



Time-cost estimation probabilistic model using MCS in quantitative risk analysis in BOT renewable energy projects

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References

- [1] S. M. El-Sayegh, S. Manjikian, A. Ibrahim, A. Abouelyousr, and R. Jabbour, "Risk identification and assessment in sustainable construction projects in the UAE," *Int.J. of Const. Manag.*, vol. 21, no. 4, pp. 327-336, 2021, doi: 10.1080/15623599.2018.1536963.
- [2] L. Wang and X. Zhang, "Bayesian analytics for estimating risk probability in PPP waste-to-energy projects," *J. of Manag. in Eng.*, vol. 34, no. 6, pp. 04018447, 2018, doi: 10.1061/(ASCE)ME.1943-5479.0000658.
- [3] M. Nabawy, and L. M. Khodeir, "A systematic review of quantitative risk analysis in construction of mega projects," *Ain Shams Eng. J.*, vol. 11, no. 4, pp. 1403-1410, 2020, doi: 10.1016/j.asenj.2020.02.006.
- [4] T. Caltrans, "Project risk management handbook: A scalable approach," Dept. of Transportation Sacramento, CA, 2012.
- [5] I. Khan, S. Chowdhury, and K. Techato, "Waste to Energy in Developing Countries—A Rapid Review: Opportunities, Challenges, and Policies in Selected Countries of Sub-Saharan Africa and South Asia towards Sustainability," *Sust.*, vol. 14, no. 7, pp. 3740, 2022, doi: 10.3390/su14073740.
- [6] G. Cao, C. Guo, and H. Li, "Risk Analysis of Public-Private Partnership Waste-to-Energy Incineration Projects from the Perspective of Rural Revitalization," *Sust.*, vol. 14, no. 18, pp. 8205, 2022, doi: 10.3390/su1418205.
- [7] H. Khalid, H. Zhang, C. Liu, W. Li, M.K. Abuzar, F.R. Amin, G., Liu, and C. Chen, "PEST (political, environmental, social & technical) analysis of the development of the waste-to-energy anaerobic digestion industry in China as a representative for developing countries," *Sust. Ene. & Fu.*, vol. 4, no. 3, pp. 1048-1062, 2020, doi: 10.1039/C9SE00692C.
- [8] L. Bing, A. Akintoye, P. J. Edwards, and C. Hardcastle, "The allocation of risk in PPP/PFI construction projects in the UK," *Int. J. of proj. manag.*, vol. 23, no. 1, pp. 25-35, 2005, doi: 10.1016/j.ijproman.2004.04.006.
- [9] Y. Ke, S. Wang, A. P. C. Chan, and P. T. I. Lam, "Preferred risk allocation in China's public-private partnership (PPP) projects," *Int. J. of Proj. Manag.*, vol. 28, no. 5, pp. 482-492, 2010, doi: 10.1016/j.ijproman.2009.08.007.
- [10] C. Chen, "Can the pilot BOT project provide a template for future projects? A case study of the Chengdu No. 6 Water Plant B Project," *Int. J. of Proj. Manag.*, vol. 27, no. 6, pp. 573-583, 2009, doi: 10.1016/j.ijproman.2008.10.006.
- [11] S. Q. Wang, and L. K. Tiong, "Case study of government initiatives for PRC's BOT power plant project," *Int. J. of Proj. Manag.*, vol. 18, no. 1, pp. 69-78, 2000, doi: 10.1016/S0263-7863(98)00072-6.
- [12] T. Liu, and S. Wilkinson, "Large-scale public venue development and the application of Public-Private Partnerships (PPPs)," *Int. J. of Proj. Manag.*, vol. 32, no. 1, pp. 88-100, 2014, doi: 10.1016/j.ijproman.2013.01.003.
- [13] G. Heravi, and Z. Hajhosseini, "Risk allocation in public-private partnership infrastructure projects in developing countries: case study of the Tehran-Chalus toll road," *J. of Infr. Sys.*, vol. 18, no. 3, pp. 210-217, 2012, doi: 10.1061/(ASCE)IS.1943-555X.0000090.
- [14] J. Song, D. Song, X. Zhang, and Y. Sun, "Risk identification for PPP waste-to-energy incineration projects in China," *Ener. Poli.*, vol. 61, pp. 953-962, 2013, doi: 10.1016/j.enpol.2013.06.041.
- [15] Y. Xu, A. P. C. Chan, B. Xia, Q. K. Qian, Y. Liu, and Y. Peng, "Critical risk factors affecting the implementation of PPP waste-to-energy projects in China," *App. ener.*, vol. 158, pp. 403-411, 2015, doi: 10.1016/j.apenergy.2015.08.043.
- [16] C. Sun, C. Cui, and Y. Liu, "Critical risk identification for PPP waste-to-energy incineration projects in China: a multiple case study," in International Conference on Construction and Real Estate Management, Guangzhou, China, 2017, pp. 328-336, doi: 10.1061/9780784481059.034.

- [17] Y. Liu, C. Sun, B. Xia, S. Liu, and M. Skitmore, "Identification of risk factors affecting PPP waste-to-energy incineration projects in China: a multiple case study," *Adv. in Ci. Eng.*, vol. 2018, 2018, doi: 10.1155/2018/4983523.
- [18] C. Cui, Y. Liu, B. Xia, X. Jiang, M. Skitmore, "Overview of public-private partnerships in the waste-to-energy incineration industry in China: Status, opportunities, and challenges," *Ene. Stra. Rev.*, vol. 32, pp. 100584. 2020, doi: 10.1016/j.esr.2020.100584.
- [19] A. M. El-Kholy, "Predicting cost overrun in construction projects," *Int. J. of Const. Eng. and Manag.*, vol. 4, no. 4, pp. 95-105, 2015.
- [20] J. P. Davies, B. A. Clarke, J. T. Whiter, R. J. Cunningham, and A. Leidi, "The structural condition of rigid sewer pipes: a statistical investigation," *Urb. Wat.*, vol. 3, no. 4, pp. 277-286, 2001, doi: 10.1016/S1462-0758(01)00036-X.
- [21] A. Altoryman, Identification and assessment of risk factors affecting construction projects in the Gulf region: Kuwait and Bahrain. Manchester, UK: The University of Manchester, 2014.
- [22] A. Taroun, J. B. Yang, and D. Lowe, "Construction risk modelling and assessment: Insights from a literature review," *The Bui. and Hum. Env. Rev.*, vol. 4, no. 1, pp. 87-97, 2011.
- [23] P. S. Ceryno, L. F. Scavarda, K. Klingebiel, and G. Yuzgulec, "Supply chain risk management: A content analysis approach." *Int. J. Ind. Eng. Manag.*, vol. 4, no. 3, pp. 141-150, 2013.
- [24] Y. Sato, K. Kitazume, and K. Miyamoto, "Quantitative Risk Analysis of Road Projects based on empirical data in Japan," *J. of the East. Asi. Soc. for Transp. Stu.*, vol. 6, pp. 3971-3984, 2005, doi: 10.11175/easts.6.3971.
- [25] Water Waterfront Risk Assessment, Cost risk assessment port lands flood protection and enabling infrastructure waterfront Toronto final report, 2016.
- [26] Turner, and Townsend, Gatwick Risk Report, A Second Runway for Gatwick', London Gatwick Airport Expansion Airport Commission, Programme Risk Management Report, 2015.
- [27] V. Platon, and A. Constantinescu, "Monte Carlo Method in risk analysis for investment projects," *Proc. Econ. and Fina.*, vol. 15, pp. 393-400, 2014, doi: 10.1016/S2212-5671(14)00463-8.
- [28] R. Alfalla Luque, I. Burcar Dunovic, A. Gebbia, A. I. Irinia Diéguez, M. Mikic, Á. Sánchez Cazorla, J. d. A. E. Silva, and K. Spang, "Risk in the front end of Megaprojects," 2015, URL: https://idus.us.es/bitstream/handle/11441/81069/Risk_in_the_Front_End_of_Megaprojects.pdf?sequence=1
- [29] S. Digiesi, F. Facchini, G. Mossa, G. Mummolo, "Minimizing and balancing ergonomic risk of workers of an assembly line by job rotation: A MINLP Model," *Int. J. Ind. Eng. Manag.*, vol. 9, no. 3, pp. 129-138, 2018, doi: 10.24867/IJIEM-2018-3-129.
- [30] G. Avlijas, "Examining the value of Monte Carlo simulation for project time management," *Manag.: J. of Sust. Busi. and Manag. Sol. in Emer. Eco.*, vol. 24, no. 1, pp. 11-23, 2019, doi: 10.7595/management.son.2018.0004.
- [31] F. Acebes, M. Pereda, D. Poza, J. Pajares, and J.M. Galán, "Stochastic earned value analysis using Monte Carlo simulation and statistical learning techniques," *Int. J. of Pro. Manag.*, vol. 33, no. 7, pp. 1597-1609, 2015, doi: 10.1016/j.ijproman.2015.06.012.
- [32] F. Acebes, D. Poza, J.M. González-Varona, and A. López-Paredes, "Stochastic Earned Duration Analysis for Project Schedule Management," *Eng.*, vol. 9, pp. 148-161, 2021, doi: 10.1016/j.eng.2021.07.019.
- [33] J. Von Neumann, "13. various techniques used in connection with random digits," *Appl. Math Ser*, vol. 12, no. 3, pp. 36-38, 1951.
- [34] J. Song, D. Song, and D. Zhang, "Modeling the concession period and subsidy for BOT waste-to-energy incineration projects," *J. of cons. eng. and manag.*, vol. 141, no. 10, pp. 04015033, 2015, doi: 10.1061/(ASCE)CO.1943-7862.0001005.