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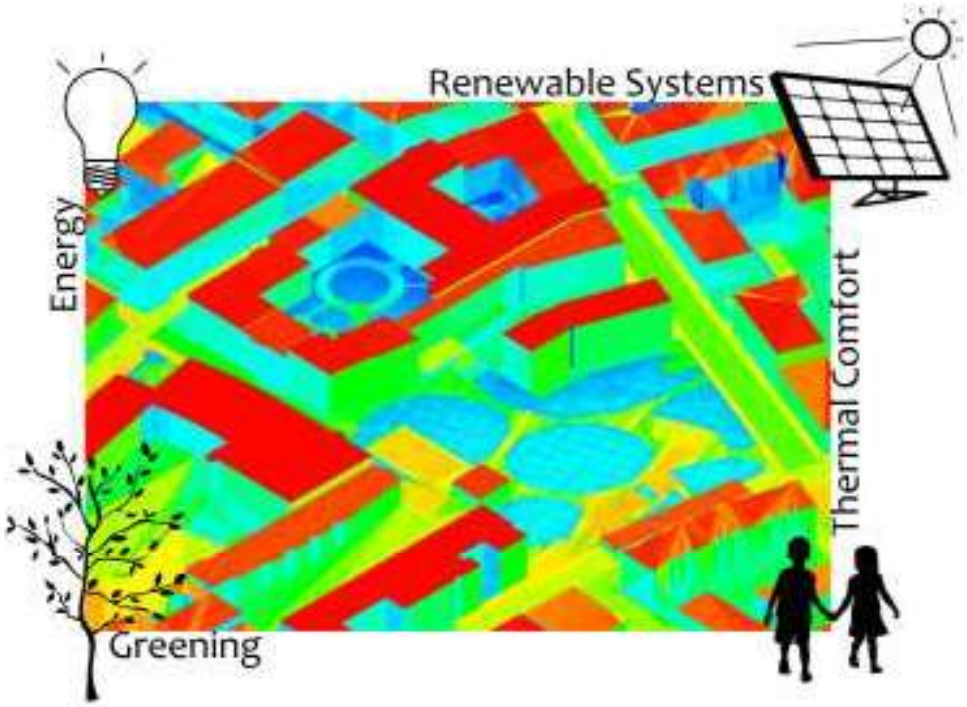
CitySim Guide

Urban energy modelling

G. Mutani, S. Coccolo, J. Kämpf and

M. Bilardo



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Contents

References

The following references helped drawing up this document. In addition, they can also be checked as focus work on the CitySim simulation topic.

Carozza M., Mutani G., Coccolo S., Kaempf J. H. 2017. Introducing a hybrid energy-use model at the urban scale: the case study of Turin (Italy). *Conference Proceedings BU Press 3rd BSA-Italy.* pp. 209-216. ISSN: 25316702, ISBN: 978-886046136-0.

Coccolo, S. 2017. *Bioclimatic design of sustainable campuses using advances optimization methods. EPFL Thesis n. 7756.*

Coccolo, S., et al. 2018. Cooling potential of greening in the urban environment, a step further towards practice. *Sustainable Cities and Society* 38, pp. 543-559.

Coccolo, S., et al. 2018. Thermal Comfort Maps to estimate the impact of urban greening on the outdoor human comfort. *Urban Forestry & Urban Greening* 35, pp. 91-105.

Guen, M.L., et al. 2018. Improving the energy sustainability of a Swiss village through building renovation and renewable energy integration. *Energy and Buildings* 158, pp. 906-923.

Kämpf, J.H. 2009. *On the Modelling and Optimisation of Urban Energy Fluxes. EPFL Thesis n. 4548.*

Kämpf, J.H., D. Robinson. 2007. A Simplified Thermal Model to Support Analysis of Urban Resource Flows. *Energy and Buildings 39*, pp. 445-53.

Kämpf, J.H., M. Montavon, J. Bunyesc, R. Bolliger, D. Robinson. 2010. Optimization of buildings' solar irradiation availability. *Solar Energy* 84, pp. 596-603.

Martin, L., L. March. 1972. Urban space and structure.

Mauree, D., et al. 2018. A new framework to evaluate urban design using urban microclimatic modeling in future climatic conditions. *Sustainability* 10 (4), 1134.

Mauree, D., et al. 2017. Multi-scale modelling to evaluate building energy consumption at the neighbourhood scale. *PLoS One.*

Mutani, G., et al. 2018. Building energy consumption modeling at urban scale: three case studies in Europe. *INTELEC® 2018 - International Telecommunications Energy Conference, Torino, Italy 7-11th October , in press.*

Mutani, G., Gamba, A. and Maio, S. 2016. Space heating energy consumption and urban form. The case study of residential buildings in Turin (Italy). *11th Conference on Sustainable of Energy, Water and Environmental Systems, SDEWES2016.0441*, pp. 1-17. ISSN 1847-7178 (digital proceedings).

Mutani, G., Martino, M. and Pastorelli, M. 2017. Hybrid models for the evaluation of energy sustainability in urban areas. *GeoProgress Journal* Vol. 4, Issue 2. (http://www.geoprogress.eu/wp-content/uploads/2018/09/GPJ2017_VOL4_2-02MutaniMartinoPastorelli.pdf).

Mutani, G., Todeschi, V. and Matsuo, K. 2018. The Microclimate in Hiroshima. A Model to Mitigate the Urban Heat Island Effects. *Journal of Weather Changes* Vol. 1, pp. 1-26. (https://openaccesspub.org/jwc/article/836).

Perera, A.T.D., et al. 2018. Quantifying the impact of urban climate by extending the boundaries of urban energy system modeling. *Applied Energy*, Vols. 222, pp. 847-860.

Remund, J., Müller, S. and Kunz, S. *Meteonorm - Global Meteorological Database - Version 7.*

Robinson, D. 2011. *Computer modelling for sustainable urban design. Physical principles, methods & applications. .* Earthscan, London and Washington DC : s.n.

Robinson, D., A. Stone. 2005. A Simplified Radiosity Algorithm for General Urban Radiation Exchange. *Building Services Engineering Research Technology* 26, pp. 271–84.

Robinson, D., F. Haldi, J. Kämpf, P. Leroux, D. Perez, A. Rasheed, U. Wilke. 2009. Citysim: comprehensive micro-simulation of resource flows for sustainable urban planning. *Proceedings of the 11th International IBPSA Conference.*

Rode, P., C. Keim, G. Robazza, P. Viejo, J. Schofiled. 2014. Cities and energy: urban morphology and residential heat-energy demand. *Environment and Planning B: Planning and Design 41*, pp. 138–162.

Torabi Moghadam, S., et al. A new clustering and visualization method to evaluate urban energy planning scenarios, Cities, under revision.

Upadhyay, G., D. Mauree, J. Kampf, J.L. Scartezzini. 2015. Evapotranspitation Model to Evaluate the Cooling Potential in Urban Areas - a Case Study in Switzerland. *Proceedings of Building Simulation 2015 - 14th International IBPSA Conference.*

Walter, E., J. Kämpf. 2015. A verification of CitySim results using the BESTEST and monitored consumption values. *Proceedings of the 2nd Building Simulation Applications BSA.*

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