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REFERENCES

[1] Republic of Indonesia, "Long-Term Strategy for Low Carbon and Climate Resilience 2050," Republic of Indonesia, Tech. Rep., 2021. [Online]. Available: https://unfccc.int/documents/299279

[2] ——, "Enhanced Nationally Determined Contribution: Republic of Indonesia," Republic of Indonesia, Tech. Rep., 2022. [Online]. Available: https://unfccc.int/sites/default/files/NDC/2022-09/23.09.2022_Enhanced%20NDC%20Indonesia.pdf

[3] PT PLN (Persero), "Statistik PLN 2023," PT PLN (Persero), Tech. Rep., 2025.

[4] Kementerian Energi dan Sumber Daya Mineral, "Handbook of Energy & Economic Statistics of Indonesia 2024," Kementerian Energi dan Sumber Daya Mineral, Tech. Rep., 2025.

[5] Republik Indonesia, "Undang-Undang Dasar Negara Republik Indonesia Tahun 1945," JDIH Setjen DPR RI, 1945, Pasal 33 ayat (2) dan ayat (3). [Online]. Available: https://jdih.dpr.go.id/setjen/index/id/UUD-1945-BAGIAN-PERTIMBANGAN-DAN-DOKUMENTASI-INFORMASI-HUKUM

[6] ——, "Undang-Undang Nomor 30 Tahun 2009 tentang Ketenagalistrikan," JDIH Kementerian Energi dan Sumber Daya Mineral, 2009. [Online]. Available: https://jdih.esdm.go.id/dokumen/download?id=UU+30+2009.pdf

[7] World Energy Council, "World Energy Trilemma Report 2024," World Energy Council, Tech. Rep., 2024. [Online]. Available: https://www.worldenergy.org/PUBLICATIONS/entry/world-energy-trilemma-report-2024

[8] International Energy Agency, "Status of Power System Transformation 2019: Power System Flexibility," International Energy Agency, Tech. Rep., 2019. [Online]. Available: https://www.iea.org/reports/status-of-power-system-transformation-2019

[9] International Renewable Energy Agency, "Innovation Landscape for a Renewable-Powered Future: Solutions to Integrate Variable Renewables," International Renewable Energy Agency, Tech. Rep., 2019. [Online]. Available: https://www.irena.org/publications/2019/Feb/Innovation-landscape-for-a-renewable-powered-future

[10] PT PLN (Persero) and Universitas Gadjah Mada, "Kajian Pengembangan Interkoneksi Sistem Kelistrikan Nusa Tenggara dan Potensi Energi Terbarukan," PT PLN (Persero) and Universitas Gadjah Mada, Tech. Rep., 2023.

[11] PT PLN (Persero), "Rencana Usaha Penyediaan Tenaga Listrik 2025–2034," PT PLN (Persero), Tech. Rep., 2025. [Online]. Available: https://gatrik.esdm.go.id/frontend/download_index/?kode_category=ruptl_pln&query=2024

[12] International Energy Agency, "Empowering Variable Renewables: Options for Flexible Electricity Systems," International Energy Agency, Tech. Rep., 2008.

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[Online]. Available: https://www.iea.org/reports/empowering-variable-renewables-options-for-flexible-electricity-systems

[13] ——, "Integrating Power Systems across Borders," International Energy Agency, Tech. Rep., 2019. [Online]. Available: https://www.iea.org/reports/integrating-power-systems-across-borders

[14] M. Alves, R. Segurado, and M. Costa, "Increasing the Penetration of Renewable Energy Sources in Isolated Islands through the Interconnection of Their Power Systems: The Case of Pico and Faial Islands, Azores," *Energy*, vol. 182, pp. 502–510, 2019.

[15] S. Ranjan, S. Jaiswal, A. Latif, D. C. Das, N. Sinha, S. M. S. Hussain, and T. S. Ustun, "Isolated and Interconnected Multi-Area Hybrid Power Systems: A Review on Control Strategies," *Energies*, vol. 14, no. 24, p. 8276, 2021.

[16] N. E. Koltsaklis and A. S. Dagoumas, "State-of-the-Art Generation Expansion Planning: A Review," *Applied Energy*, vol. 230, pp. 563–589, 2018.

[17] 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.

[18] 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, 2023.

[19] V. Oree, S. Z. Sayed Hassen, and P. J. Fleming, "Generation Expansion Planning Optimisation with Renewable Energy Integration: A Review," *Renewable and Sustainable Energy Reviews*, vol. 69, pp. 790–803, 2017.

[20] H. Sadeghi, M. Rashidinejad, and A. Abdollahi, "A Comprehensive Sequential Review Study through the Generation Expansion Planning," *Renewable and Sustainable Energy Reviews*, vol. 67, pp. 1369–1394, 2017.

[21] V. Diakov, W. Cole, P. Sullivan, G. Brinkman, and R. Margolis, "Improving Power System Modeling: A Tool to Link Capacity Expansion and Production Cost Models," National Renewable Energy Laboratory, Tech. Rep., 2015.

[22] Tumiran, L. M. Putranto, Sarjiya, F. D. Wijaya, A. Priyanto, and I. Savitri, "Generation Expansion Planning Based on Local Renewable Energy Resources: A Case Study of the Isolated Ambon-Seram Power System," *Sustainability*, vol. 14, no. 5, p. 3032, 2022.

[23] S. Cao and W. Bukhsh, "A Review of Evolving Challenges in Transmission Expansion Planning Problems," *IEEE Access*, vol. 13, pp. 39 964–39 981, 2025.

[24] 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, 2021.

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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

[25] Y. Kuang, Y. Zhang, B. Zhou, C. Li, Y. Cao, L. Li, and L. Zeng, "A Review of Renewable Energy Utilization in Islands," *Renewable and Sustainable Energy Reviews*, vol. 59, pp. 504–513, 2016.

[26] M. P. Bahrman and B. K. Johnson, "The ABCs of HVDC Transmission Technologies," *IEEE Power & Energy Magazine*, vol. 5, no. 2, pp. 32–44, 2007.

[27] J. Katz and I. Chernyakhovskiy, "Variable Renewable Energy Grid Integration Studies: A Guidebook for Practitioners," National Renewable Energy Laboratory, Tech. Rep., 2020.

[28] G. N. Psarros and S. A. Papathanassiou, "Generation Scheduling in Island Systems with Variable Renewable Energy Sources: A Literature Review," *Renewable Energy*, vol. 205, pp. 1105–1124, 2023.

[29] A. Hoke, V. Gevorgian, S. Shah, P. Koralewicz, R. Kenyon, and B. Kroposki, "Island Power Systems with High Levels of Inverter-Based Resources: Stability and Reliability Challenges," *IEEE Electrification Magazine*, vol. 9, no. 1, pp. 74–91, 2021.

[30] O. Erdinc, N. G. Paterakis, and J. P. S. Catalão, "Overview of Insular Power Systems under Increasing Penetration of Renewable Energy Sources: Opportunities and Challenges," *Renewable and Sustainable Energy Reviews*, vol. 52, pp. 333–346, 2015.

[31] N. Flourentzou, V. G. Agelidis, and G. D. Demetriades, "VSC-Based HVDC Power Transmission Systems: An Overview," *IEEE Transactions on Power Electronics*, vol. 24, no. 3, pp. 592–602, 2009.

[32] W. F. Tinney and C. E. Hart, "Power Flow Solution by Newton's Method," *IEEE Transactions on Power Apparatus and Systems*, vol. PAS-86, pp. 1449–1460, 1967.

[33] B. Stott and O. Alsac, "Fast Decoupled Load Flow," *IEEE Transactions on Power Apparatus and Systems*, vol. PAS-93, pp. 859–869, 1974.

[34] DIgSILENT, "Contingency Analysis," PowerFactory technical page, n.d. [Online]. Available: https://www.digsilent.de/en/powerfactory.html

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

[36] 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, 2020.

[37] C. A. Canizares *et al.*, "Voltage Stability Assessment: Concepts, Practices and Tools," IEEE Power Engineering Society Power System Stability Subcommittee, Special Publication, 2002.

[38] 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, 2004.

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[39] Direktorat Jenderal Ketenagalistrikan, Danish Energy Agency, and Ea Energy Analyses, "Technology Data for the Indonesian Power Sector: Catalogue for Generation and Storage of Electricity," Kementerian Energi dan Sumber Daya Mineral, Tech. Rep., 2024. [Online]. Available: https://www.ea-energianalyse.dk/wp-content/uploads/2025/05/technology-data-for-the-indonesian-power-sector-2024.pdf

[40] Kementerian Energi dan Sumber Daya Mineral, "Keputusan Menteri Energi dan Sumber Daya Mineral Nomor 85.K/TL.01/MEM.L/2025 tentang Rencana Umum Ketenagalistrikan Nasional," JDIH Kementerian Energi dan Sumber Daya Mineral, 2025. [Online]. Available: https://jdih.esdm.go.id/dokumen/download?id=2025abskmesdm85k.pdf

[41] Badan Meteorologi, Klimatologi, dan Geofisika, "Peta Rata-Rata Curah Hujan dan Hari Hujan Periode 1991–2020 Indonesia," Pusat Informasi Perubahan Iklim BMKG, Tech. Rep., 2021.

[42] Kementerian Energi dan Sumber Daya Mineral, "Peraturan Menteri Energi dan Sumber Daya Mineral Nomor 20 Tahun 2020 tentang Aturan Jaringan Sistem Tenaga Listrik (Grid Code)," JDIH Kementerian Energi dan Sumber Daya Mineral, 2020. [Online]. Available: https://peraturan.go.id/id/permen-esdm-no-20-tahun-2020

[43] D. A. Tejada-Arango, G. Morales-Espana, S. Wogrin, and E. Centeno, "Power-Based Generation Expansion Planning for Flexibility Requirements," 2019. [Online]. Available: https://arxiv.org/abs/1902.07779

[44] A. Soares, R. Perez, and F. Thome, "Optimal Generation and Transmission Expansion Planning Addressing Short-Term Constraints with Co-optimization of Energy and Reserves," 2019. [Online]. Available: https://arxiv.org/abs/1910.00446

[45] M. Moradi-Sepahvand and T. Amraee, "Integrated Expansion Planning of Electric Energy Generation, Transmission, and Storage for Handling High Shares of Wind and Solar Power Generation," 2023. [Online]. Available: https://arxiv.org/abs/2310.05811

[46] C. A. G. MacRae, M. Ozlen, and A. T. Ernst, "Transmission Expansion Planning Considering Energy Storage," 2014. [Online]. Available: https://arxiv.org/abs/1412.6961

[47] Energy Exemplar, "PLEXOS Energy Modeling Software," Official product page, n.d. [Online]. Available: https://www.energyexemplar.com/plexos

[48] DIgSILENT, "Load Flow Analysis," PowerFactory technical page, n.d. [Online]. Available: https://www.digsilent.de/en/powerfactory.html