

# Energy Efficient Cities

*Assessment Tools and Benchmarking Practices*

*Edited by*  
Ranjan K. Bose



**THE WORLD BANK**  
Washington, D.C.



# Contents

<i>Foreword</i>	<i>xi</i>
<i>Acknowledgments</i>	<i>xiii</i>
<i>Abbreviations</i>	<i>xv</i>
1 The Imperative of Efficient Energy Use in Cities: Analytical Approaches and Good Practices <i>Sangeeta Nandi and Ranjan K. Bose</i>	1
2 SynCity: An Integrated Tool Kit for Urban Energy Systems Modeling <i>James Keirstead, Nouri Samsatli, and Nilay Shah</i>	21
3 City-Scale Integrated Assessment of Climate Impacts, Adaptation, and Mitigation <i>Jim W. Hall, Richard J. Dawson, Stuart L. Barr, Michael Batty, Abigail L. Bristow, Sebastian Carney, Athanasios Dagoumas, Alistair C. Ford, Colin Harpham, Miles R. Tight, Claire L. Walsh, Helen Watters, and Alberto M. Zanni</i>	43
4 Using an Integrated Assessment Model for Urban Development to Respond to Climate Change in Cities <i>Spike Boydell, Damien Giurco, Peter Rickwood, Garry Glazebrook, Michelle Zeibots, and Stuart White</i>	65
5 Green Star and NABERS: Learning from the Australian Experience with Green Building Rating Tools <i>Lily M. Mitchell</i>	93

6	Efficient Lighting Market Transformation in the Making— The Philippine Experience <i>Noel N. Verdote</i>	131
7	The Role of Information and Communication Technologies for Demand Responsive Transport <i>Robert Clavel, Elodie Castex, and Didier Josselin</i>	147
8	Getting to Carbon Neutral: A Review of Best Practices in Infrastructure Strategy <i>Christopher Kennedy, David Bristow, Sybil Derrible, Eugene Mohareb, Sheyda Saneinejad, Robert Stupka, Lorraine Sugar, Ryan Zizzo, and Bernard McIntyre</i>	165
9	Supporting Energy Efficient Solutions in Developing Countries: The Way Ahead <i>Ranjan K. Bose and Sangeeta Nandi</i>	185
	Index	193
	Appendix	205

## Boxes

1.1	Urbanization and Human Development Attainments: A Positive Association	5
1.2	Urban Energy Use and Associated GHG Emissions	7
1.3	Masdar: A Planned Oil-Free Eco-City in Abu Dhabi, an Oil-Rich Sheikhdom	8
1.4	Benefits of Energy Efficiency Improvement in City Sectors: Case Studies	13
2.1	Pseudo-code of a Typical SynCity Model	26
8.1	PS10 Solar Central Receiver Station, Seville, Spain	175
8.2	Congestion Charging, London, United Kingdom	176
8.3	CHP from Solid Waste, Gothenburg, Sweden	176
8.4	Source Separation and Energy Recovery, Sydney, Australia	177
8.5	Calgary C-Train, Alberta, Canada—Ride the Wind!	177
9.1	The Rapid Assessment Framework: A Practical Tool for Instituting Urban Energy Efficiency	188

## Figures

1.1	Regional Urbanization Trends Worldwide	2
B1.1a	World Urban Population Share and HDI Value, 2005	5
B1.1b	World Urban Population Share and GDP per Capita, 2005	6