Australia-India Knowledge Exchange Workshop on

'Smart Energy Management for Sustainable Cities'

UNSW SYDNEY

The Energy and Resources Institute

13th December, 2018

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Background: 'Smart Energy Management'

India is currently facing rapid urbanization, which is one of the key drivers for the increase in energy demand and consumption. With 18% of the world's population, India contributes to 6% of the world's primary energy consumption (IEA, 2015). As the future population is expected to grow by another 400 million by 2050, there will be serious implications on energy consumption and subsequent greenhouse gases (GHG) emissions. Moreover, India's urban areas emit between 50-60% of the world's total GHGs (UN Habitat, 2017). The changing climate, lifestyle and economic development combined with the demographic patterns of cities can significantly affect energy demand and drain the already dismal energy infrastructure (Bains, 2016). It is estimated that almost 70% of urban infrastructure is yet to be built to accommodate the growing urban population. The Indian government is also committed to provide continuous energy access for all by 2022 (Yenneti, 2016).

At the same time, cities are currently facing a series of complex interconnected challenges related to energy management. The increasing pressure on non-renewable sources of energy, such as fossil fuels, to meet the energy demands of cities and the encroachment and polluting of protected areas for acquiring the energy sources has added more burdens on the environment. Moreover, the depletion of energy resources has adverse impacts on the climatic conditions, with high GHG emissions of cities additionally contributing to climate change and global warming. Energy management thus needs to be closely linked with environmental management and socio-economic development (WRI, 2017). For instance, ensuring continuous energy access to the entire urban population will consequentially lead to better healthcare facilities, education and livelihood opportunities, and quality of life (ibid).

In the current national urban missions in place, the impetus needed for energy management in cities is high. For instance, the 'Smart Cities Mission', designed towards making cities more liveable, sustainable and resilient, mentions the importance of having '10% of the Smart City's energy requirement coming from solar' in its guidelines, along with 15% of the housing provided in any greenfield development to belong to the affordable housing category (MoUD, 2015). Another pre-requisite for a Smart City is having 80% energy efficient buildings (MoUD, 2015) with a 'green building' design, which consists of elements such as sustainable site design and energy efficient infrastructure (Shrivastava, 2017). However, many technical and financial support mechanisms required for such retrofitting and construction processes are still in the initial phases of approval and implementation. There are also few dedicated national missions that address energy efficiency. The aim of the National Mission for Sustainable Habitats is 'encouraging sustainable urban planning in India with the help of policy, infrastructural and research interventions in sectors such as buildings, waste management, water resources and transportation' (Rattani, 2018). Further, the Solar City Mission has a primary objective of 'achieving grid parity by 2022' along with having an 'enabling policy framework for the deployment of 20,000 MW of solar power by 2022' to reduce dependence on fossil fuels (ibid).

As cities face a series of complex and interconnected challenges related to rapid urbanisation, climate change and energy management, there needs to be a better understanding of these issues for addressing the challenges and conditions of urban environments. Alongside, there needs to be support for cutting-edge technologies,

innovative planning and design, and emerging strategies that can enhance both financial and technical capacities of the cities. Integrating innovations in physical infrastructure with smart information and communication technologies (ICT) is now a top priority for city governments across India to pursue smart and green living, to improve energy efficiency, to protect the environment, to improve the quality of life, and to bolster economic competitiveness (Mahapatra et al., 2017).

Against this background, it is imperative that urban challenges such as mobility, accessibility to reliable and clean energy, provision of green and resilient infrastructure and waste management are addressed by adopting the principles of smart energy management to achieve the objectives of sustainable development. It is important to plan for policies that can manage energy demand in cities in the coming decades and can influence future carbon emissions.

To this end, The Energy and Resources Institute (TERI), India, in partnership with the University of New South Wales (UNSW), Sydney, Australia, organised a Knowledge Exchange Workshop which aimed to bring together the extensive knowledge of various sector experts to address these challenges and discuss inputs to policies on 'smart energy management' for sustainable cities. With support from the Andhra Pradesh Capital Region Development Authority (APCRDA), and industry partners Mahindra Group and DuPont India Pvt. Ltd., the workshop contributed towards the creation of a knowledge exchange partnership that would be followed by reciprocal visits between the countries.

The workshop provided a platform for academicians, research institutions, policy makers, urban planners and industry in India and Australia to participate, discuss and collaborate on identifying efficient and low-emission pathways in order to mitigate negative externalities of urbanization in Indian cities. Focusing on the urban landscape and the challenges towards adopting smart energy management for achieving low-carbon development, the discussions were centred on the following:

- Existing policies and strategies in place for 'smart energy management' in cities across different sectors such as buildings, waste management, water management, transportation and public services
- Challenges being faced by Indian cities for the implementation and integration of 'smart energy management' tools and measures
- Opportunities and enablers to promote 'smart energy management' and low carbon development in Indian cities
- Ways to interlink different sectors to achieve integrated 'smart energy management' in Indian cities
- Scope for translating global best practices to the urban Indian context and way forward to promote integrated 'smart energy management'

The discussions at this workshop would be supplemented by a workshop to be held at UNSW Sydney in March 2019. The workshops will focus on creating a dialogue towards developing and strengthening long-term collaboration between India and Australia and identifying the key challenges and enablers to the process of energy management and low carbon growth in Indian cities.

Introductory Session

a) Introduction to Australia-India Knowledge Exchange Collaboration

Knowledge exchange collaboration on 'Smart Energy Management'

Dr Komali Yenneti, New Gen Network Scholar – Lecturer, Faculty of Built Environment, UNSW

India is in the midst of a 'smart cities' revolution. The 'Smart Cities Mission' promises to make cities more liveable, sustainable and resilient. However, cities continue to face a series of complex interconnected challenges related to energy management. Power cuts with as much as three to four hours a day is a common occurrence across India's cities. Forecasts suggest that India's population is expected to grow by another 400 million over the next three decades, bringing it to 1.7 billion by 2050. The changing climate, lifestyle and economic development combined with the demographic patterns can significantly affect energy demand and drain the already dismal energy infrastructure (Bains, 2016). The task of managing energy demand and reducing energy-related carbon emissions has often proven challenging for urban planners and decision-makers in India. Addressing these trends will require radical transformations in the policy-making processes in cities.

Figure 1: Introduction to Australia-India Knowledge Exchange collaboration

The Smart cities revolution has started to influence the way cities reimagine energy access and demand management through Renewable Energy Portfolios, Smart Meters, Smart Grids, Mini and Micro Grids, Internet of Things (IoT) - based automated Building Energy Management Systems (BEMSs) and technological advancements in big data and analytics, wireless sensor networks, artificial intelligence and machine learning. Integrating innovations in physical infrastructure with smart information and communication technologies (ICT) is indeed a top priority for city governments across India in pursuing smart and green living to improve energy efficiency, protect the environment, improve the quality of life, and bolster economy competitiveness (Mahapatra et al., 2017). Research must support such government and community-based initiatives if our cities' energy pathways are to be shaped in ways which contribute to reduced carbon emissions and improved liveability, sustainability and resilience.

Most research and policy on smart cities focuses on understanding existing problems and conditions of urban environments, rather than focusing on cutting-edge technologies, innovative planning and design, and emerging strategies that bring positive change in cities as they face a series of complex and interconnected challenges related to rapid urbanisation, climate change and energy issues. To this end, the proposed Australia-India Knowledge Exchange collaboration brings together the extensive knowledge and expertise from UNSW, Sydney, Australia, and Centre for Urban Planning and Governance at TERI in support with APCRDA, Mahindra Group and DuPont to develop and strengthen long-term collaboration between India and Australia through the creation of a collaboration on 'smart energy management' for sustainable cities that will be built on the workshops held at UNSW and TERI. The outputs of the workshops will culminate into a Policy Brief on initiatives for 'smart energy management' for sustainable cities.

b) Thematic Presentation on 'Smart Energy Management'

'Smart Energy Management' in Indian cities

Ms Riya Rahiman, Area Convenor, Centre for Urban Planning & Governance, TERI

With increasing urban population in Indian cities, there is a need to move towards 'smart energy management' to ensure optimal utilisation of the existing resources and reduce the dependence on unsustainable energy sources. With advancements in technology, there are now different methods to analyse and diagnose potential energy losses and existing problems in traditional commercial, residential and industrial energy systems.

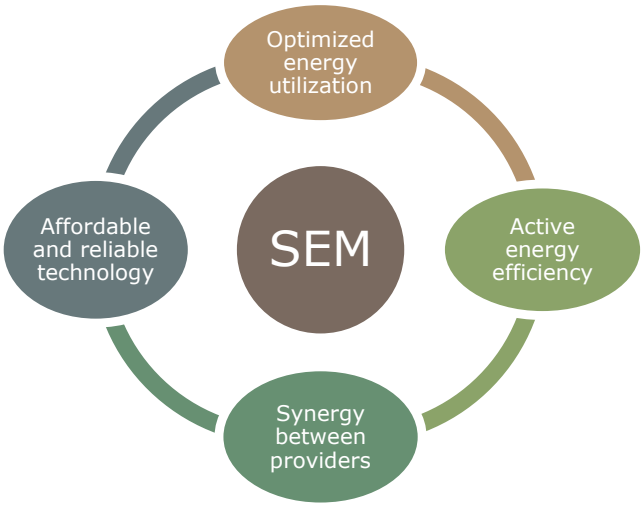
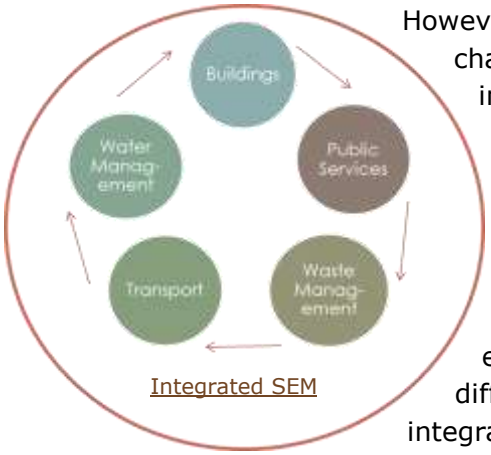


Figure 2: Features of Smart Energy Management (SEM)

After such a diagnosis, certain processes can either be identified or further developed to address the issues faced by the traditional energy systems and adopt 'smarter' technologies that are both reliable and affordable. In order to ensure the successful adaptation of 'smarter' technologies, it is further relevant to have synergy between various stakeholders, such as city and state governments, service providers, private & public sector partners and the communities themselves. Such 'smart energy management' would help in monitoring the carbon-footprint of the consumers as well as promote active energy efficiency by reducing costs through energy-saving techniques and reduce generation of waste.

There are different missions in India that have an objective of working towards 'smart energy management' in cities. At the national level, the National Mission for Sustainable Habitat includes the Energy Conservation Building Code (ECBC) for new commercial buildings to be constructed across India which is estimated to achieve a 50 % reduction in energy use by 2030. The Bureau of Energy Efficiency (BEE) has also developed design guidelines for energy-efficient multi-storey residential buildings for composite and hot-dry climates. Moreover, the National Mission on Enhanced Energy Efficiency intends to achieve fuel savings of around 23 million tonnes per year and GHGs reductions of 98.55 million tonnes per year (Rattani, 2018).

At the city level, the Smart Cities Mission by the MoHUA has listed that 10% of the Smart City's energy requirement would come from solar and 80% buildings in cities need to be energy efficient with a 'green building' design. Further, the Solar Cities Master Plan being developed by the Ministry of New and Renewable Energy (MNRE) includes the concept of a Solar City that aims at minimum 10% reduction in projected demand of conventional energy at the end of five years. This would be achieved through combination of enhancing supply from renewable energy sources in the city and energy efficiency measures. 60 cities/towns were proposed to be supported for development as Solar Cities during the 11th Plan period.



However, cities continue to face complex interconnected challenges related to energy management. There is increasing pressure on depleting non-renewable sources of energy, such as fossil fuels, to meet energy demands. The encroachment and deforestation for acquiring energy sources has added burdens on the environment and the high GHGs emission of cities is contributing to climate change and global warming. In this scenario, 'smart energy management' needs to be addressed in different sectors simultaneously to ensure an integrated approach to energy management.

Figure 3: Integration between sectors for Smart Energy Management

c) Setting the Context

Smart energy management initiatives in Australia

Scientia Prof Deo Prasad, CEO, CRC for Low Carbon Living

Figure 4: Smart energy management initiatives in Australia

Australia is one of the largest exporters of coal and the efficiency and better management of energy resources is now being fast-tracked. Despite having a coal surplus, Australia promotes usage of non-renewable sources of energy and multiple subsidies are also being provided for accessing such energy sources, especially for households. One in every five households now has access to photovoltaic energy and in South Australia, almost 55% of the energy comes from renewable sources, including both photovoltaic and wind energy. However, some issues are currently being faced regarding grid connectivity and performance of machinery. For instance, 52% of the photovoltaic energy systems are massively underperforming. So there is a need to address such issues and develop more reliable and innovative systems.

Research and data analytics related to solar energy has gained extreme significance now wherein photovoltaic rooftops would be monitored and owners would be informed about any issues related to the operation and performance of the systems. UNSW Sydney had decided to adopt 100% solar through onsite generation opportunities, as photovoltaic energy is a cheaper option in comparison to coal based energy. However, only 15% of the energy demand in the campus could be met and so the university had to extend towards offsite energy generation.

Thus, different models for urban energy generation, zero carbon appliances and buildings, and community storage need to be adopted. For instance, the block chain model of energy exchange has been looked into by various stakeholders. Innovative systems would need to incorporate latest scientific knowledge, test existing models and enhance grid connectivity and integrity. This would then lead to developing credible and systematically reviewed energy platforms.

Viewing urbanization as an ur'boon'ization

Ms Sunita Purushottam, Head-Sustainability, Mahindra Lifespace Developers Ltd

Due to rapid urbanization, there is now a sense of urgency to achieve globally set SDGs and INDCs targets. The energy demand is further expected to rise by 2050, and this calls into question the type of infrastructure that we should be providing to meet the rising energy demands without adding burdens on the existing resources. Further, the rankings on the Environmental Performance Index (EPI) highlight the leaders and laggards in environmental performance as well as provide guidance for countries to achieve sustainability. In order to move towards a net zero plan, thus, it is relevant to view urbanization as an ur'boon'ization and utilize sustainable solutions to incorporate the changes brought about by urbanization.

The average number of years that a citizen may spend in a city that they grew up in would be about 25 years and sometimes much beyond that wherein succeeding generations of their family are continuing to live in that city. So the organizations investing in developing innovative technologies to address urban issues need to be committed in providing sustainable solutions that can be functional for decades, and different generations can have effective access to the resources. Moreover, it is our responsibility to ensure that the materials used for construction, the techniques and ways of building and the end use methods engage in optimal usage of existing resources in order to reduce waste creation.

Figure 5: Setting the context for Smart Energy Management in Indian cities
L-R: Dr Komali Yenneti, Prof Deo Prasad, Ms Riya Rahiman

Technical Session

a) 'World Café' Sessions

'World Café' Format

This format provided a platform for sector experts to strategize on research and technical innovation that can contribute towards 'smart energy management' in cities. The 'World Café' methodology[1] for hosting the group sessions included the following components –

- ***Welcome & Introduction and Setting*:** The workshop coordinator welcomed and introduced the participants to the 'World Café' process and set the context. The participants were divided into groups of 4-5 per theme/table with a pre-assigned Moderator for each theme/table. There were 5 rounds of discussions, with each group moving to the next theme/table after each round.

- ***Group Rounds and Questions***: Each round was prefaced with some key questions (Refer to Annexure II) pertaining to the theme for discussion amongst the group. At the end of the designated time period of 15 minutes per round, the group moved to the next theme/table with the pre-assigned Moderator remaining constant. The Moderator welcomed the next group and briefly filled them in on what was discussed in the previous round. The questions for each round were built upon each other to streamline the conversations and have an in-depth discussion on the theme.

- ***Harvest*:** After the group discussions in rounds, the Moderators were invited to share and present key insights and recommendations from the discussions with the rest of the groups.

Themes:

- **Discussion 1:** Enhancing energy efficiency through building performance
  Moderator: Mr Tanmay Tathagat

- **Discussion 2:** Smart solutions to improve water-energy nexus
  Moderator: Dr Shresth Tayal

- **Discussion 3:** Pathways for achieving smart and low carbon mobility
  Moderator: Ms Ruchi Varma

- **Discussion 4:** Smart solutions to optimize waste management
  Moderator: Dr Hina Zia

- **Discussion 5:** Enhancing efficiency of delivery of public services
  Moderator: Mr Bhaskar Natarajan

[1]Based on the format provided by The World Café Community Foundation (TWCCF). More information can be accessed from: http://www.theworldcafe.com/key-concepts-resources/world-cafe-method/

Key Outputs from the 'World Café' theme discussions

Figure 6: Group discussions during the 'World Café' sessions

- **Enhancing energy efficiency through building performance**

It is relevant to see how well the existing energy systems are being managed so as to ensure that the tariff and costs of services are affordable, there is optimization of resource usage, and the supply-demand gap is bridged for sufficient availability of resources. Even though there are increasing availability of solutions and products to improve building performance, there is currently limited awareness of end users regarding usage of such solutions. Thus, to build a smart city, there is need for integration between sectors as well as capacity building of end users to have continued functioning of smart grids and smart buildings.

In order to ensure efficient performance of buildings in a city, contextual solutions are required which would be affordable and scalable. Some opportunities to improve energy efficiency of cities that were highlighted during the discussions were the importance of utilizing community level initiatives including traditional and vernacular practices, transit-oriented development, and district energy systems. Moreover, there is a need for an overall urban policy that would promote a 'smart' approach without necessarily adding more technology - by focusing on capacity building, enforcing regulations and promoting a decentralized and circular economy.

- **Smart solutions to improve water-energy nexus**

There is a need to identify the energy utilized for water consumption, supply and distribution at different levels – either for public or private usage. Currently, there is a loss of water in urban supply systems due to inefficient distribution systems. So there needs to be an evaluation mechanism in place to measure the efficiency of water systems, such as pumps, as well as the water pricing mechanisms. Further, challenges faced by the water sector are the lack of proper metering wherein the true cost of water pricing is not being calculated. While utilizing solar energy, there is low capacity to heat water for every household. There is also limited automation of water systems to ensure full-time water supply.

In such a scenario, there are several considerations that need to be addressed, especially to improve household water connections. For instance, the height of buildings is a factor to determine connections, along with having efficient systems for water pumping and metering which include leak detection. The reuse and recycling of waste water need to be incorporated within buildings at the households and residential communities' level, supplemented by decentralized water purification systems at the city level. There are then several opportunities to promote smart energy management in the water sector, in order to improve efficiencies in the water supply system and to reduce wastage.

Thus, some opportunities were discussed which are available to reduce the energy footprint of water in line with considering water as a social good and just an economic good. Some measures that were identified are - to reduce the overall consumption of water and minimize wastage, utilize alternate sources of energy in high water consuming sectors, improve efficiency of pumping along with rationalizing and metering of water, and having rating systems or incentives for reducing water consumption, municipal surveillance of water bodies, and increasing awareness of usage of systems. Such measures would require interlinking of various sectors and coordination between different administrative departments to ensure to improve the efficiency of water supply.

- **Pathways for achieving smart and low carbon mobility**

In order to achieve the global targets of reducing carbon emissions such as the NDCs, the policies of the cities must align with these targets. For instance, the FAME India (Faster Adoption and Manufacture of (Hybrid and) Electric Vehicles) Scheme was launched in 2015 by the Ministry of Heavy Industries and Public Enterprises to incentivize the production and promotion of eco-friendly vehicles. As the transport sector has implications on various other sectors, a cross-sectoral approach towards transportation sector should be taken which incorporates reviewing the economic and environmental feasibility of sustainable mobility options. The role of decision-making bodies should thus be to address both the politics and economics of transport.

In the group discussions, implementation challenges were focused upon in order to achieve sustainable and low carbon mobility in cities. Difficulties in localization of transport choices and limited policy information to citizens were mentioned as some of the challenges. To address the challenges, practices such as 'uberization' or providing subsidies for electric vehicles were highlighted. Non-motorized transport options such as the role of trams, as can be observed in various European countries, was emphasized as an option for public transport mode that can be adopted. Electrification of vehicles would lead to having a clean energy grid which is another relevant opportunity.

An agile approach to policy was discussed wherein going back to traditional planning methods and regulations was considered as a viable option. Cities also need to promote innovative solutions wherein there is better ICT understanding as well as efficient data and energy management within the cities. Policy inputs from all sectors need to be taken into consideration and policies for transport sector should not be developed in isolation. The way forward would thus involve a mandate of mobilizing smart energy management at the national level as part of the vision on smart cities.

- **Smart solutions to optimize waste management**

There is a need to identify key challenges the waste management sector is currently facing. The challenge of segregation is the primary hurdle towards smart waste management, in spite of the available technology for smart mapping and routing, the segregation of waste still remains a daunting task. The lack of accountability and transparency leads to corruption, which is the core of the problem. Additionally, lack of knowledge in the leadership leads to inefficient outcome.

Hence, it is important to carry out capacity building exercises for the responsible authorities and also support it with awareness programmes to bring about behavioural changes among citizens. There is a need for initiating data management at all levels and to identify the role of informal waste recycling sector. It was further discussed that it is important to identify interlinkages like promoting the role of private players

As a way forward, it is important to bring in practice the idea of circular economy and also supporting it with waste management plan with segregation of waste as the starting point.

- **Enhancing efficiency of delivery of public services**

An important aspect is the realization of public authorities and service providers of the benefits of Smart Energy Management (SEM) for effective delivery of public services. For service delivery, both private contractors and public authorities would have to work together to ensure tools for smart energy management are utilized for achieving a primary objective of public safety of citizens. As a city-level policy for energy management for public services does not exist currently, it is relevant to ensure that initiatives such as integrated command & control centres and disaster management services are incorporated within delivery systems.

In the group discussions, it was identified that Smart Energy Management will play a secondary role for providing services to the citizens as it is only a tool for delivery. It can become more effective if the delivery mechanism is more strong and transparent. To achieve the same, private contractors should follow the fundamentals. Capacity addition, awareness programmes and training can strengthen the working mechanism of private contractors.

There exists enormous scope for developing digital services, especially for people who do not have access to any of the services. This can be done by identifying more policies related to SEM, knowledge development and implementation process.

Figure 7: Discussion on the 'Transport' sector with the moderator during the 'World Café'

b) Key Takeaways & Way Forward

Key Takeaways of the 'World Café' theme discussions

Dr Komali Yenneti, New Gen Network Scholar - Lecturer, Faculty of Built Environment, UNSW

Planning and decision making forms a core integral part of energy demand management. In terms of challenges, more emphasis should be laid on knowledge creation, awareness, education and capacity building in order to contribute to SEM. All these factors are quite closely interlinked. There is a need to lay out proper enforcement as well as implementation plan along with the formulation of strong policies. It is important to identify the possibilities of sectoral integration and promotion of circular economy. Building up the profile of successful case studies and best practices from not just India but from around the world can help create a knowledge database.

ANNEXURE I: Workshop Agenda

<table>
<tr><td colspan="3">Australia-India Knowledge Exchange Workshop on ‘Smart Energy Management’

Date: 13th December, 2018 || Timing: 10.00 am – 01.00 pm ||
Venue: Seminar Hall, Ground Floor, TERI IHC</td></tr>
<tr><td>10.00 am – 11.00 am</td><td colspan="2">Introductory Session on Australia-India Knowledge Exchange Workshop</td></tr>
<tr><td>10.00 am – 10.05 am</td><td>Welcome & Introduction</td><td>Introduction to the Australia-India Knowledge Exchange collaboration on Smart Energy Management –
Dr Komali Yenneti, New Gen Network Scholar Lecturer, Faculty of Built Environment, UNSW</td></tr>
<tr><td>10.05 am – 10.10 am</td><td>Thematic Presentation</td><td>Thematic presentation on Smart Energy Management in Indian cities - Ms Riya Rahiman, Area Convenor, Centre for Urban Planning & Governance, TERI</td></tr>
<tr><td>10.10 am – 10.50 am</td><td>Setting the Context</td><td>- Scientia Prof Deo Prasad, CEO, CRC for Low Carbon Living
- Ms Sunita Purushottam, Head-Sustainability, Mahindra Lifespace Developers Ltd (Through VC)
- Dr Sreedhar Cherukuri, Commissioner, Andhra Pradesh Capital Region Development Authority (APCRDA)*
- Mr Sanjay Seth, Senior Director, Sustainable Habitat Division, TERI</td></tr>
<tr><td>10.50 am – 11.00 am</td><td colspan="2">High Tea</td></tr>
<tr><td>11.00 am – 01.00 pm</td><td colspan="2">Technical Session on ‘Smart Energy Management’ for Sustainable Cities</td></tr>
<tr><td rowspan="6">11.00 am – 12.45 pm</td><td rowspan="6">‘World Café’ Sessions</td><td>Discussions on Smart Energy Management in ‘World Café’ format –

Moderated by: Dr Komali Yenneti, New Gen Network Scholar Lecturer, Faculty of Built Environment, UNSW</td></tr>
<tr><td>Discussion 1: Enhancing energy efficiency through building performance
Moderator: Mr Tanmay Tathagat, Advisor, Environmental Design Solutions (EDS)</td></tr>
<tr><td>Discussion 2: Smart solutions to improve water-energy nexus
Moderator: Dr Shresth Tayal, Fellow & Area Convenor, Water Resources Division, TERI</td></tr>
<tr><td>Discussion 3: Pathways for achieving smart and low carbon mobility
Moderator: Ms Ruchi Varma, Sustainable Urban Development Expert and Dalai Lama Fellow</td></tr>
<tr><td>Discussion 4: Smart solutions to optimize waste management
Moderator: Dr Hina Zia, Dean, Faculty of Architecture and Ekistics, Jamia Millia Islamia (Central University)</td></tr>
<tr><td>Discussion 5: Enhancing efficiency of delivery of public services
Moderator: Mr Bhaskar Natarajan, Director, Energy Efficiency & Clean Energy, Institute for Sustainable Communities</td></tr>
<tr><td>12.45 pm – 12.55 pm</td><td>Way Forward</td><td>Key Takeaways & Way Forward –
Dr Komali Yenneti, New Gen Network Scholar Lecturer, Faculty of Built Environment, UNSW</td></tr>
<tr><td>12.55 pm – 01.00 pm</td><td>Vote of Thanks</td><td>Ms Riya Rahiman, Area Convenor, Centre for Urban Planning & Governance, TERI</td></tr>
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ANNEXURE II: Key Questions for the 'World Café' Sessions

'Smart Energy Management' for Sustainable Cities

Key Questions for each round:

Round 1: What does 'smart energy management' mean in this sector and what are the current policies and practices to achieve it in Indian cities?

Round 2: What are the challenges being faced by Indian cities when implementing the existing initiatives and policies for 'smart energy management'?

Round 3: What are the opportunities and enablers for this sector to promote 'smart energy management' in Indian cities?

Round 4: In what ways can different sectors be interlinked to achieve integrated 'smart energy management' in Indian cities?

Round 5: What is the way forward to promote integrated 'smart energy management' in Indian cities?

ANNEXURE III: Moderators' Bio-notes

'Smart Energy Management' for Sustainable Cities

Moderator Bio-notes:

a) Discussion 1: Mr Tanmay Tathagat, Director, Environmental Design Solutions (EDS)

He has a background of architecture and engineering. He has over 20 years of working experience in projects dealing with sustainable development planning, energy codes, building energy efficiency, green building design and certification, and energy efficiency policy in Asia, Africa and the US. Tanmay leads the Environmental Design Solutions (EDS) team of consultants working on climate change policies, energy efficient building design, building code development, energy efficiency policy development, energy simulation and green building certification process. Since 2003, EDS has worked on over 400 green building and energy efficiency projects worldwide. Tanmay has received the LEED (Leadership in Energy and Environmental Design) Fellow accreditation from the US Green Buildings Council.

b) Discussion 2: Dr. Shresth Tayal, Fellow & Area Convenor, Water Resources Division, TERI

He is working as Fellow and Area Convener with Water Resources Division in TERI. With more than 17 years of experience in the field of hydrology, he is involved in various projects related to hydrological modeling, groundwater assessment, integrated water resources management (IWRM) and analyzing the impacts of climate change on water resources of the country. A key focus of his research is on issues related to water-energy and water-energy-food nexus, identifying the possibilities of reducing water footprints of domestic, agricultural as well as industrial sector in the country.

c) Discussion 3: Ms Ruchi Varma, Sustainable Urban Development Expert and Dalai Lama Fellow

She is a sustainable urban development practitioner committed to people centric approaches to development, grounded in the principles of SDGs and Universal Declaration of Human Rights. An architect-urban designer by training, she has over a decade of experience in research, academia and practice across multiple urban projects of various scales in India, The Netherlands, Spain, Italy, South Korea and Ghana. With an interdisciplinary skill set, she looks at sustainability in cities in two approaches – design driven and data driven. Globally selected as the 2018 Dalai Lama Fellow, her work focuses on unpacking approaches to humanize urban spaces for children and co-creating safer and compassionate cities. She is Niti Ayog's 'Mentor of Change' and a 2017 LEAD India Fellow.

d) Discussion 4: Dr Hina Zia, Dean, Faculty of Architecture and Ekistics, Jamia Millia Islamia

She is primarily working on LEED cities in order to mainstream cities and urban settlements of all scales towards livability, efficiency, sustainability and inclusiveness. With over 15 years of experience, she has had the opportunity to work at both macro

and micro scales, from policy making to actual implementation and monitoring of the strategies/impacts to achieve contextual resource efficiency. She has worked on several cross-cutting areas and programs which looked at GHG inventory preparation, mitigation action plans, water and waste management, green infrastructure, energy supply and demand side management, financial promotional programs to promote energy efficient homes, guidelines for human settlements, integration of resource efficiency in national building codes, and actual implementation of several green building projects (GRIHA/LEED).

e) Discussion 5: Bhaskar Natarajan, Director, Energy Efficiency & Clean Energy, Institute for Sustainable Communities (ISC)

He primarily oversees ISC's work to drive energy efficiency improvements and greenhouse gas reduction in India's Small and Medium Enterprise (SME) manufacturing sector. He has 25 years of experience in energy efficiency, clean energy and sustainable development. Most recently, he served as Deputy Chief of Party (Energy Efficiency) for the USAID's PACE-D program, and he has wide experience working with government agencies and the private sector. Earlier, he was Managing Director of C-Quest Capital in India, and the Director of the Energy Management Centre, Ministry of Power where he managed national programs for energy efficiency. Bhaskar also worked with TERI in his early career.