

DAFTAR PUSTAKA

- [1] G. Ghufron, “Revolusi Industri 4.0: Tantangan, Peluang, Dan Solusi Bagi Dunia Pendidikan,” *Semin. Nas. dan Disk. Panel Multidisiplin Has. Penelit. dan Pengabd. Kpd. Masy.* 2018, vol. 1, no. 1, pp. 332–337, 2018.
- [2] L. R. Saragih, M. Dachyar, T. Y. M. Zagloel, and M. Satar, “The industrial IoT for nusantara,” *Proc. - 2018 IEEE Int. Conf. Internet Things Intell. Syst. IOTAIS 2018*, pp. 73–79, 2019, doi: 10.1109/IOTAIS.2018.8600860.
- [3] T. Hamdani, “PLN Kesulitan Bangun Transmisi Listrik Gegara Corona,” *finance.detik.com*, 2020. [Online]. Available: <https://finance.detik.com/energi/d-5057039/pln-kesulitan-bangun-transmisi-listrik-gegara-corona>. [Accessed: 02-Feb-2021].
- [4] K. Hutoro, A. Soeprijanto, O. Penangsang, J. T. Elektro, and F. T. Industri, “Desain Smart Meter Untuk Memantau Dan Identifikasi Pemakaian Energi Listrik Pada Sektor Rumah Tangga Menggunakan Backpropagation Neural Network,” pp. 1–6, 2015.
- [5] R. S. Sinha, Y. Wei, and S. H. Hwang, “A survey on LPWA technology: LoRa and NB-IoT,” *ICT Express*, vol. 3, no. 1, pp. 14–21, 2017, doi: 10.1016/j.icte.2017.03.004.
- [6] E. S. Santoso, A. Hidayati, M. Suryanegara, and M. I. Nashiruddin, “NB-IoT network planning for smart metering services in Jakarta, Depok, Tangerang, and Bekasi,” *2019 16th Int. Conf. Qual. Res. QIR 2019 - Int. Symp. Electr. Comput. Eng.*, no. July, pp. 1–6, 2019, doi: 10.1109/QIR.2019.8898262.
- [7] Asosiasi Indonesia IoT, “*IOT & Industry 4.0*” *Indonesia*, 2019. .
- [8] H. Chrismanaria and K. P. Kurniawan, “Analisis Tekno Ekonomi Perancangan Migrasi 2G/3G ke 4G (LTE),” *J. Telekomun. dan Komput.*, vol. 7, no. 3, p. 329, 2017, doi: 10.22441/incomtech.v7i3.1175.
- [9] L. Atzori, A. Iera, and G. Morabito, “The Internet of Things: A survey,” *Comput. Networks*, vol. 54, no. 15, pp. 2787–2805, 2010, doi:

10.1016/j.comnet.2010.05.010.

- [10] D. Hanes, G. Salgueiro, P. Grossetete, R. Barton, and J. Henry, *IoT Fundamentals: Networking Technologies, Protocols and Use Cases for the Internet of Things*, no. 3491. 2017.
- [11] W. D. Fang, W. He, W. Chen, L. H. Shan, and F. Y. Ma, “Research on the application-driven architecture in internet of things,” *Front. Artif. Intell. Appl.*, vol. 293, pp. 458–465, 2016, doi: 10.3233/978-1-61499-722-1-458.
- [12] J. Gómez, J. F. Huete, O. Hoyos, L. Perez, and D. Grigori, “Interaction system based on Internet of things as support for education,” *Procedia Comput. Sci.*, vol. 21, pp. 132–139, 2013, doi: 10.1016/j.procs.2013.09.019.
- [13] J. Xu, J. Yao, L. Wang, Z. Ming, K. Wu, and L. Chen, “Narrowband internet of things: Evolutions, technologies, and open issues,” *IEEE Internet Things J.*, vol. 5, no. 3, pp. 1449–1462, 2018, doi: 10.1109/JIOT.2017.2783374.
- [14] J. Zheng, D. W. Gao, and L. Lin, “Smart meters in smart grid: An overview,” *IEEE Green Technol. Conf.*, pp. 57–64, 2013, doi: 10.1109/GreenTech.2013.17.
- [15] N. Andreadou, E. Kotsakis, and M. Masera, “Smart meter traffic in a real LV distribution network,” *Energies*, vol. 11, no. 5, 2018, doi: 10.3390/en11051156.
- [16] S. Rinaldi, D. Della Giustina, P. Ferrari, A. Flammini, and E. Sisinni, “Time synchronization over heterogeneous network for smart grid application: Design and characterization of a real case,” *Ad Hoc Networks*, vol. 50, pp. 41–57, 2016, doi: 10.1016/j.adhoc.2016.04.001.
- [17] S. Liu, P. X. Liu, and A. El Saddik, “Modeling and stability analysis of automatic generation control over cognitive radio networks in smart grids,” *IEEE Trans. Syst. Man, Cybern. Syst.*, vol. 45, no. 2, pp. 223–234, 2015, doi: 10.1109/TSMC.2014.2351372.

- [18] K. J. Ross, K. M. Hopkinson, and M. Pachter, "Using a distributed agent-based communication enabled special protection system to enhance smart grid security," *IEEE Trans. Smart Grid*, vol. 4, no. 2, pp. 1216–1224, 2013, doi: 10.1109/TSG.2013.2238261.
- [19] J. Finnegan and S. Brown, "A comparative survey of LPWA networking," *arXiv*, 2018.
- [20] U. Raza, P. Kulkarni, and M. Sooriyabandara, "Low Power Wide Area Networks: An Overview," *IEEE Commun. Surv. Tutorials*, vol. 19, no. 2, pp. 855–873, 2017, doi: 10.1109/COMST.2017.2652320.
- [21] Q. M. Qadir, T. A. Rashid, N. K. Al-Salihi, B. Ismael, A. A. Kist, and Z. Zhang, "Low power wide area networks: A survey of enabling technologies, applications and interoperability needs," *IEEE Access*, vol. 6, no. c, pp. 77454–77473, 2018, doi: 10.1109/ACCESS.2018.2883151.
- [22] A. D. Zayas and P. Merino, "The 3GPP NB-IoT system architecture for the Internet of Things," *2017 IEEE Int. Conf. Commun. Work. ICC Work. 2017*, pp. 277–282, 2017, doi: 10.1109/ICCW.2017.7962670.
- [23] H. Kim, S. C. Cho, Y. Lee, and J. S. Shin, "Performance Analysis of NB-IoT System According to Operation Mode," *ICTC 2019 - 10th Int. Conf. ICT Converg. ICT Converg. Lead. Auton. Futur.*, pp. 876–878, 2019, doi: 10.1109/ICTC46691.2019.8939718.
- [24] Kominfo, "4G LTE Kekurangan Frekuensi? Tenang, Masih Banyak!," *kominfo.go.id*, 2015. [Online]. Available: https://kominfo.go.id/content/detail/4449/4g-lte-kekurangan-frekuensi-tenang-masih-banyak/0/sorotan_media. [Accessed: 17-Feb-2021].
- [25] Telecompedia, "What is NB-IoT?," *telecompedia.net*, 2017. [Online]. Available: <https://telecompedia.net/nb-iot/>. [Accessed: 17-Feb-2021].
- [26] S. K. Jha, R. Rokaya, A. Bhagat, A. R. Khan, and L. Aryal, "LTE Network: Coverage and Capacity Planning: 4G Cellular Network Planning around Banepa," *Proc. - 2017 Int. Conf. Netw. Netw. Appl. NaNA 2017*, vol. 2018-

- Janua, pp. 180–185, 2017, doi: 10.1109/NaNA.2017.23.
- [27] B. Utomo, I. Santoso, and A. A. Z, “Simulasi Link Budget Pada Sel Femto Teknologi Telekomunikasi Lte (Long Term Evolution),” *Transmisi*, vol. 15, no. 1, pp. 13–18, 2013, doi: 10.12777/transmisi.15.1.13-18.
- [28] A. Note, “Tutorial on Basic Link Budget Analysis,” *Intersil*, no. June 1998, pp. 1–8, 1998.
- [29] B. Alfaresi, M. V. E. Satya, and F. Ardianto, “ANALISA MODEL PROPAGASI OKUMURA- HATA DAN COST-HATA PADA KOMUNIKASI JARINGAN WIRELESS 4G LTE,” vol. 5, no. 1, 2020.
- [30] C. Florensa, P. Garcia-Herreros, P. Misra, E. Arslan, S. Mehta, and I. E. Grossmann, “Capacity planning with competitive decision-makers: Trilevel MILP formulation, degeneracy, and solution approaches,” *Eur. J. Oper. Res.*, vol. 262, no. 2, pp. 449–463, 2017, doi: 10.1016/j.ejor.2017.04.013.
- [31] D. Negash, “Techno-economic Analysis of LTE Deployment Scenarios for Emerging City : A Case of Adama , Ethiopia By : Dechasa Negash Advisor : Beneyam Berehanu Haile (PhD) Techno-economic Analysis of LTE Deployment Scenarios for Emerging City : A Case of Adama , Eth,” 2018.
- [32] Menteri Komunikasi dan Informatika Republik Indonesia, *Peraturan Menteri Komunikasi dan Informatika Republik Indonesia Nomor 1 Tahun 2019 tentang Penggunaan Spektrum Frekuensi Radio Berdasarkan Izin Kelas*. 2019.
- [33] Kementerian Komunikasi dan Informatika, “Peraturan Direktur Jendral Sumberdaya dan Perangkat POS dan Informatika Nomor 3 Tahun 2019 Tentang Persyaratan Teknis dan Alat Telekomunikasi Low Power Wide Area.” p. 38, 2019.
- [34] R. Indonesia, “Peraturan Menteri Komunikasi dan Informatika Republik Indonesia Nomor 13 Tahun 2019 tentang Penyelenggaraan Jasa Telekomunikasi,” 2019.

- [35] K. K. & I. R. Indonesia, “Peraturan Menteri Komunikasi Dan Informatika Nomor: 19/PER.KOMINFO/10/2005 Tentang Petunjuk Pelaksanaan Tarif Atas Penerimaan Negara Bukan Pajak Dari Biaya Hak Penggunaan Spektrum Frekuensi Radio.” 2005.
- [36] Kementerian Komunikasi dan Informatika, “PP Nomor 80 Tahun 2015.” 2015.
- [37] G. Wibisono, G. P. Saktiaji, and I. Ibrahim, “Techno economic analysis of smart meter reading implementation in PLN Bali using LoRa technology,” *2017 Int. Conf. Broadband Commun. Wirel. Sensors Powering, BCWSP 2017*, vol. 2018-Janua, no. November, pp. 1–6, 2018, doi: 10.1109/BCWSP.2017.8272578.
- [38] R. E. Goldsmith and E. B. Goldsmith, “T He E Ffects O F I Nvestment E Duction O N,” vol. 5, no. 2, pp. 55–69, 2002.
- [39] H. Kierulff, “IRR: A Blind Guide,” *Am. J. Bus. Educ.*, vol. 5, no. 4, pp. 417–426, 2012, doi: 10.19030/ajbe.v5i4.7119.
- [40] P. Prudhvi, D. Bhalodi, M. Manohar, V. Padidela, and S. Adapa, “A Smart energy meter architecture in Indian context,” *2012 2nd Iran. Conf. Smart Grids, ICSG 2012*, 2012.
- [41] Badan Pusat Statistik Kota Padang, “Data Sensus,” *padangkota.bps.go.id*, 2020. [Online]. Available: <https://padangkota.bps.go.id/publication.html>. [Accessed: 07-Mar-2021].
- [42] Badan Pusat Statistik Kab Langkat, “Profil Kota Padang,” *Profil Kabupaten Langkat*, p. 144, 2016.
- [43] W. K. Padang, “Rencana Pembangunan Industri Kota Padang 2019-2039.pdf.” .
- [44] D. O. F. Opportunity, “Annual report 2018 doors of opportunity,” 2018.
- [45] Statistic-BPS-Padang, “Padang City by number or Kota Padang Dalam Angka 2019,” *Padangkota.Bps.Go.Id*, 2019.

- [46] M. Communication, "3GPP TR 45.820," *vol. 0*, 2015. .
- [47] R. Joyce, D. Morris, S. Brown, D. Vyas, and L. Zhang, "Higher order horizontal sectorization gains for 6, 9, 12 and 15 sectored cell sites in a 3GPP/HSPA+ network," *IEEE Trans. Veh. Technol.*, vol. 65, no. 5, pp. 3440–3449, 2016, doi: 10.1109/TVT.2015.2446945.
- [48] H. Malik *et al.*, "NB-IoT network field trial: Indoor, outdoor and underground coverage campaign," *2019 15th Int. Wirel. Commun. Mob. Comput. Conf. IWCMC 2019*, pp. 537–542, 2019, doi: 10.1109/IWCMC.2019.8766568.
- [49] M. B. Ginting, A. Hikmaturokhman, and M. A. Amanaf, "Perancangan Jaringan NB-IoT Menggunakan Standalone Frekuensi 900 MHz Di DKI Jakarta," *J. Telecommun. Electron. Control Eng.*, vol. 01, no. July, pp. 43–52, 2019.
- [50] D. J. Pajak, "PPh Pajak. Jakarta: Kementerian Keuangan Republik Indonesia," 2013.
- [51] IHS Marke, *IoT Trend Watch 2018*. 2018.
- [52] Lisa Maxine, "The Ultimate List Of Marketing Spend Statistics For 2019 (Infographic)," 2021. [Online]. Available: <https://saamarketing.co.uk/the-ultimate-list-of-marketing-spend-statistics-for-2019-infographic/>. [Accessed: 17-Apr-2021].
- [53] ATS Communication, "Rooftop/Tower BTS Internet ATS." [Online]. Available: <https://www.ats-com.net/new/sewa-rooftop>. [Accessed: 17-Apr-2021].
- [54] M. ESDM, "Peraturan Menteri Energi Dan Sumber Daya Mineral Republik Indonesia No.28 Tahun 2016 Tentang Tarif Tenaga Listrik Yang Disediakan Oleh PT Perusahaan Listrik Negara (Persero)." p. 24, 2016.
- [55] Telecom Service, "SK Telecom shares prices for IoT Services," 2016. [Online]. Available: <https://www.telecomlead.com/telecom-services/sktelecom-shares-price-iot-services-69710>. [Accessed: 27-Apr-

2021].