



ISSN: 2978-4387

CONFERENCE PROCEEDINGS

SET 2003

Proceedings of the 2nd International
Conference on Sustainable Energy
Technologies

Chongqing, China. 24 to 27 October 2003.



WSSET
World Society of Sustainable
Energy Technologies

ISBN 978-1-995850-10-8

CONFERENCE PROCEEDINGS

Proceedings of the 2nd International Conference on Sustainable Energy Technologies

CONFERENCE	SET2003 · Chongqing, China · 24 to 27 October 2003
ORGANISED BY	World Society of Sustainable Energy Technologies
PUBLISHED BY	Caravel Press
PUBLISHED	24 October 2003
PUBLISHED ONLINE	1 November 2026
ISBN	978-1-995850-10-8
SERIES	SET Proceedings ISSN 2978-4387
VOLUME	2
DOI	https://doi.org/10.65582/set.v2

HOW TO CITE THIS VOLUME

Proceedings of the 2nd International Conference on Sustainable Energy Technologies (SET2003), Chongqing, China, 24 to 27 October 2003. Caravel Press. ISBN 978-1-995850-10-8. <https://doi.org/10.65582/set.v2>

COPYRIGHT

© 2003 Copyright WSSET. Free to read, download, print and share, unaltered and for non-commercial purposes, provided the authors, the paper and the proceedings are credited. Any other use, including commercial use or adaptation, needs written permission: write to set@caravelpress.com.

PEER REVIEW

Every paper in this volume was peer reviewed double-anonymously before it was accepted: the reviewers were not told who the authors were, and the authors were not told who the reviewers were.

Foreword

This Special Issue contains the scientific papers that were presented in the International Conference on Sustainable Development in Building and Environment (SET2). The authors from the UK, USA, Japan, Saudi Arabia, Switzerland, Hong Kong and the mainland China presented research activities and findings related to Sustainable Development in Building and Environment.

Sustainable development provides the framework for the integration of the overall system of social, economic, technological, environmental and ecological. The role of buildings and cities is fundamental to the realisation of sustainable development. On the one hand buildings in the worldwide are responsible for a major part of the carbon emissions which cause climate change, on the other hand buildings need to adapt to the predicted climate change. Sustainability is at the top of the agenda, firmly and irreversibly coinciding with a growing public awareness and creating a new mood, which should be put to maximum effect. The duty lies collectively with all architects and building engineers to have the vision for the future that will enable mankind to live in harmony with its host environment.

China currently accounts for about ten percent of global carbon dioxide emissions from energy use. China signed the United Nation Framework Convention on Climate Change and is formulating policies to fulfil its obligations under the convention. China is currently researching the integration of its social, economic, and environmental policies to make a significant contribution to mitigate this current adverse trend.

The conference focuses on the topics of philosophy, methodology, and technology on energy usage and efficiency, design methods and standards, new and renewable energy, recycling techniques, health and safety, management of solid waste, water resource usage and management and so on. It reports the state-of-the-art developments and provides information and results for architects, engineers, researchers, students, building developers and decision makers involved in the process of producing our future environment.

I would like to express my sincerely thanks to the conference sponsors and scientific committee. I would like to express my sincerely thanks to the keynote speakers and the authors for their contributions and for sharing their knowledge and experiences. I believe that expertise and the recognised value of the forefront research will lead to building and construction to the sustainable development and provide a useful contribution to China and international efforts.

Professor Baizhan Li (PhD)

Chairmen of the International Conference on Sustainable Development in Building and Environment, in Chongqing, P. R. China, 24–27 October 2003

SET2003

The conference

CONFERENCE CHAIR

Baizhan Li

Chongqing University, China

CO-CHAIR

Saffa B. Riffat

University of Nottingham, United Kingdom

CONTENTS

Contents

BOOK 1

Sustainable Life Labs for the 21st Century	1
Riffat, S.B. https://doi.org/10.65582/set.2003.001	
'Change for good'	7
Wyatt, T. https://doi.org/10.65582/set.2003.002	
Urban thermal diversity	11
Steemers, K., Ramos, M. and Sinou, M. https://doi.org/10.65582/set.2003.003	
Wind environment for a high-rise building adjacent to a vertical wall	19
Chow, W. https://doi.org/10.65582/set.2003.004	
A design methodology to reduce waste in the construction process	26
Baldwin, A.N., Austin, S.A. and Keys, A. https://doi.org/10.65582/set.2003.005	
Status and prospects of building energy efficiency in China	31
Long, W. and Zhou, H. https://doi.org/10.65582/set.2003.006	
Artificial lighting for green or sustainable buildings and their fire safety concerns	37
Chow, C. and Chow, W. https://doi.org/10.65582/set.2003.007	
Energy efficient design for residential buildings in China	41
Yao, R., Steemers, K. and Li, B. https://doi.org/10.65582/set.2003.008	
Urbanization impact on energy demand and CO2 emission in China	46
Wei, B., Yagita, H., Inaba, A. and Sagisaka, M. https://doi.org/10.65582/set.2003.009	
Envelope colour on thermal load in hot humid Hong Kong: Effect of hue, value, and chroma	51
Cheng, V. and Ng, E. https://doi.org/10.65582/set.2003.010	
GDP model for Chinese energy modeling based on empirical production function	57
Yagita, H., Wei, B., Inaba, A., Sagisaka, M., Hirota, K. and Minato, K. https://doi.org/10.65582/set.2003.011	
Innovative use of strategic energy design tools in building design in China	61
Li, B., Yao, R., Baker, N. and Steemers, K. https://doi.org/10.65582/set.2003.012	

Analysis of building energy efficiency in China	65
Li, D., Fan, Y. and Hao, B. https://doi.org/10.65582/set.2003.013	
A combined gray neural network model of seasonal heating load forecast	69
Qiao, X. and Yang, C. https://doi.org/10.65582/set.2003.014	
Research on phase-change material building mass applied in the air-conditioning field	72
Yan, Q. https://doi.org/10.65582/set.2003.015	
The enactment of thermal efficiency standard for domestic gas appliances and its foreground of Implementing in Chongqing	75
Peng, S., Peng, L. and Fu, X. https://doi.org/10.65582/set.2003.016	
Theoretical heating coefficient of a heat pump water heater with heat recovery applied in household bathing room	79
Kou, G., Wang, H., Gu, W. and Kou, J. https://doi.org/10.65582/set.2003.017	
Energy saving system of terminal regulated air volume in intelligent building	82
Li, J. and Wang, P. https://doi.org/10.65582/set.2003.018	
Energy fan power consumption comparison of subway station HVAC system	85
Jiang, Y. and Zhu, Y. https://doi.org/10.65582/set.2003.019	
Study on heating technique for high productivity, superior quality and lower consumption	88
Chen, Y., Zhou, J. and Mei, D. https://doi.org/10.65582/set.2003.020	
A study of the heating and heat storage problems in passive solar heated room with greenhouse	92
Chen, W. and Liu, W. https://doi.org/10.65582/set.2003.021	
Experimental research on daylight performance of side lighting light pipe	96
Wu, Y. and Ma, C. https://doi.org/10.65582/set.2003.022	
The study on energy demand forecast of Chongqing	100
Yang, J. and Wu, X. https://doi.org/10.65582/set.2003.023	
Reflection of ground-source heat pump systems' application	104
Zhang, S., Lin, Z., Wu, X. and Wu, T. https://doi.org/10.65582/set.2003.024	
Summarization of Energy efficiency in buildings in West China	107
Lin, Z., Zhang, S., Fu, X., Xiao, Y. and Bai, X. https://doi.org/10.65582/set.2003.025	

Technological options for and Chinese government regulation of building energy efficiency Fan, Y., Lin, Z. and Fu, X. https://doi.org/10.65582/set.2003.026	111
A case study in carbon management during the design process Satellite 3, Stansted Airport, UK Sharratt, P. and Diaz, C. https://doi.org/10.65582/set.2003.027	115
Recent developments in healthy city design Lau, S.S., Chau, K. and Ho, D.C. https://doi.org/10.65582/set.2003.028	121
Sustainable development of streetscape in the desert city of Riyadh-Saudi Arabia BaHammam, O.S. https://doi.org/10.65582/set.2003.029	128
Meteorological simulation of thermal environment in the Sichuan basin Zhang, H., Hanaki, K. and Aramaki, T. https://doi.org/10.65582/set.2003.030	134
A comparative sustainability assessment of standard housing blocks in Hong Kong and proposed integer concept tower alternative Amato, A., Frewer, R. and Humphrey, S. https://doi.org/10.65582/set.2003.031	139
Study on particulate pollution in cities of China and evaluation of protective measurements Shen, H., Yang, L., Wang, H. and Liu, G. https://doi.org/10.65582/set.2003.032	144
Indoor environment quality in the university dormitory Wu, X., Yang, J., Ao, L. and Zheng, Z. https://doi.org/10.65582/set.2003.033	149
Experimental study on the indoor temperature variation characteristics and energy conservation potentialities in winter Long, E., Wang, Y. and Fu, X. https://doi.org/10.65582/set.2003.034	153
Study on planting structure in multiple levels Bai, X. https://doi.org/10.65582/set.2003.035	157
Development of city water supply net information system Chen, J., Guo, S. and Lu, J. https://doi.org/10.65582/set.2003.036	160
Indemnification of the quality of water supply in residential areas Chen, J. and Guo, S. https://doi.org/10.65582/set.2003.037	165
Adding analysis of urban heat island effect in GIS system and applying them in urban planning Liu, S., Lu, J., Chen, J. and Wu, J. https://doi.org/10.65582/set.2003.038	169

Study on factors of affecting sedimentation performance of activated sludge in A-step of AB process	172
Zhou, J., Tian, W. and Long, T. https://doi.org/10.65582/set.2003.039	
Bio-chemical process for nitrogen and phosphorus removal by draining out anaerobic rich phosphate supernatant in ERP-SBR system	178
Ji, F., Xu, X. and Luo, G. https://doi.org/10.65582/set.2003.040	
Strategies to water pollution control in western China	183
Jiang, W., Cheng, J., Long, T. and He, Q. https://doi.org/10.65582/set.2003.041	
Research on the benign utilization and management system of water environment in our country	188
Fang, J., Long, T. and He, Q. https://doi.org/10.65582/set.2003.042	
The progress and development of environment control techniques in the building	191
He, T. and Liu, X. https://doi.org/10.65582/set.2003.043	
Performance analysis and application of air compression refrigeration system for air conditioning	194
Huang, X., Wang, R. and Li, D. https://doi.org/10.65582/set.2003.044	
Model experiment on stratified air-conditioning in winter condition in High ceiling industrial plants	198
Yang, L., He, T., Li, X. and Xiong, H. https://doi.org/10.65582/set.2003.045	
Review and prospect of stratified air conditioning technology of large space buildings	202
Li, X. and He, T. https://doi.org/10.65582/set.2003.046	
Trend of the application research into air conditioning technology in large space building	206
Xiong, H., He, T., Li, X. and Yang, L. https://doi.org/10.65582/set.2003.047	
Study on the exploitation of biomass energy in environmental engineering	211
Ye, J., Luo, G. and He, C. https://doi.org/10.65582/set.2003.048	
Direct evaporative cooling with porous ceramics	217
Riffat, S., Al-Koheji, M. and Zhu, J. https://doi.org/10.65582/set.2003.049	
Dial-Europe— European daylighting design tool	221
Paule, B., Baker, N., Lawton, S., McEvoy, M., Yao, R., de Boer, J., Erhorn, H., Woesner, S., de Groot, E., Zonneveldt, L. and Scartezzini, J. https://doi.org/10.65582/set.2003.050	

Simulation framework for design sustainability of buildings	225
Tang, D.D. https://doi.org/10.65582/set.2003.051	
Porous ceramics for building evaporative cooling	231
Ibrahim, E., Shao, L. and Riffat, S.B. https://doi.org/10.65582/set.2003.052	
Fire safety management in hotel	236
Wu, H. and Chow, W. https://doi.org/10.65582/set.2003.053	
Smoke dispersion in a building with double-skin facade	242
Huang, T., Wang, F. and Kew, P. https://doi.org/10.65582/set.2003.054	
Modeling airflow in an urban landscape	247
Li, W., Wang, F. and Bell, S. https://doi.org/10.65582/set.2003.055	
Sheltering effect of trees on reducing space heating in an office building with large glazing area in a windy city	252
Wang, F. and Liu, Y. https://doi.org/10.65582/set.2003.056	
Heat transfer field synergy analysis	260
Ma, L., Sun, D., Zhang, J. and Dai, Y. https://doi.org/10.65582/set.2003.057	
Cooling/heating floor air conditioning systems in residential buildings	264
Lu, J., Chen, J. and Gao, D. https://doi.org/10.65582/set.2003.058	
Research on catalytic combustion burners and products selectivity of the heterogeneous oxidation of methane	268
Zhang, S., Zhou, Q., Wang, W., Mao, Y. and Dupont, V. https://doi.org/10.65582/set.2003.059	
Application of gaseous fuels to heating and cooling	272
Zheng, Z. and Yang, Y. https://doi.org/10.65582/set.2003.060	
Experimental study on effects of inlet geometry on cyclone separator performance	275
Zhao, B., Shen, H., Kang, Y., Zhang, J. and Gan, C. https://doi.org/10.65582/set.2003.061	
Numerical simulation for the ventilation form of the underground main workshop in the hydropower station	279
Long, T., Yang, Y. and Luo, Q. https://doi.org/10.65582/set.2003.062	
Models for simulating hourly ambient temperature based on daily mean and range of temperature	283
Su, H., Tian, S., Su, F., Wang, J. and Li, T. https://doi.org/10.65582/set.2003.063	

Calculation of solar radiation load through glass windows in BIN building energy analysis	287
Su, F., Tian, S., Zhang, C. and Zhang, K. https://doi.org/10.65582/set.2003.064	
Numerical simulation and optimization design for ceiling supply air of an underground main workshop in hydropower station	291
Zhang, H., Fu, X. and Ma, X. https://doi.org/10.65582/set.2003.065	
Neural-net model of heat-transfer system on buried thermal well of ground-source-heat-pump	297
Ding, Y., Liu, X. and Sun, C. https://doi.org/10.65582/set.2003.066	
Smoke exhaust experiments in an atrium model	301
Liu, F., Fu, X. and Lin, Z. https://doi.org/10.65582/set.2003.067	
Studies of evacuation start time in fires	305
Zhang, H., Liu, C. and Jia, C. https://doi.org/10.65582/set.2003.068	
The intelligent guard control system based on CPLD	309
Dong, X., Cao, L. and Li, T. https://doi.org/10.65582/set.2003.069	
Fault diagnosis and its application in HVAC facilities management	311
Zheng, J., Zhou, Y., Liu, T. and Zhao, S. https://doi.org/10.65582/set.2003.070	
The development of automated energy-saving HVAC systems	315
Zheng, J., Ye, Q. and Zhang, P. https://doi.org/10.65582/set.2003.071	
Control mode of household heating system	319
Zhao, X., Li, B. and Li, D. https://doi.org/10.65582/set.2003.072	
Energy saving of pumps in water supply pump station	323
Wang, P., Wen, Y. and Wang, L. https://doi.org/10.65582/set.2003.073	