [Online]. Available: https://ourworldindata.org/grapher/electricity-demand?mapSelect=~IDN

[7] PT PLN (Persero), "Rencana usaha penyediaan tenaga listrik pt pln (persero) tahun 2025–2034," PT PLN (Persero), Jakarta, Indonesia, Tech. Rep., May 2025, disahkan melalui Keputusan Menteri ESDM Nomor 188.K/TL.03/MEM.L/2025. [Online]. Available: https://gatrik.esdm.go.id/assets/uploads/download_index/files/b967d-ruptl-pln-2025-2034-pub-.pdf

[8] M. Mahdavi, C. Sabillon Antunez, M. Ajalli, and R. Romero, "Transmission expansion planning: Literature review and classification," *IEEE Systems Journal*, 2019.

[9] R. Hemmati, R.-A. Hooshmand, and A. Khodabakhshian, "State-of-the-art of transmission expansion planning: Comprehensive review," *Renewable and Sustainable Energy Reviews*, vol. 23, pp. 312–319, 2013.

[10] J. Choi, T. D. Mount, and R. J. Thomas, "Transmission expansion planning using contingency criteria," *IEEE Transactions on Power Systems*, vol. 22, no. 4, pp. 2249–2261, Nov. 2007.

[11] S. Das, A. Verma, and P. R. Bijwe, "Security constrained ac transmission network expansion planning," *Electric Power Systems Research*, vol. 172, pp. 277–289, Jul. 2019.

[12] ——, "Efficient multi-year security constrained ac transmission network expansion planning," *Electric Power Systems Research*, vol. 187, p. 106507, Oct. 2020.

[13] J. Zhou, H. Zhang, H. Cheng, D. Liu, S. Zhang, G. Li, and X. Zhang, "Security-constrained transmission expansion planning with n-k security criterion and transient stability," *Electric Power Systems Research*, vol. 222, p. 109505, 2023.

UNIVERSITAS
GADJAH MADA
Multi-Year Power System Assessment of the Proposed Sulawesi Transmission Network Expansion under
RUPTL 2025â€“2034
Mofid Narawangsa Adhika Kusuma, Dr. Rian Fatah Mochamad, S.T., M.Eng.; Husni Rois Ali, , S.T., M.Eng., Ph.D., D
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

[14] L. Thurner and M. Braun, "Vectorized calculation of short circuit currents considering distributed generation: An open source implementation of iec 60909," in *2018 IEEE PES Innovative Smart Grid Technologies Conference Europe (ISGT-Europe)*, 2018, pp. 1–6.

[15] V. Ajjarapu and C. Christy, "The continuation power flow: A tool for steady state voltage stability analysis," *IEEE Transactions on Power Systems*, vol. 7, no. 1, pp. 416–423, Feb. 1992.

[16] P. Kundur, J. Paserba, V. Ajjarapu, G. Andersson, A. Bose, C. Canizares, N. Hatziargyriou, D. Hill, A. Stankovic, C. Taylor, T. Van Cutsem, and V. Vittal, "Definition and classification of power system stability," *IEEE Transactions on Power Systems*, vol. 19, no. 3, pp. 1387–1401, Aug. 2004.

[17] L. Liu, W. Li, Y. Ba, J. Shen, C. Jin, and K. Wen, "An analytical model for frequency nadir prediction following a major disturbance," *IEEE Transactions on Power Systems*, vol. 35, no. 4, pp. 2527–2536, Jul. 2020.

[18] J. E. O. Pessanha, O. R. Saavedra, J. C. R. Buzar, A. A. Paz, and C. P. Poma, "Power system stability reinforcement based on network expansion: A practical case," *International Journal of Electrical Power & Energy Systems*, vol. 29, no. 3, pp. 208–216, Mar. 2007.

[19] A. Schroeder, P.-Y. Oei, A. Sander, L. Hankel, and L. C. Laurisch, "The integration of renewable energies into the german transmission grid: A scenario comparison," *Energy Policy*, vol. 61, pp. 140–150, Oct. 2013.

[20] Tumiran, L. M. Putranto, R. Irnawan, Sarjiya, C. F. Nugraha, A. Priyanto, and I. Savitri, "Power system planning assessment for optimizing renewable energy integration in the maluku electricity system," *Sustainability*, vol. 14, no. 14, p. 8436, Jul. 2022.

[21] Pusat Kajian LKFT Universitas Gadjah Mada, "Penyusunan kajian masterplan kelistrikan sulawesi," Pusat Kajian LKFT Universitas Gadjah Mada, Yogyakarta, Indonesia, Study Report, 2018.

[22] H. Saadat, *Power System Analysis*, 3rd ed. Milwaukee, WI, USA: PSA Publishing, 2010.

[23] P. Kundur, *Power System Stability and Control*. New York, NY, USA: McGraw-Hill, 1994.

[24] C. A. Canizares, Ed., *Voltage Stability Assessment: Concepts, Practices and Tools*. Piscataway, NJ, USA: IEEE Power Engineering Society Power System Stability Subcommittee, 2002, special Publication.

[25] *IEEE Standard for Calculating the Current-Temperature Relationship of Bare Overhead Conductors*, IEEE Std. IEEE Std 738-2012, 2013.

[26] *IEEE Guide for Loading Mineral-Oil-Immersed Transformers and Step-Voltage Regulators*, IEEE Std. IEEE Std C57.91-2011, 2012.

[27] *Short-Circuit Currents in Three-Phase AC Systems – Part 0: Calculation of Currents*, International Electrotechnical Commission Std. IEC 60 909-0, 2016.

[28] F. Gonzalez-Longatt, J. M. Roldan-Fernandez, H. R. Chamorro, S. Arnaltes, and J. L. Rodriguez-Amenedo, "Investigation of inertia response and rate of change of frequency in low rotational inertial scenario of synchronous dominated system," *Electronics*, vol. 10, no. 18, p. 2288, Sep. 2021.

[29] E. V. Larsen and D. A. Swann, "Applying power system stabilizers, part i: General concepts," *IEEE Transactions on Power Apparatus and Systems*, vol. PAS-100, no. 6, pp. 3017–3024, Jun. 1981.

UNIVERSITAS
GADJAH MADA
**Multi-Year Power System Assessment of the Proposed Sulawesi Transmission Network Expansion under
RUPTL 2025â€“2034**
Mofid Narawangsa Adhika Kusuma, Dr. Rian Fatah Mochamad, S.T., M.Eng.; Husni Rois Ali, , S.T., M.Eng., Ph.D., D
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

[30] ——, "Applying power system stabilizers, part ii: Performance objectives and tuning concepts," *IEEE Transactions on Power Apparatus and Systems*, vol. PAS-100, no. 6, pp. 3025–3033, Jun. 1981.

[31] North American Electric Reliability Corporation, "Oscillation analysis for monitoring and mitigation: Technical reference document," North American Electric Reliability Corporation, Atlanta, GA, USA, Tech. Rep., Nov. 2021.

[32] Sarjiya, L. M. Putranto, Tumiran, R. F. S. Budi, D. Novitasari, and Deendarlianto, "Generation expansion planning with a renewable energy target and interconnection option: A case study of the sulawesi region, indonesia," *Renewable and Sustainable Energy Reviews*, vol. 183, p. 113489, Sep. 2023.

[33] P.-P. Schierhorn, A. V. Turnell, and M. E. Susetyo, "Operational planning study of sulawesi grid," Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Jakarta, Indonesia, Technical Report, Oct. 2023, implemented by the 1,000 Islands–Renewable Energy for Electrification Programme Phase 2 (REEP2), Energy Programme Indonesia/ASEAN, in cooperation with the Ministry of Energy and Mineral Resources of the Republic of Indonesia.

[34] K. Dartawan and C. St. Pierre, "Evaluating generator circuit breakers short-circuit duty using ieee c37.010 and c37.013," *IEEE Transactions on Industry Applications*, vol. 50, no. 6, pp. 4164–4170, 2014, nov.–Dec.

[35] D. Das, *Electrical Power Systems*. New Delhi, India: New Age International, 2006.

[36] Pusat Kajian LKFT Fakultas Teknik Universitas Gadjah Mada, "Kajian penguatan sistem interkoneksi kalimantan: Laporan kemajuan pekerjaan," Pusat Kajian LKFT Fakultas Teknik Universitas Gadjah Mada, Yogyakarta, Indonesia, Laporan Kemajuan Pekerjaan, Nov. 2023, kerja sama dengan PT PLN (Persero) Unit Induk Penyaluran dan Pusat Pengatur Beban Kalimantan.

[37] M. M. Aman, G. B. Jasmon, A. H. A. Bakar, H. Mokhlis, and M. Karimi, "Optimum shunt capacitor placement in distribution system: A review and comparative study," *Renewable and Sustainable Energy Reviews*, vol. 30, pp. 429–439, Feb. 2014.

[38] M. Furukakoi, T. Senjyu, and T. Funabashi, "Voltage stability improvement of power system using a shunt capacitor," *Renewable Energy and Power Quality Journal*, vol. 14, no. 3, pp. 339–344, May 2016.

[39] M. H. Samimi, I. Ahmadi-Joneidi, A. Majzoobi, and S. Golshannavaz, "Appropriate selection of shunt compensation reactor in parallel transmission lines: A case study," *International Journal of Electrical Power & Energy Systems*, vol. 96, pp. 163–173, Mar. 2018.

[40] P. C. Ananthula and V. Erukula, "Addressing future power demand through optimized transmission planning using high-power conductors and partial dynamic line loading," *Journal Européen des Systèmes Automatisés*, vol. 58, no. 2, pp. 393–408, Feb. 2025.

[41] E. Zientek, "Loading considerations when paralleling transformers," Schneider Electric USA, Inc., Nashville, TN, USA, Technical Data Bulletin AT322, Oct. 2011.