

Ajman 4th International Environment Conference on
"Smart Cities and Green Innovation"

دائرة البلدية والتخطيط

Municipality & Planning Department

حكومة عجمان

Government Of Ajman

Book of Abstracts

AIEC2016

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Ajman - UAE

www.aiec2016.org



مؤتمر عجمان الدولي للبيئة

AJMAN INTERNATIONAL ENVIRONMENT CONFERENCE



His Highness Sheikh Khalifa Bin Zayed Al Nahyan
President of the United Arab Emirates



His Highness Sheikh Humaid Bin Rashid Al Nuaimi
Member of the Supreme Council - Ruler of Ajman



His Highness Sheikh Ammar Bin Humaid Al Nuaimi
Crown Prince of Ajman - Chairman of The Executive Council



H.H. Sheikh Rashid Bin Humaid Al Nuaimi
Chairman of the Department of Municipal and Planning
Ajman



H.E. Yahya Ibrahim Al-Reyaysa
Director General of the Department of Ajman
Municipality and Planning

LEGEND OF ABSTRACTS:

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<i>BP</i>	<i>Best Practices</i>
<i>GI</i>	<i>Green Infrastructure</i>
<i>LW</i>	<i>Land, Waste & Emergency Management Innovations</i>
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30 KS03: Seeking a Sea Change Conceptualizing Urban Water Supply Systems. Bryan Karney, Division of Environmental Engineering & Energy Systems - Faculty of Applied Science & Engineering, University of Toronto, Canada

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36 BP406: Effect of Various Shading Methods on Cucumber (*Cucumis sativus* L.) Growth and Yield Production. Taleb Rateb Abu-Zahra, Jordan

37 BP443: Death of the Human Embryo from Electromagnetic Radiation. Viktor A. Ovsyannikov, Russian Federation

38 BP448: Consequences of Environmental Pollution on Agricultural Productivity in the Developing Countries; A Case of Nigeria. Comfort Godson-ibeji, Nigeria

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- 53 GI410: SMEs and Sustainable Tourism - The Case of an Indian Himalayan Destination. Ravinder Nath Batta, India
- 54 GI421: Effect of New Ellipse Design on the Performance Enhancement of PV/T Collector: CDF Approach. Kamaruzzaman Sopian, Malaysia
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- 56 GI475: Rural Electrification through Solar Energy: Insights from Chattisgarh State of India. Meenal Jain, India
- 57 GI612: Examining the Lagos Green Initiative: A Case Study of Kosofe Local Government. Ayinde Anjolajesu, Nigeria
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- 64 LW438: Comparison of Irrigation Qualities of Septic Tank Effluents Reclaimed Using Aerobic- Versus Anaerobic-Based Treatment Systems. Abdallah Abusam, Kuwait
- 65 LW449: Efficient Extraction of Radioactive Isotopes of Cobalt, Europium, Cerium, Strontium and Copper from Aqueous Solutions. Sergiy N. Lavrynenko, Ukraine
- 66 LW549: Natural Heritage as a Structure for Urban Regeneration: Case of El Harrach River. Amel Bellala, Algeria
- 67 LW558: Dimensions of Spatial Change in an Egyptian Village. Bahgat Mohamed Abdel-Maksoud, Egypt

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- 71 SC397: Smart Cities and Sustainability: An Approach for Managing Resources through Smart Systems. Doaa Medhat Morsy, Egypt
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- 75 SC474: Water Resource Management for Sustainable Development of Smart Cities along Foothills of Himalayas – Dehradun A Case Study. Kulsum Fatima, India
- 76 SC482: Towards the 2nd Sustainable City in the Middle East: Retransforming and Applying the PRS and the Estidama First Model of Abu Dhabi Master Plan 2030 on Ras El Khaimah Coastal City. Aia Mohamed Sherif, UAE
- 77 SC547: Advancing Smartness of Traditional Settlements- Case Analysis of Indian and Arab Old Cities. Mani Dhingra, India
- 78 SC557: Optimal Air Quality Monitoring Network for Green Cities. Shareef Mohammed Mujtaba, Canada
- 79 SC587: Smart Cities – A Successful Implementation of Smart Sewerage Infrastructure in Ajman, UAE. Christophe Ledur, UAE
- 80 SC642: Unlocking the Potential of Shared Mobility: The Role in Environmental Protection and Impact on the Urban Transportation System. Maria Strigunova, France

FOREWORD

It is our great pleasure to welcome you to Ajman 4th International Environment Conference on Smart Cities and Green Innovation – AIEC2016.

AIEC2016 is aimed to integrate research, technology and expertise in four theme tracks including: Land, Waste & Emergency Management Innovations, Smart Cities, Green Infrastructure, and Best Practices. AIEC2016 gives its participants a unique opportunity to share their perspectives with others interested in the various aspects of AIEC2016.

The call for papers attracted more than 350 submissions from North & South America, Europe, Asia, Middle East, Australia and Africa. The accepted papers cover a variety of topics in the four different tracks. Selected papers presented in AIEC2016 will be put together as special issues of international scientific journals published by Science Target Inc., Canada, AIEC2016 Official Scientific Partner.

The conference program includes a panel of presentations delivered by prominent keynote speakers from University of Toronto (Canada), University of Salford (UK), University of Missouri (US), and University of Portsmouth (UK). The keynote addresses will integrate the four themes of AIEC2016.

Putting together AIEC2016 was a team effort. We first thank the authors for providing the content of the program. We are grateful to H.H. Sheikh Humaid bin Rashid Al Nuaimi, Supreme Council Member and Ruler of Ajman, the Patron of AIEC2016; the chairs; keynotes; and the organizing and scientific committees who worked very hard in reviewing papers and providing feedback for authors. Finally, we thank our sponsors for their generous corporate support.

We hope that you will find this program interesting and thought-provoking and that AIEC2016 will provide you with a valuable opportunity to share ideas with other researchers and practitioners from institutions around the world.

Sheikh Rashid Bin Humaid Al Nuaimi

*Chairman of the Department of
Municipal and Planning - Ajman*



Prof. Joseph Hobbs

*Head of AIEC2016 Scientific
Committee Director, Vietnam
Institute, University of Missouri, USA*

Joe Hobbs is a professor of Geography at the University of Missouri. He is primarily a geographer of the Middle East, with a research specialization on the pastoral nomads of the region's deserts. He is also interested in traditional environmental knowledge worldwide. His most recent fieldwork has focused on traditional uses of Acacia trees in Egypt's Eastern Desert. His books include *Bedouin Life in the Egyptian Wilderness*, *Mount Sinai*, *The Birds of Egypt*, and *Fundamentals of World Regional Geography*. He has done work for the Emirates Foundation and the United Arab Emirates University.



Prof. Miklas Scholz

*Chair in Civil Engineering,
University of Salford, UK*

Professor Scholz, cand ing, BEng (equiv), PgC, MSc, PhD, CWEM, CEnv, CSci, CEng, FHEA, FIEMA, FCIWEM, FICE, Fellow of IWA holds the Chair in Civil Engineering at The University of Salford. He is the Head of the Civil Engineering Research Group. Prof. Scholz has shown individual excellence evidenced by world-leading publications, postgraduate supervision and research impact. His main research areas in terms of publication output are as follow: integrated constructed wetlands, sustainable flood retention basins, permeable pavement systems, decision support systems, ponds and capillary suction time. He has published four books and 181 journal articles. Prof. Scholz's full journal article publications in recent years are as follows: 2009 (13), 2010 (19), 2011 (13), 2012 (21), 2013 (17), 2014 (15) and 2015 (17). Prof. Scholz has total citations of more than 3033 (above 2289 citations since 2011), resulting in an h-index of 28 and an i10-Index of 69. Prof. Scholz is Editor-in-Chief of the Web of Science-listed journal *Water* (impact factors for 2012, 2013 and 2014: 0.973, 1.291 and 1.428). Prof. Scholz is an Editor, Sub-editor and Editorial Board member (no double counting) of 17, 6 and 40 journals, respectively.



Prof. Bryan Karney

*Associate Dean & Chair, Division
of Environmental Engineering
& Energy Systems, University of
Toronto, Canada*

Since 2006, Professor Bryan Karney has served as Chair, Division of Environmental Engineering and Energy Systems. In 2009, Professor Karney became Associate Dean, Cross-Disciplinary Programs, providing leadership to the Cross-Disciplinary Programs Office. In 2012 his appointment was extended to June 30, 2015. He is a professor in the Environmental Section of the Department of Civil Engineering.

Professor Karney's research interests reside in the design, analysis, operation and optimization of various water resource and energy systems. He specializes in the design and analysis of water distribution systems, with interests in infrastructure renewal, transient and water hammer analysis and system optimization. Professor Karney also studies the implication of climate change to system design and performance, and particularly energy use. He has written or co-written several hundred journal papers and articles. Dr. Karney and his students received the American Water Works Association's (AWWA) award for the Best Engineering and Construction Publication Article for 2008, the Steven's award for best discussion in the Journal of Hydraulic Engineering in 2014 and Best Paper award at the 2014 American Society for Mechanical Engineering conference on Pipelines in Calgary.

Dr. Karney's book *Comprehensive Water Distribution Systems Analysis Handbooks for Engineers and Planners* was published in 2006. *Current Affairs: Perspectives on Electricity Policy for Ontario* (2010), co-edited by Karney, Doug Reeve and Donald Dewees, was a finalist for the Speaker Book Prize in Ontario 2013.



Prof. Steffen Lehmann

Sustainable Architecture, Founding Director, s_Lab (Sydney-Berlin) The University of Portsmouth, UK

Professor Lehmann, Dr (TU Berlin), AA Dipl (London), is a German-Australian urbanist, senior university leader and since 1993 registered as a chartered architect and urban designer in Berlin.

Steffen is a Research Professor in the Faculty of Creative and Cultural Industries at the University of Portsmouth (UK). Prior to this, he has been a full professor for 13 years at high-ranking universities in Australia, holding senior leadership positions ranging from Research Director to Head of School and Head of Discipline. For most of his academic career, Steffen was a tenured Chair Professor of Sustainable Design at the University of South Australia, where he was Founding Director of the Centre for Sustainable Design & Behaviour, and Founding Director of the China-Australia Centre for Sustainable Urban Development.

Prior to becoming a full-time academic, he ran for over ten years his successful architectural practice Steffen Lehmann Architekten Berlin (s_Lab) in Berlin, where he was instrumental in the design of the 'New Berlin'.

Steffen is an internationally renowned thought leader in the field of sustainable urban development principles, exploring our complex relationships with nature and place. Most of his own research projects are planning/design/architecture nexus based, concerned with the integration of low-carbon/low-impact technologies in design and the social/behavioural and urban context. His most recent book is: 'Low Carbon Cities. Transforming Urban Systems' (Routledge, 2015)

For more information: www.slabb.com.au



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Technical Director, Canadian Center for Green
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Head of Studies & Planning Unit

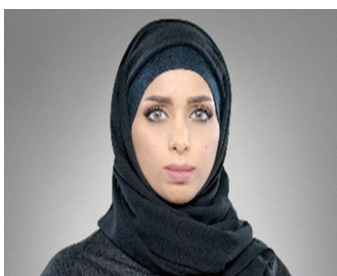
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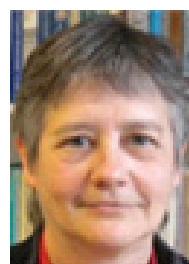
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PORTUGAL



Shamel Alam-Eldin
Guelph University -
CANADA

PROGRAM



Day 1: Wednesday, March 02, 2016

Venue: Sheikh Zayed Center For Conferences and Exhibitions, Ajman University, Ajman - UAE

08:30	– Registration
09:00	– Arrival of <i>H.H. Sheikh Humaid bin Rashid al-Nuaimi</i> , Member of the Supreme Council, Ruler of Ajman
	– Inauguration of the Sponsors' Exhibition

OPENNING CEREMONY:

Venue: Theater Hall

09:15	– National Anthem
	– Holy Quran
	– Opening Address: <i>H.H. Sheikh Humaid bin Rashid al-Nuaimi</i> , Member of the Supreme Council, Ruler of Ajman, Patron of AIEC2016
	– Guest Speech: <i>H.E. Dr. Thani Al Zeyoudi</i> , Minister of Climate Change and Environment
	– A Documentary Film

09:45 COFFEE BREAK

SESSION 1: Keynote Addresses:

Venue: Theater Hall

Chair: *Terrence Cooke*, Director of Business Development, Science Target Inc., CANADA

10:15	– KS01: Local Practices as Best Practices: Heritage in Development in Ajman, the United Arab Emirates, the Middle East, and Beyond. <i>Prof. Joseph Hobbs</i> , Head of AIEC2016 Scientific Committee, Department of Geography, Director, Vietnam Institute, University of Missouri, United States of America
10:35	– KS02: Green Infrastructure: Assessment of Tree Damage to Urban Structures. <i>Prof. Miklas Scholz</i> , Chair in Civil Engineering, University of Salford, United Kingdom
10:55	– KS03: Seeking a Sea Change Conceptualizing Urban Water Supply Systems". <i>Prof. Bryan Karney</i> , Associate Dean and Chair, Division of Environmental Engineering & Energy Systems - Faculty of Applied Science & Engineering, University of Toronto, Canada
11:15	– KS04: Urban Design towards Smart Low Carbon Precincts. <i>Prof. Steffen Lehmann</i> , Professor of Sustainable Architecture, Founding Director, s_Lab (Sydney – Berlin), The University of Portsmouth, United Kingdom
11:35	Q&A Discussion
12:00	LUNCH BREAK

LEGEND: [KS] Keynote Speaker; [BP] Best Practices; [GI] Green Infrastructure; [LW] Land, Waste and Emergency Management Innovations; [SC] Smart Cities

SESSION 2: Sustainable Practices in the United Arab Emirates

Venue: Theater Hall

Chair: *Prof. Joseph Hobbs*, Director, Vietnam Institute, University of Missouri, USA

13:00	–	SC587: A Successful Implementation of Smart Sewerage Infrastructure in Ajman, UAE. <i>Christophe Ledur</i> , UAE
13:15	–	BP568: Towards Safer UAE Roads: A Micro-Level Approach. <i>Benish Chaudhry</i> , UAE
13:30	–	GI344: Drone Applications for Environmental Monitoring in Urban Spaces. <i>David James Gallacher</i> , UAE
13:45	–	GI620: Use of Wetlands in Sharjah, UAE – Possibilities and Challenges. <i>Mahsa Hashemi</i> , UAE
14:00	–	SC482: Towards the 2 nd Sustainable City in the Middle East: Retransforming and Applying the PRS and the ESTIDAMA First Model of Abu Dhabi Master Plan 2030 on Ras El Khaimah Coastal City. <i>Aia Mohamed Sherif</i> , UAE
14:15	–	BP628: Sustainability is Pure Profit – Hotel Point of View, <i>Iftikhar Hamdani</i> , UAE
14:30		Q&A Discussion
14:45		COFFEE BREAK

SESSION 3: Green Infrastructure

Venue: Theater Hall

Chair: *Prof. Miklas Scholz*, Chair in Civil Engineering, University of Salford, UK

15:00	–	GI324: Solar Panel and Renewable Energy in Mexico Development and Outlook for Photovoltaic. <i>José G Vargas-hernández</i> , MEXICO
15:15	–	GI472: Understanding the Role of Green Infrastructure (GI) in Tackling Climate Change in today's World. <i>David Idiata</i> , UK
15:30	–	GI343: Adoption of Green Practices in Industrial Buildings: An Action Research on Capacity Building of Stakeholders towards Green Factories. <i>Gagan Preet Kaur</i> , INDIA
15:45	–	GI421: Effect of New Ellipse Design on the Performance Enhancement of PV/T Collector: CDF Approach. <i>Kamaruzzaman Sopian</i> , MALAYSIA
16:00	–	GI612: Examining the Lagos Green Initiative: A Case Study of Kosofe Local Government. <i>Ayinde Anjolajesu</i> , NIGERIA
16:15	–	GI627: The Urgent Necessity to Redouble Renewable Energy Output. <i>Ali Sayigh</i> , UK
16:30		Q&A Discussion
16:45		End of Day 1
18:30		Gala Dinner at King Grills International Restaurant- Ramada Beach Hotel- Ajman

LEGEND: [KS] Keynote Speaker; [BP] Best Practices; [GI] Green Infrastructure; [LW] Land, Waste and Emergency Management Innovations; [SC] Smart Cities

Day 2: Thursday, March 03, 2016

Venue: Sheikh Zayed Center For Conferences and Exhibitions, Ajman University, Ajman – UAE

08:30 Registration

SESSION 4: Green Innovation

Venue: Theater Hall

Chair: *Prof. Bryan Karney*, Associate Dean and Chair, University of Toronto, CANADA

09:00 – BP464: The “Green Curtain” as an Educational Project for Spreading Sustainability Awareness. *Ikko Tucker*, UAE

09:15 – BP356: Contamination of Soil and Crops Irrigated with Recycled Domestic Wastewater. *Suhad Almuktar*, UK

09:30 – BP561: Resource Efficiency and Innovation in Public Transport: Implementing Inclusive Green Growth in the Himalayas. *Ravinder Nath Batta*, INDIA

09:45 – BP470: Green Synthesis Approach of Ag-Nanoparticles Decorated Mesoporous Nanofibers Membrane: Excellent Antimicrobial Properties in Dark Environment. *Ahmed Aboueloyoun Taha*, CHINA

10:00 – BP473: Energy Intensive Water Management to Achieve Zero Carbon Footprint – A Case Study in Semi-Arid Region, India. *Kulsum Fatima*, INDIA

10:15 – SC642: Unlocking the Potential of Shared Mobility: the Role in Environmental Protection and Impact on the Urban Transportation System. *Maria Strigunova*, FRANCE

10:30 Q&A Discussion

10:45 COFFEE BREAK

SESSION 4A: Land, Waste and Emergency Management Innovations

Venue: Room A

Chair: *Prof. Miklas Scholz*, Chair in Civil Engineering, University of Salford, UK

– LW619: Assessment of Mixing Potential of Sewage Sludge, Green Waste and Food Waste for Co-Composting. *Mortula Maruf*, UAE

– LW294: Stabilization/Solidification (S/S) Technique: A Review of its Advantages and Applications in Saudi Arabia. *Abdulrahman Hamid*, SAUDI ARABIA

– LW308: Introduction of Knowledge of Waste Separation in Developing Countries. *Khondaker G.A. Islam*, CANADA

– LW438: Comparison of Irrigation Qualities of Septic Tank Effluents Reclaimed Using Aerobic- Versus Anaerobic-Based Treatment Systems. *Abdallah Abusam*, KUWAIT

– LW449: Efficient Extraction of Radioactive Isotopes of Cobalt, Europium, Cerium, Strontium and Copper from Aqueous Solutions. *Sergiy N. Lavrynenko*, UKRAINE

– LW549: Natural Heritage as a Structure for Urban Regeneration: Case of El Har-rachRiver. *Amel Bellala*, ALGERIA

Q&A Discussion

LEGEND: [KS] Keynote Speaker; [BP] Best Practices; [GI] Green Infrastructure; [LW] Land, Waste and Emergency Management Innovations; [SC] Smart Cities

SESSION 5: Smart Cities		SESSION 5A: Best Practices	
Venue: Theater Hall		Venue: Room A	
Chair: <i>Prof. Steffen Lehmann</i> , Founding Director, s_Lab (Sydney – Berlin), The University of Portsmouth, UK		Chair: <i>Prof. Joseph Hobbs</i> , Director, Vietnam Institute, University of Missouri, USA	
11:00	– SC340: Development and Validation of ICT for Building Capacities towards Renewable Energy and Energy Efficiency: A Step towards Smart Cities through Sustainable Resource Use. <i>Gagan Preet Kaur</i> , INDIA	–	BP373: The Impact of Potential Evapotranspiration Methods at Various Altitudes on the Reconnaissance Drought Index Alpha Form for Arid and Semi-arid Regions. <i>Ruqayah Mohammed</i> , UK
11:15	– SC397: Smart Cities and Sustainability: An Approach for Managing Resources through Smart Systems. <i>Doaa Medhat Morsy</i> , EGYPT	–	BP468: Risk of Environmental Performance Decrease after Revocation of Financial Accounting Standard No. 32 for Forestry Accounting in Indonesia. <i>Lindrinasari Amsir Saidi</i> , INDONESIA
11:30	– SC414: The Role of Energy in Buildings in Smart Cities. <i>Ala Hasan</i> , FINLAND	–	BP406: Effect of Various Shading Methods on Cucumber (<i>Cucumissativus L.</i>) Growth and Yield Production. <i>Taleb Rateb Abu-Zahra</i> , JORDAN
11:45	– SC379: Urban-Scale Material Flow Analysis: Malaysian Cities Case Study. <i>Farah Ayuni Shafie</i> , MALAYSIA	–	BP448: Consequences of Environmental Pollution on Agricultural Productivity in the Developing Countries; a Case of Nigeria. <i>Comfort Chigozie Godson-ibeji</i> , NIGERIA
12:00	– SC439: Planning for a Smart City with a Human Face in Developing India. <i>Shashi Mehta</i> , INDIA	–	BP584: Environmental Management Activity towards Financial Performance in Indonesian Mining Companies. <i>Farah Dina</i> , INDONESIA
12:15	– SC557: Optimal air quality monitoring network for Green Cities. <i>Shareef Mohammed Mujtaba</i> , CANADA	–	BP626: Delivering Sustainability Values through Green Information Technology, Media Literacy in the Public Arena. <i>Jabbar Al-Obaidi</i> , USA
12:30	Q&A Discussion		Q&A Discussion
12:45	LUNCH BREAK		

LEGEND: [KS] Keynote Speaker; [BP] Best Practices; [GI] Green Infrastructure; [LW] Land, Waste and Emergency Management Innovations; [SC] Smart Cities

PROGRAM

SESSION 6: Environmental Health and Policy		SESSION 6A: Sustainability and Smartness	
Venue: Theater Hall		Venue: Room A	
Chair: <i>Prof. Bryan Karney</i> , Associate Dean and Chair, University of Toronto, CANADA		Chair: <i>Prof. Steffen Lehmann</i> , Founding Director, s_Lab (Sydney – Berlin), The University of PortsmouthUK	
13:45	– BP625: Innovative Schemes and Partnerships to Leverage Investment in SPS Systems. <i>Maria Strigunova</i> , FRANCE	–	GI410: SMEs and Sustainable Tourism - The Case of an Indian Himalayan Destination. <i>Ravinder Nath Batta</i> , INDIA
14:00	– BP555: Investigative Studies on Environmental Disclosure and the Costs of R&D as a Compliance with Government Policy on Corporate Social Responsibility in Indonesia. <i>Lindrianasari Amsir Saidi</i> , INDONESIA	–	SC474: Water Resource Management for Sustainable Development of Smart Cities along Foothills of Himalayas – Dehradun A Case Study. <i>Kulsum Fatima</i> , INDIA
14:15	– BP443: Death of the Human Embryo from Electromagnetic Radiation. <i>Viktor A. Ovsyannikov</i> , RUSSIAN FEDERATION	–	SC547: Advancing Smartness of Traditional Settlements - Case Anal Indian and Arab Old Cities. <i>Mani Dhingra</i> , INDIA
14:30	– LW326: Poultry Production and the Environmental Health. <i>Hanan Salman Al-Khalifa</i> , KUWAIT	–	LW558: Dimensions of Spatial Change in an Egyptian Village. <i>Bahgat Mohamed Abdel-Maksoud</i> , EGYPT
14:45	– SC471: Sustainable Development and Right to Water - An International Perspective. <i>Zainab Fatima</i> , INDIA	–	GI475: Rural Electrification through Solar Energy: Insights from Chattisgarh State of India. <i>Meenal Jain</i> , INDIA
15:00	– LW263: Shrimp Fry (meen) Farmers of Sundarban Mangrove Forest (India): A Tale of Ecological Damage and Economic Hardship, <i>Pritha Das</i> , INDIA	–	BP629: Sustainability Plan in Ottawa and Green Infrastructure. <i>James Britch and Eslam Alhogaraty</i> , CANADA
15:15	Q&A Discussion		Q&A Discussion
15:30	Wrap-up, Recommendations and Closing Ceremony		
18:30	City Sightseeing Tour (Ajman and Sharjah)		

LEGEND: [KS] Keynote Speaker; [BP] Best Practices; [GI] Green Infrastructure; [LW] Land, Waste and Emergency Management Innovations; [SC] Smart Cities

KEYNOTE ADDRESSES



KS01: Local Practices as Best Practices: Heritage in Development in Ajman, the United Arab Emirates, the Middle East and Beyond

Joseph Hobbs

Director, Vietnam Institute, University of Missouri, USA

One of the principles of sustainable development, born out worldwide, is that local people often possess the best solutions to their own problems. The human and environmental legacies of Ajman and the UAE provide lessons on architectural and other adaptations to harsh climatic conditions and little water, with conservation of resources essential. In very many countries, such heritage is sacrificed in favor of globalized patterns disconnected from local environmental circumstances and social needs.

This presentation draws from interviews with Emiratis and others in the UAE that give insight into a hunger for authenticity and “belongingness” in the lived environment. It uses the geographical concepts of “place” and “placelessness” to appeal for as much hindsight as foresight in creating and inhabiting spaces for quality of life. The presentation also explores several of the UAE’s top human- environmental concerns.

KS02: Green Infrastructure: Assessment of Tree Damage to Urban Structures

Miklas Scholz

The University of Salford, School of Computing, Science and Engineering, Civil Engineering Research Group, Newton Building, Greater Manchester M5 4WT, UK

This keynote speech paper highlights the importance of green infrastructure. The remediation of contaminated land is a great challenge to create suitable development areas for green buildings located within a network of green spaces. The smart use of water and soil can support ecologically significant land dominated by higher plants such as trees, creating a high quality urban environment. However, a smart selection of trees is required to avoid challenges such as damages buildings. This article assesses the damage caused by urban tree roots in relation to tree characteristics. Tree damage to permeable pavement systems and other urban structures such as impermeable pavements, kerbs, roads, retaining walls, footpaths, walls and buildings were assessed to identify the most suitable trees for the urban environment from an engineering perspective. Hundred square sites of 100 m × 100 m were randomly selected in Greater Manchester for this representative example case study to demonstrate the assessment methodology. Results show that 44% of the damage was to impermeable pavements and 22% to permeable pavements. Other damage to structures included kerbs (19%), retaining walls (5%), footpaths (4%), roads (3%) and walls (3%). Concerning the severity of damage, 66% were moderate, 21% light and 19% severe. Among tree species occurrence, Norway Maple occurred most frequently (17%); others were Lime (16%), Common Ash (12%) and Sycamore (10%). Horse Chestnut (59%) caused the greatest damage. This tree was followed by others including Large-leaved Lime (53%), Norway Maple (52%), Common Ash (45%), Sycamore (42%) and Small-leaved Lime (35%).

KS03: Seeking a Sea Change Conceptualizing Urban Water Supply Systems

Bryan Karney

Associate Dean & Chair, Division of Environmental Engineering & Energy Systems, University of Toronto, Canada

In the past we have often viewed the technical and engineering challenges of creating urban water systems as primarily concerned with the design, construction, commissioning and operation of new systems. Yet, we now have a many already-constructed cities with their water-related infrastructures in various stages of repair (and disrepair). In this context, we have to progressively think about these systems as re-design and rehabilitation challenges, where continuous evolution and extension is axiomatic. The investments we need to make are actually quite small relative to the value of the systems in place, with the new mandate being to monitor a great deal more than we did in the past, to “listen” to actual system performance more rather than relying on design assumptions, and to learn what incremental changes would be most strategic to contribute in a meaningful and economic way to the overall system performance, whether that performance is measured economically or as various statistical measures ranging from reliability and vulnerability to resilience. This shift will have economic, design, operation, communication, policy and engineering dimensions. This paper will briefly illustrate some these challenges by considering representative aspects of hydraulic, structural, water quality, economic and safety performance considerations. In the long run this transformation we tend to move the profession closer to real world performance but will also challenge our creativity, resourcefulness and technical ingenuity. Perhaps more significantly, we will be challenged to re-think our “conservatism” where some of our a priori assumption may no longer stand up to close scrutiny.

KS04: Urban Design towards Smart Low-Carbon Precincts

Steffen Lehmann

Sustainable Architecture, Founding Director, s_Lab (Sydney-Berlin) The University of Portsmouth, UK

Designing low-carbon cities for the post-fossil era has emerged as the new paradigm in global urban development. Due to our obsession with economic growth and excessive use of finite resources, the urban challenges, including rapid urbanisation and sprawl, require us to think about cities in a new way. Urbanisation in the Asia-Pacific and Middle-East region has become accelerated and much more complex.

The speed and scope of urbanisation in this region is unprecedented. Currently, more than two billion of the region's total population live in cities (another one billion will be added by 2040). This historic change, and how it is managed, is arguably the biggest challenge facing the region's governments and municipalities. As such there rests a great responsibility on the shoulders of the politicians, policy makers, urban managers, engineers and urban designers/planners/architects to introduce sustainable patterns of urbanisation and urban form.

The need is now widely recognised to identify strategies and holistic approaches for sustainable urban systems of resource-efficient, climate-smart and resilient cities. In this process, the compact, mixed-use, green and walkable city model has emerged as the most promising model in the shift towards low-carbon cities. However, curbing urban sprawl and car dependency will depend on this transition. An urban growth boundary has frequently proven to be an effective instrument in containing the city's urban footprint, protecting precious agricultural land and forests. The precinct and neighbourhood scale is the most appropriate scale for action: up-scaling the successful strategies at the neighbourhood scale, e.g. the integration of new types of energy systems, water networks, waste management and local food supply chains.

This presentation will discuss a number of issues in connection to the urban design of climate-smart low-carbon precincts. To be effective, our strategies for sustainable city transformation have to vary and be adapted from city to city. A new focus on systems' thinking will link the various systems of the natural, built and virtual - with a shift from the individual single building scale to the urban design of entire low-carbon precincts.

Prof Steffen Lehmann will argue that we cannot afford isolated approaches; integration and interdisciplinary collaboration have become essential to move forward towards this low-carbon goal. The urban challenges we face are far too big as that one single discipline alone would be able to resolve them. New partnerships and sharing of experiences, evidence and best practice is increasingly important to ensure a basis for better decision making, and to overcome the fragmentation and lack of reliable urban data. The traditional master-planning process appears now too rigid and increasingly out-dated, not able to cope with the speed, scale and new set of urban challenges requiring a more flexible framework.

Clearly, while we have entered the Age of Cities, we have not yet entered the “Age of the Sustainable and Smart City”.

ORAL PRESENTATIONS



BP356: Contamination of Soil and Crops Irrigated With Recycled Domestic Wastewater

Suhad A. A. N. Almuktar, Suhail N. Abed and Miklas Scholz

The University of Salford, School of Computing, Science and Engineering, Civil Engineering Research Group, Newton Building, Greater Manchester M5 4WT, UK

Due to water scarcity in many arid countries, there is considerable interest in recycling wastewater streams such as treated urban wastewater for irrigation in the agricultural sector. The aim of this study is to assess the contamination of soil and the example crop Chilli (*Capsicum annuum* L.) irrigated by domestic wastewaters treated by different wetland types between September 2013 and September 2014. The objectives were to assess (a) the impact of different treated wastewaters as a function of the wetland type, (b) the volume of treated wastewater available for irrigation, (c) the impact of the environmental conditions, and (d) the impact of different growth media. Ortho-phosphate-phosphorus, ammonia-nitrogen, potassium and manganese concentrations in the irrigation water considerably exceeded the thresholds for irrigation water. High contamination levels of total coliforms, *Salmonella* spp. and *Streptococcus* spp. were detected. No mineral contamination was observed in the soils due to irrigation with treated wastewater. Results showed that slight to moderate zinc contamination was detected in some harvested Chillies based on common standards for vegetables. Potassium accumulation in the yield had the highest values followed by zinc. In contrast, the lowest mineral accumulation in the yield was observed for iron. No bacterial contamination was detected for fruits harvested from plants irrigated by wetland outflow water. However, findings indicate that vegetable pots receiving wastewater treated with wetlands can be considered as safe compared to those receiving only preliminary treated wastewater. The project contributes to ecological sanitation understanding by closing the loop in the food and water chain.

BP373: The Impact of Potential Evapotranspiration Methods at Various Altitudes on the Reconnaissance Drought Index Alpha Form For Arid and Semi-Arid Regions

Ruqayah Mohammed, and Miklas Scholz

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The agriculture industry in arid regions depends on irrigation and appropriate water management strategies informed by hydrological indicators. Meteorological drought severity is conventionally evaluated through indices. Several drought indices with different complexity have been utilized in many geographical regions. Recently, a robust meteorological drought index, the Reconnaissance Drought Index (RDI), is acquisitioning acceptance primarily in arid and semi-arid climatic areas. Since RDI is founded on precipitation and potential evapotranspiration (PET), it is vital assessing the impact of the PET estimation method on the drought severity characterization obtained by RDI. The main focus of the current research is to evaluate how the PET methods impact on the results of RDI, in particular, the alpha form of the index for annual reference periods using three of the most popular empirical PET methods with minimum data requirements. These methods are known as Hargreaves, Thornthwaite, and locations Blaney-Criddle, and are applied in addition to the Food and Agriculture Organization Penman-Monteith standard method. The Climate Forecasting System Reanalysis (CFSR) global methodological dataset has been applied for different altitudes and. No significant influences on both the standardized and normalized forms of the RDI were detected by using the selected PET methods at different altitudes for various climatic conditions. However, the alpha form of RDI is directly influenced by various PET methods at different altitudes. Accordingly, attention should be paid to the method of estimation of PET, particularly at high altitude. The application of different methods may lead to flaws in water resources availability predictions.

BP406: Effect of Various Shading Methods on Cucumber (*Cucumis sativus* L.) Growth and Yield Production

Taleb R. Abu-Zahra and Mazen A. Ateyyat

Department of Plant Production and Protection, Faculty of Agricultural Technology, Al-Balqa Applied University, As Salt 19117 Jordan

Greenhouse shading may have a time-dependent effect on fruit production and water and nutrient uptake in plants. A plastic house experiment was conducted in Jordan Valley-Jordan, to find out the impact of four shading treatments on cucumber "189 Cultivar" growth and yield production. These treatments were; Green Shadow 1 (GS1), Whitewash (Calcium Carbonate), Mud and Control (no shading).

Results showed that; after washing the cover materials, plastic cover permeability was reduced by using GS1 or whitewash as shading materials. On the other hand, GS1 treatment produced the highest vegetative growth, whereas, whitewash produced the highest fruit yield, so there is a need for shading the plastic houses at this area of Jordan during summer months. However, using of GS1 as a shading material improved fruit fresh and dry weight and kept on fruit quality. Also, as the light intensity increased, fruit fresh and dry weight was increased, while, control treatment delayed flowering, decreased production period and increased the mite infection percentages.

BP443: Death of the Human Embryo from Electromagnetic Radiation

Ovsyannikov VA

Ioffe Physico-Technical Institute, Russia

In Russia since the 90's the fatality and the child population drastically reduced. Its reason is a miscarriage, the death of an embryo in the womb. In 2000, the St. Petersburg Military Medical Academy published an article: "State immunity and humeral factors of nonspecific protection of persons living in conditions of microwave smog." Their investigation shown that all persons who were living in such conditions have alter (reduce) the body immunity and as a result to the emergence of a number of diseases.

Analysis of dead embryos showed that near half of them dies from infection, and another half of them dies from genetic changes in tissues. At this time cellular or mobile connection was appeared

Analysis of all known sources of electromagnetic radiation (EMR) led us to the conclusion that the greatest harm to human health and the death of an embryo was produced the radiation of own cell phone or base station retranslates.

Without of immune defense infections are developed rapidly, so they can kill the embryo.

Mechanism that EMR cause changes in genetic properties of the embryo cells was shown, so malignant tumors and metastasis can seen at the autopsied of dead embryos.

If a human embryo is exposed to EMR and not to dye but to birth, the 30% of that children shall have a serious pathology.

BP448: Consequences of Environmental Pollution on Agricultural Productivity in the Developing Countries; A Case of Nigeria

Comfort Chigozie Godson-ibeji, and Jonadab Ubochioma Chikaire

Federal University of Technology, Owerri, Imo State, Nigeria

Among the greatest problems facing the world today is environmental pollution and this causes grave and irreparable damage to the earth. The issue of environmental degradation is a major cause of productivity losses and poor human health making it a tropical concern to the developing countries including Nigeria. Nigeria as a developing country has lost a lot of her habitable and agricultural productions due to environmental degradations and pollution which extensively destroys crops and aquaculture through the contamination of water ways, ground water and soil, flaring of associated gasses and mismanagement of the land resources. This paper therefore, examines the nature of environmental pollution in Nigeria and its constituencies on agricultural productivity. Questionnaires were administered to elicit information on soil fertility, crop growth and crop productivity viz aviz agricultural productivity. A total of 180 questionnaires were administered using Multistage Sampling technique and analyzed using frequency tables and Percentages. Results show that environmental pollution reduces the level of soil nutrients fertility (80%), crop growth and crop yield are negatively affected by pollution (82%), and therefore, this has negative consequences on agricultural productivity in Nigeria. The paper contends among other recommendations that efforts should be made by the government of Nigeria and other stake holders concerned to control and mitigate the environmental problems of the country if any meaningful development should be sustained.

BP464: The “Green Curtain” as an Educational Project for Spreading Sustainability Awareness

Ikko Tucker

Zayed University, UAE

As global warming is an empirically verified scientific fact, human beings are facing the crucial point of no return. Throughout the world, many governmental agencies, non-governmental organizations, and private corporations have been systematically working toward the achievement of a sustainable society; however, we are far from any noticeable advances. All human beings are living in a tiny, and closed, environment, “the Planet Earth Ship.” And, thus, we have a mission to be more cognizant of, and adopt policies and behaviors to live within, the capacity to avoid a catastrophic disaster. As an educator and a resident of the UAE (which has the highest per capita ecological footprint in the world), I search for effective and powerful ways of incorporating and implementing sustainability in education. As a part of such responsibilities and interests, I have been conducting a “Green Curtain (biological shutter)” research project. Any large grass-root movements always begin with a small step. And, implementing “Green Curtain” projects in educational institutes will spread awareness among children and young adults, and change habits and values to achieve a sustainable society.

BP468: Risk of Environmental Performance Decrease after Revocation of Financial Accounting Standard No. 32 for Forestry Accounting In Indonesia

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This research generally aims to provide empirical evidence that there is an influence on environmental liability after revocation Statement of Financial Accounting Standards (PSAK) 32 on forestry by 15 Indonesian companies in period 2007- 2013. The motivation of this study is to demonstrate the existence of a risk to a reduction in environmental responsibility after regulatory changes in environmental accounting in forestry companies. For developing countries, such as Indonesia, needed powerful rules to limit and protect the forest from destruction as a result the company's activities. This study also wanted to show the need for caution in assessing the environmental studies corporate responsibility. When the researchers measured the corporate responsibility solely on what companies disclose, without further research how much the allocation of funds they had acquired to manage and anticipate the destruction to the environment, it seems the research results generated will provide misleading information.

The results shows that there is no difference and increase on the level of environmental disclosure after the lifting of PSAK 32 on forestry companies in Indonesia, and there is a difference and a significant reduction in the environmental cost allocation forestry companies in Indonesia after revocation of PSAK 32, Accounting for Forestry. These findings confirm that environmental disclosure could be increased, but not accompanied by an increase in the allocation of environmental costs, so the researchers wanted to prove despite increased level of environmental disclosure, but not accompanied by the allocation of environmental costs decreased after the change in regulations in Indonesia.

BP470: Green Synthesis Approach of Ag-nanoparticles Decorated Mesoporous Nanofibers Membrane: Excellent Antimicrobial Properties in Dark Environment

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A facile green method was proposed for synthesis of three dimensional Ag-nanoparticle decorated mesoporous nanofiber membrane. The proposed method avoids the use of high temperature thermal treatment as well as hazardous solvents, which is a typical environmental friendly approach. Sol-gel and electro spinning methods was applied for the fabrication of the membrane followed by template extraction and Ag-nanoparticle decoration. The characterization results revealed that the prepared membrane has a mesoporous structure with a surface area and pore size of $406 \text{ m}^2 \text{ g}^{-1}$ and 3.51 nm, respectively. In addition, the Ag-nanoparticles with a diameter 5 to 10 nm were grown in a well coordination and distribution along the nanofibrous. The membrane displayed highly efficient antibacterial performance in dark, a complete *Esheria Coli* inactivation was achieved within 30 minutes. The membrane recovery and reuse was convenient due to the 1D property of the fiber. The strategy to immobilize AgNPs within a mesoporous nanofibers can be extended to other particle systems for various applications in catalysis, energy, sensing, photonic and biomedical applications.

BP473: Energy Intensive Water Management to Achieve Zero Carbon Footprint – A Case Study in Semi-Arid Region, India

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The present attempt to look into area around NCT region having deep soil conditions along Yamuna River and are known for having ground water resource potential. The site selected has a complex mix Land use including residential, administrative & industrial setup along with a warehouse & other supporting facilities.

As assessment of onsite water demand is made on the basis of liter par day demand for various functions within the site and an estimation of water availability on site with respect to surface & ground water resource potential as well as the possibilities of Rain water harvesting potential & recycled water potential is also assessed. The study is also suggestive of reversing & improving the declining trends of the ground water table conditions which are burdened because of overexploitation/over extraction.

Corresponding to the actual demand & reduced demand of water, an estimation of carbon footprint for water based energies is estimated which is further supported by solar exposure analysis for assessing the entire site potential for harnessing solar energy. This helped in proposing on site renewable energy generation possibilities along with ground water improvement. This leads to the innovative idea of energy intensive site with zero carbon footprints for water pumping systems.

BP555: Investigative Studies on Environmental Disclosure and the Costs of R&D as a Compliance with Government Policy on Corporate Social Responsibility in Indonesia

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The research objective is to provide empirical evidence on responsibility companies in achieving sustainable development not only for Indonesia, but also for the world. This study has investigated the allocation of research and development costs as other government regulations issued after the regulations issued related to the environment, i.e. in 2004, 2007 and 2012. Samples observations as many as 246 companies in 11 years.

This study examined separately three times (2004, 2007, and 2012) the enforcement of laws related to the environment. The test results show that the disclosure of environmental information on food and beverage company in Indonesia has increased significantly and the better after the legislation was issued. This finding suggests that since the Indonesian government ratified the Kyoto Protocol in 2004, Indonesian companies more transparent in informing environmental conservation activities that they do.

The study also found that there is a positive relation to the allocation of research and development costs associated with the reduction of carbon emissions the company during the year of observation. Significant relationships were also found in 2007, when the government issued Law No. 40 of 2007. However, in 2012 we did not find a significant relationship. This study concluded that the legal instruments that require companies to reduce carbon emissions is urgently needed in developing countries like Indonesia. This policy also will determine the success of Indonesia in realizing the commitments to reduce carbon emissions.

BP561: Resource Efficiency and Innovation in Public Transport: Implementing Inclusive Green Growth in the Himalayas

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Situated in the high hills of the Himalayas, ecosystems in Himachal Pradesh (India) are very fragile and amenable to damage due to pollution and resource degradation. Road transport is the only mode of transport dominated by personalised vehicles. Seventy five percent of air pollution caused here is attributed to this sector. Public transport mostly used by poor is with a public sector undertaking operating on huge cumulative losses resulting in poor quality operation dominated by highly polluting, obsolete and unsafe fleet.

Project Outline

A major initiative of promoting green transport started with a study of transport and energy sectors that sprung interesting revelations: (1) public transport is resource consumptive and inefficient owing to market and policy failures; (2) aging fleet is highly polluting, prone to frequent accidents and breakdowns; and (3) the state surrenders its surplus power to the national grid free during the night hours that could be used for battery operated pollution free buses at cheap fares that could bring a modal shift from private to public modes of transport.

Outcome

(i) A comprehensive green transport policy identifying measures to tackle market and policy failures; (ii) Replacement of aged fleet with fuel efficient Euro IV buses and introduction of battery operated buses (first time in the country); (iii) Solar Power generation units under installation on roof tops of all bus terminals and skill gaps for green jobs identified; and Within one year, all performance parameters improved drastically. The project is a pioneering effort capable of replication in developing countries.

BP568: Towards Safer UAE Roads: A Micro-Level Approach

Benish Chaudhry

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The paper focuses on micro-level approaches that are taken on individual level to make sure that the roads are safer and traffic issues are solved. The author has surveyed and interviewed 100 regular drivers and have come to baby steps that can be taught in order to make sure each resident/citizen in the UAE takes individual responsibility to make and help traffic flows. Approaches include

- Regular traffic jam check
- time management
- don't text and drive approach among others
- Creating applications to help citizens take alternate roads
- Car seat and driving with family and children
- Speed limits

among others.

The author also portray multiple means by which these micro-level issues can be taught at an individual level.

BP584: Environmental Management Activity towards Financial Performance in Indonesian Mining Companies

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The objective of this study is to determine the influence of environmental management activity based on Indonesia statement of financial accounting standards number 33 namely accounting for mining towards the financial performance of Indonesian mining companies. The measurement of environmental activity were proxied by three environmental activity. There are disclosure of stripping cost in production phase, exploration and evaluation assets, and environmental management on general mining.

There are 41 sample of this research consists of all mining companies in Indonesian that have fulfilled sample criteria in 2011 until 2013. The data on this research were tested by multiple linear regression. The result of this research showed that the stripping cost in production phase and environmental management on general mining had significantly positive effect towards the financial performance. While exploration and evaluation assets had significantly negative effect towards the financial performance.

This study shows that the cost to acquire the best technology that companies use when performing exfoliating ground at the beginning of production activity, bring a positive performance for the company. Similarly, environmental management implemented in the company, also had a positive impact for the survival of the company. These results indicate that the company implement best act in the management of the environment, increasing the company's performance. The consequence of all this is the sustainability of the company is increasingly assured.

BP625: Innovative Schemes and Partnerships to Leverage Investment in SPS Systems

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Conventional forms of financing are hardly accessible in agri-producing states, thus traders are often excluded from full gains of trade exchanges and international markets. An objective to enhance financial sustainability and phase out traditional funding schemes calls to galvanize actions at the multilateral level. Declining ODA and inefficient public funding reaffirm the need to implement new financial instruments and services targeted on inclusiveness, efficiency and safety of agriculture development. The safety aspect is governed by sanitary and phytosanitary (SPS) measures which are an essential condition to reach out to international markets. The implementation of food SPS provisions can be costly, yet the lack of conformity with SPS imposes bigger losses on actors of agri value chains. Improved access to finance will strengthen the capacity to improve production systems, protect public health and increase the market access. This paper examines existing funding mechanisms in agriculture and related fields in order to elucidate recommendations for new mechanisms that could be transferable to SPS capacity building.

BP626: Delivering Sustainability Values through Green Information Technology, Media Literacy in the Public Arena

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This paper is designed to look at strands of critical correlations of thinking and planning for sustainability, information technology, media literacy, and public awareness. Building a capacity for sustainability requires a creative approach of thinking along with applied research, which should offer ways for strategic planning as oppose to superficiality, immediacy, and deceptive initiatives. Developmental sustainability flourishes with political stability, favorable governmental policies, and a strong partnership between public and private sectors. Research and literature of sustainability support the premise that the road to sustainability is not single but multiple. Mediacy and a multicultural approach provide evidence in support of the argument of this paper; green information technology, media literacy, and public involvement must occupy the epic center of any sustainability projects or initiatives. It's a matter of knowledge management as related to sustainability. It creates sustainable venues to convey the right information at the right time to policymakers, projects managers, staff, and the general audience.

Increasing the level of information and media literacy will influence people's behavior. What is the public common perception of sustainability? Why are policymakers, managers, and the public not obtaining the full benefits out of media local and global coverage? How can we utilize information and technology literacy literacy to deliver business and social values to promote sustainability? This paper argues there are creative ways which can be implemented to strengthen the venues for delivering sustainability values through green Information technology and media literacy in the public arena. This paper will formulate strategies governing green information technology, media literacy, and public arena.

BP628: Sustainability is Pure Profit – Hotel Point of View

Iftikhar Hamdani

Cluster General Manager Ramada Hotel & Suites Ajman and Ramada Beach Hotel Ajman, UAE

The reason we decided to adopt practices at Ramada Hotel & Suites Ajman was mainly for economic reasons. The turning point of going green at Ramada Ajman was the electricity/energy bill of Aed 549,000 a month which opened our eyes to act fast. On the same month we had taken action by establishing an active Green Committee & Energy Committee to oversee the waste part. Our team started studying the basics of reduce, reuse and recycle approach and practically started adopting the practices at the Ramada Ajman. We started attending the green seminars, Sustainable Congresses, Green Tourism Conferences for learning purpose.

What we learnt the most that it is not important to invest only in the technologies or inventions but to invest in people. We started with small steps by educating our staff through letting them participated in the environment activities organized by the hotel, i.e. Earth Hour, Earth Day, Environment Day, Beach Clean-up Drive. All these activities were actually for the awareness to build a team to take responsibility.

Also to note, our staff turnover is just 2% which is great example of sustainability. Secret behind high staff retention, we have back to back staff events particularly sports to maintain the loyalty, we do not pay the best wages but to take care by empowering them and with lot of appreciations. With this result, Ramada Ajman saved the recruitment cost for hiring new staff.

GI324: Solar Panel and Renewable Energy in Mexico Development and Outlook for Photovoltaic

José G Vargas-hernández, and Emmanuel Rodolfo Ascencio Espinosa

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Mexico has a great opportunity for the use of renewable energy (RE), regardless of type energy is concerned, solar, geothermal, hydro, etc., Because it is a country with diverse climate sea world, though little explored sparsely and it is necessary to identify the most suitable for promoting public policies and find the absolute advantage, given the international theories, we can use the same basis for rethinking the development of the sector, using as a guide the absolute advantage that Mexico has in its natural resources and climate types. We also see that international experience shows that it is possible to establish markets "green energy" where end users cover their costs and is a highly profitable emerging market, for both sides, provider and consumer, we also see as government programs exist that support the same, a fact that makes it tempting for the investment of national and international firms.

GI343: Adoption of Green Practices in Industrial Buildings: An Action Research on Capacity Building of Stakeholders towards Green Factories

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Buildings and development provide countless benefits to society, they also have significant environmental and health impacts. Rapid industrialization is having an impact on resources, besides creating impacts on human health and wellbeing. To address this, Indian Green Building Council (IGBC) has developed green factory rating system for industrial structures, which can help address issues like energy efficiency, conservation of natural, betterment of working conditions and productivity. The research brings out the action oriented approach followed to generate awareness amongst stakeholders regarding the green factory rating system with special reference to Indoor Environment Quality (IEQ) technologies since it has major impact on the health and productivity of the workers.

Firstly, technologies used for IEQ by operational green factories were studied. Newer technologies employed by existing green factories, as revealed by the study were Building flush out, entryway systems, high efficiency filters and so forth. Taking this as a framework, an intervention programme was developed and conducted on managers of non-green factory buildings, to empower them towards long-term sustainability benefits through green factories. It resulted in change in knowledge and perception of stakeholders, which was statistically analyzed. This change helped them to understand and appreciate how their practices and preferences in their factory buildings can contribute to good working environment thereby leading to a holistic goal of sustainable development. Thus, such interventions can be taken up at a wider scale to motivate community stakeholders to adopt green building guidelines.

GI344: Drone Applications for Environmental Monitoring in Urban Spaces

David James Gallacher

Zayed University, UAE

Options for environmental monitoring have improved dramatically over recent years. Sensors for air and water pollutants, and subsets of the electromagnetic spectrum, have become smaller, cheaper, and more bundled into comprehensive units. Aerial sensor platforms have also expanded in the form of low-altitude unmanned aerial vehicles (micro-drones), but their use in populated spaces is increasingly restricted for safety and privacy reasons. This article defines the types of applications for which benefits of aerial surveillance by micro-drone have the potential to outweigh the risks. These include monitoring (1) the efficiency of temperature control and irrigation systems at the scale of urban blocks and above, (2) evaluation of air and water quality that is supplementary to fixed sensors, and (3) compliance of industry to municipal regulations. They do not include applications that require repeated measurements from locations proximal to fixed or publicly owned mobile infrastructure, whether terrestrial or marine.

GI410: SMEs and Sustainable Tourism - The Case of an Indian Himalayan Destination

Ravinder Nath Batta

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Small and Medium Enterprises (SMEs) constitute life blood of travel and tourism industry and strongly influence the development of a region, especially in the context of developing countries. As they often regard each other as competitors, this has resulted in serious effects on the environment at the destination since with mushroom growth of enterprises, the common pool resources (water, sewage treatment facility, solid waste management, parking and roads) at the destinations experience serious capacity strain leading to problems often associated with unsustainable development. While some literature on SMEs and tourism is available, studies on successful experiments on cluster formations and institutional arrangements relating to SMEs development, operation and destination development are relatively scarce and relating this framework to sustainable tourism development at the destination is an area still unexplored. This paper is an attempt in this direction.

This paper examines the impacts of unplanned growth of tourism SMEs on civic infrastructure and the environment at Manali- an ecologically fragile area on the foothills of the western Indian Himalayas. Using indicators framework, impacts of tourism on the economic, social, environmental aspects are studied and it is seen that SMEs working in isolation are damaging the environment at the destination. For achieving sustainable tourism development at the destination through public-private partnership, a Community Benefit Tourism Initiative (CBTI) model is developed which helps generation of resources for green infrastructure, community mobilization for sustainable tourism development ultimately leading to green and inclusive growth of the local economy.

GI421: Effect of New Ellipse Design on the Performance Enhancement of PV/T Collector: CDF Approach

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Photovoltaic and thermal collectors are combined as a photovoltaic/thermal (PV/T) collector system to increase collector efficiency. The efficiency of photovoltaic collectors is known to decrease when ambient temperature increases and vice versa. PV/T collector systems function by absorbing the heat gained from the sun via photovoltaic panels and by converting this heat into electrical energy. Simulations CFD have been investigated to explore the impact of different mass flow rates against photovoltaic and thermal efficiencies of PVT collector using FVM. New ellipse design of collector have been modeled and investigated to generate hot water and electricity. In this simulation, the absorber collectors were assumed to be attached underneath the photovoltaic (PV) module, and water is used as a heat transfer medium in absorber collectors. The results shown that new ellipse absorber collector generates a combined PV/T efficiency of 72.5% with electrical efficiency of 11.9%. The efficiency of the PV/T system should be improved further by developed the surfaces between the absorber and solar panel (PV module). However, different types of PV cells, such as amorphous silicon cell with black mat surface property, should be used to improve the thermal absorption of PV/T systems.

Highlights: (i) A three-dimension hybrid photovoltaic/thermal solar collector module was performed in CFD software. (ii) The results agree with those obtained through steady-state characterization. (iii) The simultaneous use of new ellipse design of absorber which absorb much more thermal energy compare to others normal designs to increase thermal and electrical efficiency significantly.

GI472: Understanding the Role of Green Infrastructure (GI) in Tackling Climate Change in today's World

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The physical environment is an important determinant of health influencing the prospects of health in many ways. The influence also encompasses biodiversity and the health of infrastructure. Understanding Green Infrastructure role in tackling climate change means understanding the dynamics of environment, climate change and sustainability which this paper will address the basics. Green infrastructure incorporates both the natural environment and engineered systems to provide clean water, conserve ecosystem values and functions, and provide a wide array of benefits to people and wildlife. Green Infrastructure (GI) promotes multifunctional, connected and green spaces and has a key role to play in delivering climate change policy objectives, tackling harmful emissions and creating sustainable places. CO₂ has the highest impact on the climate as observed by scientists among the identified GHG. Hence, reducing CO₂ in the environment is key in mitigating climate change. In summary vegetation (cover) might be able to take in more carbon dioxide than is currently modelled. The United Nations Framework on Climate Change (UNFCCC), highlights two ways of tackling climate change and these are: Mitigation and Adaptation. Mitigation deals with combating the causes of climate change and one way which will be very cost effective is Green Infrastructure by growing vegetation.

GI475: Rural Electrification through Solar Energy: Insights from Chattisgarh State of India

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The Indian energy sector has witnessed a rapid growth in an effort to meet the demands of a developing nation. But continuation of the use of fossil fuels is set to face multiple challenges: depletion of fossil fuel reserves, global warming and other environmental concerns, geopolitical and military conflicts and of late, continued and significant fuel price rise. Renewable energy is the solution to the growing energy challenges as they are abundant, inexhaustible and environmentally friendly. Accelerating the use of renewable energy, specifically solar energy is also indispensable if India is to meet its commitments to reduce its carbon intensity. Given the vast potential of solar energy in India, all it needs is comprehensive policies to be a global leader in clean and green energy. Government has taken a number of steps towards improving the adoption of solar energy at a large scale in the country. Many programs and policies have been initiated at both the National and State level for promoting solar energy, but its use and production in the country is still limited. On studying one of the major initiatives of National government, the "Remote Rural Village Electrification" in Chattisgarh as a case, it was found that there was a gap between the policies and the actual scenario. The awareness level among the beneficiaries was found to be very low. Thus, there is an urgent need to generate awareness among the stakeholders regarding the government initiatives, so that solar energy is widely accepted and used.

GI612: Examining the Lagos Green Initiative: A Case Study of Kosofe Local Government

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Environmental sustainability has been a global agenda which aligns with the Millennium Development goal seven (7). In line with this global agenda, Nigeria scaled up her priorities to ensure meeting this goal by putting in place useful machineries (Adeagbo,2013); the creation of parks and greening Lagos was one of such actions. Hence, this study sort to examine government's initiative towards sustaining the environment, and the attitude of its citizenry. The study utilized a qualitative method to obtain information from key informants, opinion leaders and program coordinators who were identified; while a cross-sectional descriptive survey was utilized to obtain quantitative data through the distribution of questionnaires among residents of Kosofe Local Government of Lagos after cluster sampling. Computed coded data, were analyzed into frequencies and descriptive statistics using SPSS version 16. Findings from this study reveal that, the mean age of the respondents was ± 30 . The key informant interview revealed commitment to sustaining the initiative and it also showed that community involvement was a key strategy to sustenance. Data from respondents revealed that 60% of the community members support the green initiative, while 70% of respondents, established willingness to contribute to the green Lagos initiative. Overall, respondents felt positive effect on their health. Hence, this initiative is worthwhile and should be replicated elsewhere. There is a need for focused strategies to harness full community involvement so as to meet the vision of the initiative.

GI620: Use of Wetlands in Sharjah, UAE – Possibilities and Challenges

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Wetlands, flooded lands by shallow water or saturated soils where plants can be grown, has been used in a number of locations to treat different qualities of water or as a holding area for rainfall runoff. The benefits of having wetland, for wastewater treatment, are its low cost, its capability of removing contaminants such as metals, organic and inorganic matter. In addition, wetlands add to the beauty of nature, attract tourists, birds and avoid flooding around wetland areas. There are essentially two types of wetlands based on the nature of the water flow, surface and subsurface. In the United Arab Emirates, surface wetlands, where the water lies above the ground surface, is not suggested because the water will evaporate very fast due to the high temperature. However, use of the subsurface flow wetlands does show promise. Despite the advantages of a wetland to treat wastewater, its use in Sharjah and the Middle East is almost non-existent. This paper investigates the possibilities and challenges of developing wetlands for the treatment of leachate and other chemical wastewater with the purpose of being able to use the treated water for different activities.

GI627: The Urgent Necessity to Redouble Renewable Energy Output

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There is no room now for climate change scepticism. It is evident to all that climate change is happening – the results can be seen in many countries. Floods, freaks storms, wind speeds of more than 80 mph, heat waves, droughts, rising sea levels and disappearing glaciers, largely due to excessive use of fossil fuels.

Climate change acceleration began slowly in the 1970s but has now increased beyond our ability to stop it or reduce its impact. Using renewable energy effectively on a large scale will put an end or considerably slow down this process in many parts of the world. This papers shows that some countries are making greater efforts than others. Installations of the 70s and 80s were limited to kilowatts while in the 2010s we speak in terms of megawatts. The cost of most renewable energy systems have been reduced by so much that they have reached parity with fossil fuels or are even cheaper. The most effective progress has been made in photovoltaic systems: the cost of turnkey installations say for 5 MW is \$6 million. Governments in European countries are using Feed-in-Tariffs which has made the payback period of installing a large system less than 1.25 years. Similarly, Concentrated Solar Power, biomass, wind energy and hydro-power have greatly improved payback periods. Countries such as Morocco have pledged to produce 40% of their electricity from renewable energy by 2020, while Austria has declared that by 2050 all its energy will come from renewable sources.

It is clear from the media and UN Reports that there is no country which is not utilising renewable energy to some extent, but what is urgently needed is for this use to be redoubled immediately to prevent the earth heating by more than 2 C.

While much is hoped from the outcome of the December 2015 Paris climate summit, realistically in the past very few nations honoured their pledges. A great deal of aid has been given to poor countries which are suffering from climate change, however the donor nations have failed to restrict their own carbon emissions. Many poor countries feel they are being expected to forgo the industrial benefits which came from the industrial revolution powered by fossil fuels.

LW263: Shrimp Fry (meen) Farmers of Sundarban Mangrove Forest (India): A Tale of Ecological Damage and Economic Hardship

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The Sundarban is a stretch of largely impenetrable mangrove forests lying at the southern tip of the Indian state of West Bengal, and stretching into Bangladesh. Nearly 4.5 million people live in Indian Sundarban. In absence of any industry, people entirely live by exploiting the natural resources. Due to the salinity of soil, regular storm, flood agriculture is very difficult. Collection and cultivation of prawn is an alternative means for subsistence in the area. Prawn cultivation not only provided them with ready cash but it appeared to be more paying than agriculture. Instead of high earning from huge collection of tiger shrimps, base level workers collecting the shrimps are facing toughest economic situation. Their socioeconomic condition is very poor. The provision of basic services and infrastructure to the people of the Sundarban is far from satisfactory. Women and children are becoming increasingly vulnerable in the Sundarban. Women are underpaid for jobs that they are employed for. They wish to work to supplement their family income but are unable to find employment outside the traditional work. Children are engaged in meendhora (meaning collection of prawn fry), fish drying and domestic work from a young age. But huge ecological damage is being caused over decades by this shrimp collection method. Shrimp fishing produces large amounts of bycatch, which may be as high as more than 65 percent of the total fry caught. These bycatch is completely discarded by the collectors causing huge loss to other aquatic species. Also, due to direct and prolonged contact with the seawater, the collectors develop occupational hazards like waterborne diseases, skin infections, some contiguous diseases. In this work, we present details of this damage- both to ecology and to livelihood of people involved in this occupation. We report national and international studies expressing concern on these issues. Also, we report with examples what safe strategy can be adopted to reduce ecological damage, as well as protect physical damage to shrimp collectors.

LW294: Stabilization/Solidification (S/S) Technique: A Review of Its Advantages and Applications in Saudi Arabia

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The protection of the environment from hazardous pollutants associated with the soils contaminated with oil is a major concern in today's industrialized world, especially the developing nations. Therefore, there is necessity to cure the contaminated soils to reduce the potential release of crude oil into the environment. The Stabilization/Solidifications (S/S) treatment process consists of the addition of cementitious binders to contaminated soils to form a slurry or liquid waste so that the contaminants from the soil can be prevented from affecting the groundwater and subsequently the environment. In this review, detailed discussion is presented the stabilizer that were conventionally used for S/S treatment and tests for evaluating effectiveness of S/S treatment. In addition, advantages of the S/S technology is reported. Lastly, background of soil contamination by oil spill in Saudi Arabia is addressed in this manuscript.

LW308: Introduction of Knowledge of Waste Separation in Developing Countries

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Importance of know how of waste separation must take place, for an easy cleanup and management of it, in developing countries. As polythene and plastic materials have become common usable, its uncontrolled land discharge is responsible for major soil degradation and pollution, resulting climate change. Therefore, it is an utmost importance to know the basic technology of its separation at the user point.

Most of the developing countries population are unaware and without knowledge of waste management. They also do not know why it is so important for themselves and generation to come. Municipalities or building code authorities do not provide sufficient guide lines regarding this matter. As mixed organic and inorganic substances are dumped in same place they degrade the land, pollute the whole area, and create hazardous methene gas. This practice is increasing in a geometric progression along with population growth. On the other hand, poorly manage waste, depriving all healthy living.

This paper includes description of practical education and training processes. It also elaborates the details of methods and medium for it.

This education will be beneficial to the local and as well as the foreign folks as in today's world, through system of air transportation communication, made it easier to transfer any kind of pollution including SARS, MERS etc. So, to make the earth safe and its living sustainable, this knowledge is a must.

LW326: Poultry Production and the Environmental Health

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The localization and intensification of the poultry industry over the past 50 years have incidentally created a largely ignored environmental management crisis. As a result of these changes in poultry production, concentrated animal feeding operations (CAFOs) produce far more waste than can be managed by land disposal within the regions where it is produced. However, much less attention has been given to the potential risks related to poultry waste constituents, including ammonia, pathogenic bacteria, antibiotic-resistant bacteria, and residues of the drugs added to poultry feeds. In addition, there are several chemicals emitted from poultry litters which in turn affect the environment beneficially and detrimentally. Several steroid hormones and trace elements are also found to make impact on the environment and human population. This paper will focus on the effect of poultry production on the environment and vice versa and the methods used to utilize of poultry litter to mitigate the effect on the environment and climate change.

LW438: Comparison of Irrigation Qualities of Septic Tank Effluents Reclaimed Using Aerobic-Versus Anaerobic-Based Treatment Systems

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Conventional septic tanks remove partially suspended solids and organics from wastewater, but do not remove nutrients or pathogens. Kuwait Institute for Scientific Research has studied a number of promising systems for the reclamation of the effluents of conventional septic tanks. This paper compares the irrigation qualities of the final products of aerobic- versus anaerobic-based post-treatment systems. Reclamation of the effluents of a full-scale conventional septic tank indicated that anaerobic treatment results in lesser salinity, fewer suspended solids, and smaller amounts of organics than aerobic treatment which is found to be more efficient in the removal of total nitrogen. However, obtained results have also indicated that both treatment systems give almost the same concentrations of boron and heavy metals. Accordingly, it has been concluded that reclamation of effluents of conventional septic tanks requires a system that consists of both aerobic and aerobic biological treatment units.

LW449: Efficient Extraction of Radioactive Isotopes of Cobalt, Europium, Cerium, Strontium and Copper from Aqueous Solutions

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One of the most effective and simple methods of natural and waste waters from heavy metals and radionuclides is a sorption extraction. As sorbents proposed the use of polymers, natural materials, and other oxides. The particles of iron oxide Fe_2O_3 and Fe_3O_4 are among the most promising materials for inorganic heavy metal ions and radionuclides from water bodies. Their advantage over other compounds is the lack of toxic effects on the human body, low cost and ease of obtaining precursors.

Synthesis of Fe_2O_3 particles as follows: 100 ml of a 0.2M precursor salts of iron (III) an aqueous solution of ammonia or ammonium bicarbonate to a predetermined pH ranging from 7 to 12 and stirred on a magnetic stirrer for 30 min. The resulting precipitate was filtered, washed several times with distilled water and dried at room temperature for 24 h, then calcined at 450°C for 1 hour.

Synthesis of Fe_3O_4 particles was performed by precipitation from aqueous solution: 5.99 g $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ and 10.79 g of $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ was dissolved in 40 ml of distilled water. The resulting solution was heated to 60°C and 10 ml of 25% aqueous ammonia solution under constant magnetic stirring. The resulting precipitate was filtered and washed with distilled water. Then dried in air for 24 hours.

X-ray analysis of the sample Fe_2O_3 showed that after annealing at 450°C formed $\alpha\text{-Fe}_2\text{O}_3$ (hematite). Unlike samples Fe_2O_3 , for Fe_3O_4 samples X-ray data is multiphase and contain magnetite (Fe_3O_4) – 70%, maghemite ($\gamma\text{-Fe}_2\text{O}_3$) – 25% and goethite (FeOOH) – 5%. The presence of impurity phases goethite and maghemite Fe_3O_4 samples associated with aging and is characteristic of the powders obtained from aqueous solutions.

It is established that from nitrate solutions formed shapeless large agglomerates of 50 – 200 microns, consisting of spherical particles of Fe_2O_3 (specific surface $S_{\text{sp}} = 150 \text{ m}^2/\text{g}$). Introduction of chloride ions leads to the formation of solid particles of cubic and oval size of about 0.12 – 0.20 microns ($S_{\text{sp}} = 30 \text{ m}^2/\text{g}$). Sodium ion has no significant effect on the formation of particles Fe_2O_3 .

LW549: Natural Heritage as a Structure for Urban Regeneration: Case of El Harrach River

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Discredited for a long time, El Harrach River became extremely polluted today and it exceeds 30 times the accepted standards and 400 times the WHO standards. Indeed, it crosses over its last nine kilometers to its outfall, an important urban and industrial zone. Nonetheless, the river pollution threatens the bay of Algiers. Referring to Mistuo Yoshida studies (2005), the river contains lead, chlorine, zinc and chromium in large quantities released into the sea.

Being a main part of the urban structure and the natural grid of the city, with 67km-long, it starts in the Blida Atlas and flows into the Mediterranean, in the middle of the Bay of Algiers. Relative modest operations have been undertaken, trying to absorb the pollution. Recently, the government launched rigorous decontamination works as a part of the new redevelopment plan of Algiers by 2029, where the river is considered as an important ecological axis and natural regenerative of the urban structure.

This article analyses the strategy of reinstatement of this urban and natural microcosm through five segments as a green heritage and generator of the city of tomorrow, with a special focus on the impact of the river redevelopment on these different slices, in relation to the protection of ecosystems, channelling axis of urbanization, for the medium and the long terms.

LW558: Dimensions of Spatial Change in an Egyptian Village

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The main objective of this paper was to explore several kinds of spatial change in the village of Shoeshay in Menoufia governorate, Egypt during the period 1930 – 2015. The paper presents losses in agricultural lands of the village occurred as a result of individual encroachment on these lands for building new houses, and the new spatial mapping made by the government for all villages and their surrounding ezab. The expansion of areas under buildings, changes in the shape of buildings, their identity, number of floors, and building material were explored and described. Maps were prepared using GIS Arc Map 10 to show the development of the expansion of areas under buildings of the village during the period 1930 – 2015. These losses in agricultural lands resulting from the horizontal expansion of building have negative effects on agricultural sustainability of the village. Great efforts are needed by the agricultural extension organization at the Ministry of Agriculture to make people aware of the impact of encroachment on agricultural sustainability. Great efforts also are needed by the government to take and implement serious decisions to put an end to this critical problem.

LW619: Assessment of Mixing Potential of Sewage Sludge, Green Waste and Food Waste for Co-Composting in Sharjah, UAE

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The generation of large amount of solid waste is a big challenge for large cities like Sharjah, UAE. A major portion of this generated waste is organic in nature. The use of composting is very common for municipalities dealing with large quantities of organic waste. However, there are different types of organic waste produced in different operations within the municipalities. Instead of having separate composting facilities, working with the major types of organic waste for co-composting can add value. Sewage sludge, green waste and food waste are major sources of organic waste in many municipalities. Currently, the compost facility within Sharjah Municipality use sewage sludge and green waste as their raw material. There is no separate composting provision for food waste. The objective of the paper was to characterize different organic waste and assess the suitability of co-composting in Sharjah, UAE. Results indicated that sewage sludge, green waste and food waste had very diverse characteristics suitable for compost. Mixing these wastes in the appropriate proportion can provide the basis for creating good compost. When it comes to maintaining a mixing proportion of these three different organic wastes, there are several combinations that can work. In addition green waste can be used a bulking agent for other types of organic waste. Optimal moisture content was also investigated in the study. Combination of these three types of organic waste can be a quite viable co-composting option for Sharjah, UAE. A laboratory based experimental study identified the mixing potential of these three types of organic waste for the municipality of Sharjah, UAE.

SC340: Development and Validation of ICT for Building Capacities towards Renewable Energy and Energy Efficiency: A Step towards Smart Cities through Sustainable Resource Use

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A smart city uses information and communication technologies (ICT) to enhance quality and performance of urban services, to reduce costs and resource consumption. Education with ICT strategies towards efficient use of resources such as energy will guides us on our journey towards the goal of climate change abatement and making cities smarter, since smart people make smart cities. Youth of today are the driving force of tomorrow; through them we can tap future generations, policies and development. The study involves designing a capacity building programme and administering it to the sample, the goal is to measure the enhancement of knowledge; change in perception regarding energy management and energy auditing skills, pre and post intervention. Energy Management was studied in terms of energy related carbon emissions, renewable energy, energy conservation practices, energy efficient appliance and energy audit. The sample constitutes 470 students from schools and colleges of selected Universities in Delhi, India.

The paper will discuss curriculum analysis, which was done to appraise the inclusion of information on energy management in school and college curriculum, followed by pre intervention outcomes with respect to sample's knowledge, perception and skills. The paper also discusses strategies used in designing and administration of the capacity building programme. The programme comprises of capacity building aids blended with educational technology in an information-sharing mode of instruction. Interactive media such as technology based learning (mobile application, game), simulation exercises, multimedia, lectures and group discussion is being used.

SC379: Urban-Scale Material Flow Analysis: Malaysian Cities Case Study

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Urban metabolism study highlights the consumption of the input resources, the process within the system together from the source, use phase and recycling of wastes. The aim of the study was to assess urban metabolism in three cities in Malaysia; Kuala Lumpur, Ampang Jaya and Selayang by using Material Flow Analysis (MFA). Primary data through questionnaires and secondary data from government agencies and public service providers were obtained and analysed. The data that was analysed included electricity inputs, water inputs, rice, eggs and sugar inputs, carbon dioxide outputs, wastewater outputs and solid waste outputs. National data were downscaled to regional data where deemed necessary. The study found that electricity use are not significantly differed with the use of home electrical appliances alike. On the other hand, water use and food consumption significantly differed among the three cities as the number of households and city living standard varies. The electrical consumption of 0.188 koe/cap/day in Klang Valley contributed to carbon dioxide of 0.455 kg/cap/day while 95.32% of water consumption became wastewater. Consumption of 0.38 kg/cap/day of rice, eggs and sugar contributed in the production of 4.5 kg/cap/day of solid wastes. The urban metabolism approach provides information on urban management such as material cycling, energy efficiency and waste management and may also assist in decision making for future urban development planning as well as providing an informed and rapid assessment on the performance of urban area.

SC397: Smart Cities and Sustainability: An Approach for Managing Resources through Smart Systems

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Smart City vision can be viewed as 'System of systems', where all systems within it are interconnected, in constant communication with each other in real time, exchanging information and making smart decisions, all in a sustainable and highly efficient model. Two decades ago, the Smart City concept was born to address emerging city sustainability issues, and was mainly focused on energy efficiency and greenhouse gas emissions reduction. More recently the term was attached to the role of ICT Infrastructure.

This paper aims to clarify interrelations between the Smart City concept, and fostering cities' sustainable development. The paper is based on an analytical study of the main ICT building blocks for a Smart City, emphasizing the significant role of simulation softwares in managing Smart City's assets. The first section is a short introduction to challenges and drivers for a Smart City. Section two discusses the technological context of Future Internet and the expected impact of Internet-of-Things, sensors, tags, and cloud computing on smart cities. The next two sections analyze the main Smart City Systems and approaches for managing them. Section five presents the Europe 2020's strategy, with analyzing to three of top performing cities, to identify Smart City's good practices. The final section addresses the UAE's potentials, presenting recommendations for transforming it into Smart Cities.

This paper concludes the growing importance of ICT infrastructure as a driver for boosting economic competitiveness and environmental sustainability.

SC414: The Role of Energy in Buildings in Smart Cities

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VTT, The Technical Research Centre of Finland Ltd, is a multidisciplinary application-oriented research organization. VTT carries out researches and innovations that support the development of smart cities in many different ways. VTT works from the early stages of a concept and ecosystem development to the practical implementations of the outcomes. Our research and innovation activities cover all the core technology areas relevant to the concept of smart city and its development. Our key related technologies and application domains are: ICT, Energy, Transport and the Built Environment. VTT has three interactive research programmes that focus on the smart cities area: Ingrid (Intelligent Energy Grids and Smart Districts), TransSmart (Smart Mobility Integrated with Low Carbon Energy) and pro-IoT (Productivity Leap with Internet of Things).

The focus of this paper is the role of energy in buildings in the smart city. This is done through presenting some aspects of selected cases from recent research projects carried out by VTT on different national, EU and International levels. These projects fall under a general topic of smart city concepts of intelligent buildings/urban spaces and distributed energy systems, including sub-topics of energy positive neighbourhoods, renewable energy technologies, energy and ICT business concepts, ICT for energy monitoring and management for buildings and districts, and building maintenance.

The paper indicates the importance of energy efficiency, renewable technologies, and energy management of buildings/districts, including ICT utilization and business initiatives, in achieving a sustainable smart city.

SC439: Planning for a Smart City with a Human Face in Developing India

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The increasingly urban and interconnected world today is recognizing the role of the city as '*an engine of growth*' and development. Though urban centers are associated with greater access to basic facilities and services - educational, medical, cultural, employment opportunities and greater involvement of polity in the developing economies, cities often have poor infrastructure and services and sub-standard living conditions. Though, currently smart cities being mooted as the solution to all problems with the help of ICT and its enabled services over the globe, they lack clarity in totality. The smart city mission launched as a flagship program in India is working in the same spirit.

With the advancement of science and technology, the importance of ICT and digitization in the overall governance of towns and cities cannot be underestimated, but the feasibility of this option in India, where a sizable proportion of population lives in villages and below poverty line remains debatable. Research studies have proved that, it is also the root cause of compulsive migration to urban areas in search of livelihoods, aggravating urban poverty.

In this background, India needs to plan and develop cities and villages in synergy with regional and local contextual realities. On the foundation of this integration, Indian cities could be built more livable, sustainable, prosperous and inclusive-smart cities '*with a human face*'.

SC471: Sustainable Development and Right to Water - An International Perspective

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The Paper argues that only laws cannot guarantee gender equality, urban planning and design also play a major role in the same by making public spaces safer for women and making them confident to move out even at odd hours. It explores the constitutional perspective and advocates gender sensitization awareness and safety checklists in urban planning and design and guidelines for safety audits can help to ensure safety of women. It seeks to explore options for creating women friendly environment and streets. It also aims to analyze the relevant legislations and judicial attitude, followed by suggestions and conclusion.

SC474: Water Resource Management for Sustainable Development of Smart Cities along Foothills of Himalayas – Dehradun A Case Study

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The basic concept of smart cities would be development of infrastructures to achieve sustainable development via creation of sustainable environment, water management, & water resource management. This makes water as one of the major component towards sustainable development becoming crucially important for human settlements & there survivals.

The most ambitious 'Smart Cities Mission' of government of India, includes cities across the major geographical regions in India including mainly central plains, western deserts, coastal areas & northern Himalayas. This paper attempts to focus on the Northern Himalayan region considering them the most ecosensitive climatic domain of the Indian subcontinent and this being attributed is attributed for being a Global diversity hotspot on account of its unique topography, micro-climatic conditions and strategic location, affecting the mountain habitats but also the much larger inhabiting the adjoining indo-Gangetic plains.

Therefore, considering the sensitivity regarding planning & sustenance of Human settlements in Himalayan regions, the region deserves more attention to improve its existing situation with sustainable technologies & practices. along with a sensitive approach towards the management of its natural resources to be sustained without getting exploited & deteriorated by the rapid phenomenon of urbanization.

The present study deals with the specific contribution of water towards the achievement of sustainability of smart cities & special emphasis shall be given to functional & recreational consideration of natural water bodies based on principles of sustainability & conservations & re-use of water resources, in order to revitalize & sustain the natural as well as artificial water resource system in smart cities to become water smart.

SC482: Towards the 2nd Sustainable City in the Middle East: Retransforming and Applying the PRS and the Estidama First Model of Abu Dhabi Master Plan 2030 on Ras El Khaimah Coastal City

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Consisted of three rating stages; Design rating, Construction rating and Operational rating processes, the new Pearl rating system is the core of UAE Estidama program that was introduced to the world under the vision of Abu Dhabi master plan 2030 “towards the first sustainable capital in the Middle East”. By monitoring every stage in a building life cycle, the (PRS) will guarantee applying all development aspects in a sustainable manner. For one of the most rising countries in the Middle East that is rushing to be one of the best developed country in the region, having one city as the 1st sustainable capital is not enough for conserving the heritage, culture and the unique virgin environment of the Arabian Gulf western shore through the three pillars of sustainability; environmental, economic and social. A small city as Ras El Khaimah with its few resources and its richness with desert hidden treasures can be a good second step to reapplying the vision of Abu Dhabi 2030 Estidama program.

This paper will present two detailed analytical studies regarding Abu Dhabi master plan 2030 and Ras El Khaimah current situation in order to investigate the obstacles facing the sustainable development in the city under the Estidama program. The aim is to generate a guideline and a set of recommendations should be taken care of during the development process and applying the PRS and the UAE Estidama program.

SC547: Advancing Smartness of Traditional Settlements- Case Analysis of Indian and Arab Old Cities

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The study aims to investigate the concept of Smart Sustainable Cities in traditionally planned and organically grown settlements. Smart Cities Mission is an ambitious project of Government of India targeting 100 cities for improving their urban quality of life.

However, there is no universally accepted definition of smart cities because of its vast and vague scope.

In such a situation, it becomes important to understand where our old cities stand in terms of smart sustainability and inclusiveness. The methodological approach adopts case analysis of old Indian cities and Arab cities in terms of their environmental, economic and social planning paradigms.

These include land use mix, compact development, dwelling density, internal and external connectivity, open spaces, walkable neighbourhoods, access to social services, collective cohesiveness, local area governance, crime & safety, economic diversification and socio-cultural diversity.

The study enlists smart urban elements in our existing old cities, which are derived from extensive literature study of Middle East cities and primary surveys of around 160 samples in a medium sized old Indian city in Rajasthan. The study assesses the baseline situation of culturally rich and varied old cities and need to advance from their inherent smartness using innovative and interactive ICT and urban engineering solutions.

SC557: Optimal Air Quality Monitoring Network for Green Cities

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Continuous efforts are being made by cities around the world to identify methods to make their environment healthier and more livable through the improvement of water, land and air. Air pollution assumes high importance as most of the times it causes severe and irreversible damages to human health and environment and remediation is extremely difficult. The potential sources of air pollution such as large industries, automobiles and power plants are essential part of Cities. Transforming these cities into 'Green Cities' necessitates control on these emissions. Continuous monitoring of the air pollution with a well-designed air quality monitoring network (AQMN) is usually the first step in addressing and tackling the emissions. Environment protection agencies would be looking for an optimal designed AQMN with an obvious focus on minimizing the cost, along with other objectives. This article proposes a simple method of optimizing the AQMN using geographical information system (GIS), interpolation techniques and historical data. Existing air quality stations are systematically eliminated and the missing data is filled in with data generated from the most appropriate interpolation technique. The interpolated data is then compared with the observed data. Pre-defined performance measures were used to check the accuracy of the interpolated data. An algorithm was developed in GIS environment and the process was simulated for several sets of measurements. This methodology proves to be useful to the decision makers to find optimal numbers of stations that are needed without compromising the coverage of the concentrations across the City.

SC587: Smart Cities – A Successful Implementation of Smart Sewerage Infrastructure in Ajman, UAE

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Ajman Sewerage (Private) Company Ltd is a partnership between the Government of Ajman, BESIX and Veolia, two leading international water treatment experts from the private sector. Ajman Sewerage collects wastewater, treats it and delivers treated water to the City of Ajman. The sewerage system has about 300 km of sewer lines, 22 pump stations and a wastewater treatment facility that handles 80,000,000 litres/day. On a daily basis, more than 300,000 people living and working in Ajman benefit from the sewerage system.

Over the years Ajman Sewerage has developed a Smart Sewerage Infrastructure. More than merely civil underground pipes and pump stations, the wastewater flows throughout the network system is continuously monitored through Real Time Control and Remote Management, which provides us with numerous benefits. As an example, pumps settings are continuously adjusted based on the information received from upstream and downstream pump stations. This smarter way of managing assets and optimizing their use has also yielded increased assets capacity, significant power savings, and reduced sediment deposition in the sewers and pump stations. A real technical case example in line with Ajman's 2021 vision toward environmental and operational excellence.

SC642: Unlocking the Potential of Shared Mobility: The Role in Environmental Protection and Impact on the Urban Transportation System

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The twentieth century has reshaped the urban landscape through the rapid industrialisation and development of transportation systems. Today, car ownership hardly is a luxury, and one can reach a desirable destination without relying on public transportation. The new millenium has reaped the benefits of such technological progress changing the notion of mobility and advancing the introduction of the shared car use. While drivers and passengers reconsider their reliance on motorised individual transport, international public policy has set up a debate on benefits versus drawbacks of such community-driven approach to mobility. Notably, the safety and labor right issues shape raising concerns of local municipalities and global policymakers. Whether shared mobility should be addressed as a positive transformation of social perception of ownership rights and an environmentally friendly initiative or as a distortion-producing industry with blurry safety regulations is currently an open question. This paper analyse effects on environmental and transportation systems and associated public policies carried by shared mobility companies and individual users.

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