







SUMMIT PROCEEDINGS

APPROACH TO INTEGRATED SUSTAINABILITY

December 17-18, 2019 India Habitat Centre, Lodhi Road, New Delhi, India

Acknowledgements

The 11th GRIHA Summit 2019, GRIHA's flagship event was successfully conducted with eminent speakers, GRIHA's partners, development team, and guests gathered on the national platform to pave the way for a sustainable built environment. The collective ideas and shared knowledge will be taken on board by GRIHA with great gusto in an endeavour to continually grow and outperform ourselves.

We are extremely grateful to Shri Nitin Gadkari, Hon'ble Minister for Road Transport & Highways and MSMEs, Government of India, for graciously inaugurating the summit in the presence of H E Mr Freddy Svane, Ambassador of Denmark to India; H E Ms Harinder Sidhu, Australian High Commissioner to India; Prof. Ian Jacobs, President and Vice Chancellor, UNSW, Sydney; and Dr Ajay Mathur, President, GRIHA Council and Director General, TERI.

We would like to extend our sincere gratitude to Prof. Ian Jacobs, President and Vice-Chancellor, University of New South Wales (UNSW), Sydney, Australia; Mr Laurie Pearcey, Pro-Vice-Chancellor (International), UNSW; Professor Helen Lochhead, Dean, Faculty of Built Environment, UNSW Sydney; Scientia Professor Veena Sahajwalla, Dean, Faculty of Built Environment, UNSW Sydney and Director, Centre for Sustainable Materials Research and Technology, UNSW, Australia; Mr Amit Dasgupta, India Country Director, UNSW; Ms Simone Zarpelon Leao, Associate Dean – International (joint), Built Environment, UNSW; Mr James Lotherington; and the entire UNSW team for their support in co-creating the 11th GRIHA Summit second year in a row.

We would especially like to thank all our honourable speakers for sharing their knowledge and contributions to various aspects of sustainability.

The 11th GRIHA Summit was conceivable due to the constant support provided by all our partners.

We are grateful to our bilateral and multilateral partners, government partners, real estate partners, knowledge partners, associate partners, exhibition partners, radio partner and associate media partners for supporting the 11th GRIHA Summit.

We would also like to thank the staff of India Habitat Centre and the TERI fraternity for their unwavering cooperation in successfully organizing the 11th GRIHA Summit 2019.

Our participants offered a plethora of enriching discussions, making the event a success with their active participation and engagement. We would like to thank all the participants and guests for making the event a huge success.

Lastly, we would like to convey our sincere gratitude and deep appreciation for the leadership provided by Dr Ajay Mathur, President, GRIHA Council and Director General, TERI, for embarking on a journey with a vision of greener India.

11th GRIHA Summit

"Approach to Integrated Sustainability"

Historically, sustainability has been a way of living. With the intent of progressing and developing the world, extensive use of resources took place and newer interventions were made to enhance the rate at which the advancement was happening. The effects of climate change became apparent soon thereafter in terms of rising temperatures and frequent incidents of natural calamities. Climate change discussions began way back in 1979 when the First World Climate Conference was conducted in Geneva and was sponsored by WMO and soon it became a global agenda and several national and international conferences were conducted to tackle the ever-increasing effects of climate change. As a result of all the environmental mayhem, the sustainable development goals (SDGs) were set and came into effect in January 2016.

To align with the global agenda and moving towards sustainability, several industries have been self-declaring to be sustainable by adopting greener practices. Sustainability was initially demonstrated as an environmental concept but over the years it has undergone a massive paradigm shift. It has been fully integrated into the way we think and plan our economic goals. In order to address the challenges faced by humanity, it is imperative to strike a balance between social development, sustained economic growth, sustainable management of natural resources and cultural variations. By focusing only on the economic growth and neglecting the other aspects would lead to short term growth but would eventually have irreversible consequences.

Keeping this in mind the integrated approach for sustainability becomes extremely important. The sustainability goals can thus be met by enhancing resource efficiencies and minimal waste generation without impacting the environment. Additionally, the intent is also to work symbiotically and ensure that the waste generated in one process becomes a resource for the other process thus creating a closed loop.

To cater to the current issues of sustainability and to integrate the best practices adopted worldwide, GRIHA Council in association with the UNSW, Australia hosted its flagship event, the 11th GRIHA Summit from December 17-18, 2019 with the theme *"Approach to Integrated Sustainability"*. The Summit served as a platform to deliberate innovative technologies and solutions for creating robust mechanism for developing sustainable solutions for the benefit of the entire community.

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Detailed Agenda

Curtain Raiser

16th December 2019 (Monday)

Venue – Viceroy Hall, The Claridges, 12 Dr APJ Abdul Kalam Road (Formerly known as Aurangzeb Road) New Delhi – 110011, India

1900 hours onwards	Setting the Theme followed by dinner reception
	Welcome Address: Dr. Ajay Mathur, President, GRIHA Council & DG, TERI
	Welcome Address: Prof. Ian Jacobs, President and Vice-Chancellor, UNSW Sydney, Australia
	Keynote Address: H. E. Ms. Harinder Sidhu, Australian High Commissioner to India
	GRIHA EB Rating Awards Ceremony & Felicitation
	MoU Signing with NAREDCO
	Vote of thanks: Mr. Sanjay Seth, CEO, GRIHA Council & Senior Director - Sustainable Habitat Programme, TERI

Day 1

17th December 2019 (Tuesday) Venue - India Habitat Centre, New Delhi

08:30 - 09:30 hrs	Registration, Tea/Coffee & Networking
09:30 – 11:00 hrs	Inaugural Session & Inauguration of the Exhibition by dignitaries
	Venue - Stein Auditorium
	Lighting the lamp
	WELCOME ADDRESS: Dr. Ajay Mathur, President, GRIHA Council and DG, TERI
	SPECIAL ADDRESS: Prof. Ian Jacobs, President and Vice-Chancellor, UNSW Sydney, Australia
	SPECIAL ADDRESS: H. E. Mr. Freddy Svane, Ambassador of Denmark to India
	KEYNOTE ADDRESS: H. E. Ms. Harinder Sidhu, Australian High Commissioner to India
	Launch of GRIHA Version 2019 Rating manual
	GRIHA Rating Awards Ceremony
	INAUGURAL ADDRESS: Shri. Nitin Jairam Gadkari, Hon'ble Minister for Road Transport &
	Highways and MSMEs, Government of India
	VOTE OF THANKS: Mr. Sanjay Seth, CEO, GRIHA Council & Senior Director - Sustainable
	Habitat Programme, TERI

Plenary Session 1: Approach to Integrated Sustainability (Grand Challenge on Rapid Urbanization)

Sustainability was initially demonstrated as an environmental concept but over the years it has undergone a massive paradigm shift. It has been fully integrated into the way we think and plan our economic goals. In order to address the challenges faced by humanity, it is imperative to strike a balance between social development, sustained economic growth, sustainable management of natural resources and cultural variations.

Through the past few decades the world has come to an agreement that the massive development had led to devastating impact on the environment-The Grand Challenge on Rapid Urbanization. Cities are growing by 1.5 million people per week. Two-thirds of humanity will be living in cities by 2050. While cities offer economic opportunities and stimulate innovation, they are also places of growing inequality, and a major contributor to climate change. Unless urban solutions are developed, cities will continue to deplete resources, increase temperatures and contribute to chronic poverty. For Indian cities to remain a dynamic engine of economic growth while also providing a high quality of life for its citizens, they will need to be able to provide affordable, safe and equitable access to economic and social opportunities, while reducing social and environmental impacts.

This session intends to bring forth renowned experts from diverse disciplines and multiple sectors to debate on challenges and possible integrated solutions.

Thematic Track 1 – Changing Consumer Behavior

None of us is untouched by the rapid pace at which the natural resources are getting depleted. A major contributor to this would be the manufacturing agencies who develop materials to fulfill the demands of the consumers which exerts pressure on the natural resources thereby affecting the environment adversely. The purchasing power of the consumers has increased about 40% in the last four decades.

Consciousness needs to be developed amongst the consumers to shift their preferences towards sustainable and greener products and services along with capping their resource consumption thereby reducing the burden on the resource pool. Majority of the consumers are under the impression that sustainable products are expensive and acts as the greatest barrier in the adoption of sustainable materials. Policy interventions are thus required to encourage and motivate the manufacturers for mass scale production of these materials in order to make them competitive in the market.

This session aims to bring about the various stakeholders to deliberate on the initiatives which should be adopted to bring about a change in the behavior of consumers through the process of legislation, marketing and education thereby relieving the stress on the existing resources.

11:00 – 12:00 hrs Venue - Stein Auditorium, IH

INTRODUCTION TO THE THEME: Dr. Ajay Mathur, President, GRIHA Council, DG, TERI

INTRODUCTION TO THE SESSION & MODERATION:

Prof. Helen Lochhead, Dean, UNSW Faculty of Built Environment

SPEAKER:

Prof. David Sanderson, Lead of the UNSW Rapid Urbanization Grand Challenge, Built Environment

Mr. Peter Søgaard, City of Aarhus, Project Manager, M.Sc. Biologist

Dr. Madhumita Roy, Professor, Department of Architecture, Jadhavpur University

Q & A session

12:15 – 13:15 hrs Venue – Silver Oak Hal

THEMATIC SPEAKER: **Ar. Habeeb Ahmad Khan,** President, Council of Architecture

MODERATOR:

Mr. Sriram Kuchimanchi, Ashoka Fellow, Founder & CEO, Smarter Dharma

SPEAKERS:

Mr. Saurabh Diddi, Director, Bureau of Energy Efficiency

Ms. Amrita Chatterjee, Director-Communications, South Asian Forum for Environment (SAFE)

Dr. Sapna A. Narula, HoD and Associate Professor, Department of Business and Sustainability, TERI School of Advanced Studies

Thematic Track 2 – Women in sustainability

Women's empowerment is a key factor for achieving sustainable economic growth, social development and environmental sustainability. Women in India represent a substantial chunk of able workforce. However, the decision of and ability for women to participate in the labour force is the outcome of various economic and social factors that interact in a complex fashion at both the household and macro-level. Based on global evidence, some of the most important drivers include educational attainment, fertility rates and the age of marriage, economic growth/cyclical effects, and urbanization. In addition to these issues, social norms determining the role of women in the public domain continue to affect outcomes. With, 49 countries still lacking laws protecting women from domestic violence, 39 barring equal inheritance rights for daughters and sons and continued violence against women, inclusion of women is still a challenge.

Sustainable development depends on an equitable distribution of resources for today and for the future as well as acknowledging the role and contribution of women in the workforce.

This session celebrates the contributions of women in the realm of sustainable development. A true sustainably developing nation would be one that focuses on gender equality, balanced economic growth, a high level of education along with social progress, all aiming towards protection and enhancing the quality of the environment.

Thematic Track 3 – Vernacular Architecture: Reconciling with the past

Sustainability has often been a fundamental part of the composition of both tangible and intangible cultural resources; sustainability and preservation of cultural identity are complementary. Elements of sustainable design are integral to vernacular architecture that have evolved over time using local materials and technology emerging from ambient natural and cultural environment creating optimum relationships between people and their places.

Over time the humans adapted to the ambient environment and every place and region develops a unique characteristic that distinguishes it from other places and that is the core of "identity."

Preserving the identity and special characteristics of a place requires in-depth understanding of the natural systems of the place and immersion into the timetested cultural responses to that environment's assets and liabilities, which contain the essence of sustainability. Since sustainability is inherent to vernacular practices, it is essential to rediscover and reimagine these learning and adapt them to the modern day context. The core values of frugality, climate responsiveness and cultural appropriation hold the key to preserving and sustaining environs for the future.

This session brings together domain experts who have reinterpreted vernacular architecture to create contextual solutions in the current built environment.

12:15 – 13:15 hrs Venue – Amaltas Ha

MODERATOR: **Dr. Alka Bhargava,** Additional Secretary, Department of Agriculture Cooperation & Farmers Welfare

SPEAKERS:

Dr. Sunita Purushottam, Head – Sustainability, Mahindra Lifespace Developers Ltd. (MLDL)

Dr. Parveen Dhamija, Adviser- Skill Council for Green Jobs

Ms. Poonam Sandhu, Financial Sector Specialist and India Head Consultant NRDC India Program

Ms. Trupti Doshi, Principal Architect, The Auroma Group

Q&A session

12:15 – 13:15 hrs Venue – Jacaranda Hall

THEMATIC SPEAKER: Dr. Shikha Jain, Founder Director, DRONAH Foundation

MODERATOR:

Ar. Yatin Pandhya, Founder Principal, Footprints E.A.R.T.H

SPEAKERS:

Mr. Uday Andhare, Design Principal, Indigo Architects

Dr. Ajay Khare, Member, National Monuments Authority, (Ministry of Culture, Govt. of India)

Ms. Line Kjær Frederiksen, Architect, Royal Danish Academy of Fine Arts School of Architecture, Design & Conservation.

Q & A session

Lunch

Plenary Session 2: Energy Challenge

India's energy consumption is increasing at an exponential rate, following a continuous and unprecedented population and economic growth. While India has a mix of all sources of energy, including renewables, most of its energy supply is yet fuelled by coal.

According to India's Bureau of Energy Efficiency (BEE), two thirds of the built space in India in 2030 would have been built after 2012. Energy consumption could increase by the same proportion. However, an opportunity exist to increase the use of renewable energy, and to raise the standard for energy efficiency of buildings and appliances. To implement this, however, serious efforts need to be made for improving and enforcing building codes and regulations, bilateral partnerships for the adoption of new technologies, as well significant investments should be applied to renewable energy infrastructure. Fast growing cities have no choice but to transition toward low-carbon systems to become sustainable.

This session wants to take an integrated approach to the energy challenge while discussing the issues of energy access, kind of technologies, investments and infrastructure required to power India's fast growing cities; off-setting the increased energy consumption by efficient design of the built environment; and seeking the support of institutional regulations and policies in promoting a low carbon living in urban India.

Engaging Women in Built Environment

UNSW Built Environment is committed to equity and diversity in the Built Environment professions, with the aim of 50% of women in leadership roles by 2025. The event will include 10 high profile women in the built environment industry, providing 3 minutes presentations of their experience.

13:30 - 14:30 hrs Venue - The Hub

14:30 – 15:30 hrs Venue – Stein Auditorium

MODERATOR:

Scientia Prof. Deo Prasad, CEO CRC-Low Carbon Living, Built Environment, UNSW

SPEAKERS:

Mr. Abhay Bakre, Director General, BEE

Mr. Pramit Patel, Business Development Manager, Gujarat Guardian Limited

Mr. Ashwani Pahuja, Chief Sustainability Officer and Executive Director-Manufacturing at Dalmia Cement (Bharat) Ltd

Dr. Anna Agarwal, Fellow, CPR

Mr. Sanjay Seth, CEO, GRIHA Council

15:30-16:30 Venue- Tamarind Ha

Prof. Helen Lochhead, Dean, Faculty of Built Environment, UNSW Sydney

Thematic track 4 – Reducing the global carbon footprint	15:45 – 16:45 Venue – Jacaranda Hall
Widespread dependency on fossil fuels, rapid deforestation, activities related to the production of goods and services, energy and transport has caused an exponential increase in greenhouse gas emissions directly contributing to climate change. In India, 68.7% percent of GHG emissions come from the energy sector, followed by agriculture, industrial processes, land-use change and forestry, and waste which contribute 19.6 percent, 6.0 percent, 3.8 and 1.9 percent relatively to GHG emissions. India's GDP increased 357% from 1990 to 2014, while GHG emissions increased 180%. Relative to GDP, India emits twice as many GHGs as the world average. While India's renewable energy sector has received attention, waste management has been severely neglected. India is heading towards rapid urbanization which necessitates the need for assessing the impact of anthropogenic activities over their entire life cycle and developing best practices. It is the onus of every individual to recognize their carbon footprint to drive down emissions and facilitate change. This session deliberates requisite measures and policy framework for sustainable growth and informed decision making aimed at reducing global carbon emissions and climate change.	Signing of MoU between GRIHA Council & First Construction Council THEMATIC SPEAKER: Mr. Swastik Harish , Senior Lead - Urban Practitioners' Programme, Indian Institute of Human Settlement MODERATOR: Mr. R R Rashmi , Distinguished Fellow & Programme Director, Centre for Global Environment Research, TERI SPEAKERS: Mr. Pankaj Bhatia , Deputy Program Director (Climate and Energy) & Director, GHG Protocol, WRI Dr. Pradeep Kini , Associate Director,(Research & Collaboration), Faculty of Architecture, MAHE Mr. Krunal Negandhi , Director, JANS Bamboo Products Pvt. Ltd. Mr. Pratap Padode , President, First Construction Council O & A session
Thematic track 5 – Sustainable low impact materials	15:45 – 16:45 hrs Venue – Silver Oak Hall
The construction industry is progressing at a lightning fast speed and so is the demand for materials as well as the quantum of waste generation. The consumption of materials has increased to six times, from 1.18 billion tonnes in 1970 to 7 billion tonnes in 2015. The use of energy intensive construction materials inadvertently cause over- exploitation of resources; environmental pressure due to the vast scale of extraction, processing, transport affecting the end use energy consumption and environmental quality. The use of natural resources also impacts the trade and market prices of raw materials and goods perturbing the productivity and competitiveness of the economy. There is advancement in the sustainable materials market and construction practices along with usage of waste as construction material but is not able to keep up with the growing demand in the construction industry.	THEMATIC SPEAKER & MODERATOR: Dr. Sanjay Pant, Head- Civil Engineering, Bureau of Indian Standards SPEAKERS: Mr. Amar Tendulkar, Head- Design, Mahindra Lifespace Developers Ltd. Mr. Ravi Sarangan, ED, Edifice Architects Ms. Megha Behal, Associate Fellow & Area Convenor, TERI Dr. S Rajkumar, Head & DGM - Buildings and
able to keep up with the growing demand in the construction industry.	Factories, L&T construction

The present government is strengthening the MSMEs by announcing lucrative loan schemes of up to 1 crore rupees to allow ease of access to resources.

This session intents to bring forth experts associated with the construction industry to deliberate on the building materials circularity, technological innovations and policy interventions required to mainstream the low impact materials in the construction industry to achieve resource recovery and create a closed loop.

Mr. Chris Thurlbourne, Associate Professor, Aarhus School of Architecture

Q & A session

Thematic track 6-	15:45 – 16:45 hrs
GWI Hackathon	Venue – Amaltas Hall
Rapid urbanization challenges how we plan and manage our systems	MODERATOR:

to manage water, energy and transport. Moreover, encroachment of cities onto farm lands disrupts traditional approaches to agriculture. Consequently we need to re-assess food production, processing and distribution in a urban context. The challenges of food security will be exacerbated by variability in climate - less frequent but more intense rainfall events; shorter winters; collapse of bee colonies; salinization of soil; proliferation of pests; all disrupt conventional agricultural systems. Under these conditions, foods production must move closer to the point of food consumption. Building scalable and sustainable urban food systems requires a multi-disciplinary approach involving; building and precinct design, water, horticulture, energy, food storage & distribution and e-commerce to efficiently connect growers with consumers. More importantly, the solutions must be insured and harness the creative power of communities.

The Urban Agriculture hack brought groups of undergraduates from Australia and India together to imagine and design a new approach for food production in urban areas. Students from different cultural and educational backgrounds gathered and formed teams with the objective of building a sustainable and profitable community business to connect local growers with consumers. Experts in water, vertical farming, energy and supply chains provided advice and ideas on possible solutions. Entrepreneurs from successful startups provided advice on developing business models and strategies and how to "pitch" an idea to potential investors.

This session will present a suite of possible solutions for scalable and sustainable urban food production and distribution networks. The solutions were generated through collaboration between students at UNSW Sydney and IIT Ropar.

MODERATOR:

Prof. Greg Leslie, Director, Global Water Institute, UNSW

SPEAKERS: Mr. Kapil Garg, Student, IIT Ropar

Mr. Vinay Ghai, Student, IIT Ropar

Mr. Devesh Singh, Student, IIT Ropar

Mr. KVS Teja, Student, IIT Ropar

Dr. Sapna A. Narula, HoD and Associate Professor, Department of Business and Sustainability, **TERI SAS**

Day 2

18th December 2019 | Venue - India Habitat Centre, New Delhi

Plenary Session 3: Water Challenge	10:00 - 11:00 Venue - Stein Auditorium
According to the Indian Ministry of Water Resources, 600 million people in India currently face high to extreme water stress in the country. Changed climate patterns with severe droughts and erratic rainfall have drained rivers, reservoirs, and aquifers across vast parts of India; and floods in other parts.	MODERATOR: Prof. Greg Leslie, Director, Global Water Institute, UNSW SPEAKERS:
About three-fourth of the households in India do not have drinking water at their premise. With nearly 70% of water being contaminated, India is placed at 120th amongst 122 countries in the water quality index, and around 200,000 people die every year due to inadequate access to safe water.	Mr. Amar Tendulkar, Head- Design, Mahindra Lifespace Developers Ltd. Mr. Dan Alluf, Counsellor, MASHAV Agriculture
The crisis is expected to get worse. By 2030, the water demand in India is projected to be twice the available supply, implying severe water scarcity for population and business, and an eventual 6% loss in the country's GDP. Social and economic losses are mostly due to low performer regions on the Composite Water	Dr. Syamal Kumar Sarkar, Distinguished Fellow & Senior Director, TERI
Management Index (CWMI) are home to more than 50% of India's population and its agricultural baskets.	Mr. Divyang Waghela, Head, Tata Water Mission, Tata Trust
The present session aims to take an integrated approach to the water challenge and would discuss about the technology, infrastructure and investments required to provide safe and accessible water; implications of the water crisis on health, food security and economic growth; and appropriate design of urban spaces for	Dr. Sherly MA, Assistant Professor, Department of Regional Water Studies, TERI School of Advanced Studies
efficient usage of water resources.	Q & A session
Thematic Track 7 – Social Aspect of Sustainability	11:30– 12:30 Venue – Silver Oak Hall
Sustainability is a tri-dimensional concept. Besides environment and economy, social aspect of sustainability also plays a pivotal role, however, it is the least talked about. Businesses today should have acceptance, support and approval from all its stakeholders. They should be involved not only to encourage and	THEMATIC SPEAKER: Dr. Shalini Sarin, Chair Signify Foundation and Advisor Solar business at Signify
enable social relationships and interactions but also improve the degree of coexistence amongst people with different income, gender, cultures, ages and professions through designs, actions and policies that promote integration,	MODERATOR: Mr. Ajay Shankar, Distinguished Fellow, TERI
equality, inclusion, resilience, acceptance of the dispute or difference as a positive value, access to housing, consolidation and creation of equipment and public facilities, etc.	SPEAKERS: Mr. H.S. Suresh, Executive Director (Engg.), Southern Region & Corporate Social Responsibility, AAI
In short, social sustainability is not only to create space for public awareness but also to make them participate and make decisions towards the problems being faced. This would come with upholding diversity and freedom of expression.	Ar. Ankit Bhalla, Deputy Manager (Technical), GRIHA Council

This session will focus on the models of businesses, policies, action plans, and so on which uplift the social aspects at the same time cater to the cause of sustainability.

Mr. Ashish Sachdeva, Founder President, Green Dream Foundation

Q & A session

Thematic track 8– Sustainability for Schools: Dream or Reality

Education is a definitive tool to transform the existing lifestyle to a sustainable one. Educational institutes like schools, colleges and universities play a critical role in bringing behavioral change in the students, bridging pathways to sustainability. With the agenda 2030 being kept at the forefront, it is eminent that such institutes are upgraded and prepared to accept the sustainability challenges.

In the present scenario, most of the existing schools nationwide follow prescribed curriculum while also having infrastructure which is largely resource intensive. Therefore, it is imperative to upgrade the infrastructure of these institutes along with orienting learner's knowledge and skills towards resource efficient ways. To bring this transition, it is important to start developing students and educational institutes that are able to think critically, innovate and provide solutions towards local challenges that have global relevance.

This session, hence is an effort to demonstrate how education acts as an effective tool to transform traditional learning to learning sustainability. It will strive to familiarize the participants with the convergence of the three major sectors i.e. knowledge – infrastructure – learners' well-being while presenting education as a remedy to address issues like energy efficiency, water quality and conservation, students' well-being; sustainable transportation; sustainable consumption and waste management thereby promoting sustainable development.

Thematic track 9-Sustainability in the Clothing Industr

Ever since the world has started emphasizing on being well-groomed throughout the day, the clothing industry has been blooming. Tons of clothes are being manufactured daily, and majority of them are dumped back into the landfills much earlier than their end-of-life. Statistics suggests that the global clothing production has doubled in the past 15 years. Second to oil, the clothing and textile industry is the largest polluter in the world. The fashion industry contributes 10% of global greenhouse gas emissions due to its long supply chains and energy intensive production.

Up to 95% of the textiles that are land filled each year could be recycled. Nearly 20% of the global wastewater is produced by the fashion industry. Thus, it is imperious to bring in behavioral and lifestyle transformation amongst the masses. Another study showcases, that over 70% of the world's population uses second hand clothes. The above mentioned sentences showcase the disparity that is present across the world which needs to be eliminated for optimum resource utilization and minimizing the impact of the industry on the environment.

This session aims to bring forth the experts to deliberate on the various challenges being faced by the clothing industry, and their strategies for enhancing the sustainability of the sector and policy level interventions required to cater to the issues prevailing in the fashion industry.

11:30 – 12:30 Venue – Jacaranda Hal

MODERATOR: Dr. Livleen K Kahlon, Associate Director, EEA, TERI

SPEAKERS: **Ms. Shilpa Bharti,** TGT Science, Billabong International School, Noida

Ms. Gaura Saxena, Deputy Manager, GRIHA Council

Ms. Tanya Spisbah, Director, Australia India Institute, New Delhi

Mr. Pradip Burman, Chairman, Mobius Foundation

Mr. Heath Reed, FRSA, Principal Research Fellow at Lab4Living and Industrial Designer, Sheffield Hallam University

Q & A session

11:30 - 12:30 Venue - Amaltas Ha

MODERATOR:

Mr. Gaurav Shorey, Founder Member - Swaraj (NGO) & Director - Psi Energy Pvt. Ltd.

SPEAKERS:

Dr. Banhi Jha, Sr. Professor, National Institute of Fashion Technology

Ms. Rajul Jain, Brand Head WW, Globus

Mr. Gautam Gupta, Creative head, Asha Gautam

Mr. Vineet Mohan, Chief Sustainability Officer, FastTalks

Q & A session

Lunch	12:45 - 14:00 Venue - The Hub
Plenary Session 4: The Waste Challenge	14:00 - 15:00 Venue - Stein Auditorium
India generates 62 million tonnes of waste every year, of which less than 60% is collected and around 15% is processed. With landfills ranking third in terms of greenhouse gas emissions in India, the burgeoning cities and rapidly exhausting landfill sites pose a great threat to the environment. A paradigm shift in end of the line waste management to reuse and recycle waste at source offers a plausible solution. Recyclable dry waste contributes to nearly 25% of the total solid waste generated in India with e-waste and plastic waste being the major contributors. The CPCB National action plan for MSW 2015 has proposed the setting up of Material Recovery Facilities to segregate and recover valuable materials from household waste. Such recovered materials can be utilized directly or after reprocessing. This presents a great opportunity for large- scale upcycling of waste. While several entrepreneurial ventures have sprung up with the intent of up cycling waste and initiatives like plastic roads are gaining traction, large scale policy level measures and consumer sensitization could be the answer to managing the increasing concern of solid waste.	MODERATOR: Scientia Prof. Veena Sahajwalla, Director, SMaRT, UNSW SPEAKERS: Mr. S.K Ray, Honorary Secretary, Indian Centre for Plastic in the Environment (ICPE) Mr. Nitin Gupta, Co-founder & CEO, Attero Recycling Dr. Suneel Pandey, Senior Fellow & Director, Centre for Waste Management, TERI Ms. Radhika Abrol, Municipal
This session aims to facilitate dialogue around waste upcycling strategies for value addition and minimizing waste disposal into landfills. The panel will discuss the challenges, solutions, efforts taken towards Solid waste management at the source.	Councillor, South Delhi Municipal Corporation Q & A session
Thematic track 10 – Sustainability in Water Supply	15:30 – 16:30 Venue – Silver Oak Hall
Growing pressure on water resources from population, economic growth, climate change, pollution, and other challenges has major impact on our social, economic, and environmental well-being. The world's water problem stems from our failure to meet the basic human needs, ineffective or inappropriate management of our resources, and our inability to balance our resource needs with the replenishing capacity of the nature. Many of our most important aquifers are being over-pumped, causing widespread decline in groundwater level. Sustainable water supply should emphasize on finding reliable and resilient approach for meeting the water demand of our population without exhausting the existing source of water and not affecting the local economy as well. The rapid development of demographic and economic change is increasing stress on India's water resources resulting in declining water quantity and quality. The shift should be on enhancing efficient utilization of existing resources and changes in the existing water policies both in India and around the world. The most important change we can make is in the way we think about, value, and manage our water resources.	THEMATIC SPEAKER & MODERATOR: Mr. Vishwanath S, Director, Biome Solutions SPEAKERS: Dr. Himanshu Kulkarni, CEO, Acwadam Mr. J. Venkatesh, Head- Water Management, Water Supply & Distribution BU, Larsen & Toubro Mr. Akash Deep, Senior Manager, GRIHA Council Dr. Nupur Bahadur, Co-Founder & CTO, Perfact Advanced Water Solutions Pvt. Ltd.
This session aims to bring together multiple stakeholders with various viewpoints in order to determine how the water resources as well as the increased consumption	Ms. Arushi Sharma, AVP, Business Development & Marketing, Swajal

Q & A session

can be effectively managed.

Thematic Track 11 – Switching to Cleaner Fuels

Energy consumption and production represents around two-thirds of the global GHG emissions and 81% of the global energy mix is still based on fossil fuels, the same percentage as 30 years ago. Global energy demand is expected to increase at an average rate of about 1.5% per annum from 2017 to 2030.

Despite a clear shift toward renewables in the energy mix, from 15% in 2016 to 22% in 2030, the demand for the three key fossil fuels – coal, oil, and natural gas –is expected to remain constant.

A transition is desirable to more sustainable and long-lasting global energy systems that provide solutions to global energy-related challenges, while creating value for business and society, without compromising the balance of the energy triangle i.e. security and access, environmental sustainability and economic development and growth.

This session will focus on the importance of future driven energy solutions which needs to be accelerated through the development of effective policies, private-sector actions and public-private cooperation.

Thematic track 12-Air pollution - A global menace

Air pollution is becoming a major problem that affects millions of people worldwide. 9 out of 10 people breathe polluted air which is causing about 7 million premature deaths annually.

It has now become a concern which if not addressed now can lead to catastrophic results. The effect of the deteriorating quality of air is well evident from the increasing cases of respiratory diseases amongst infants, children and adults of all ages.

The importance of fresh air is understood by many, but only a few actually work towards facilitating its presence in their environment.

Bad air quality not only affects the physical health of all the individuals inhaling it but also indirectly affects their mental functioning as well. The increase in energy consumption aiding to a diversity of processes due to the ever-increasing population and rapid urbanization, leads to toxic emissions being produced that slowly degrade our surrounding air's quality.

Due to the burning of biomass and fossil fuels that are the root cause of air pollution, the greenhouse gases are released into the atmosphere which warms up the earth's atmosphere ultimately leading to climate change. The importance of fresh air and the process of reaching a stage where it is readily available to all inhabitants – is an important topic that requires immediate call for action. The present session would provide a platform to various stakeholders working towards the mitigation of the challenges put forth by degraded air quality and discussing the possible solutions to cater to this problem.

15:30 - 16:30 Venue - Iacaranda Ha

THEMATIC SPEAKER & MODERATOR: **Mr. Richie Mittal**, Managing Director, Overdrive Engineering Pvt. Ltd.

SPEAKERS:

Ms. Manju Menon, Project Manager, ACRA Foundation

Mr. Neeraj Kuldeep, Programme Lead, Council on Energy, Environment and Water

Mr. Prasad Vaidya, LEED Fellow, Solar Decathlon India

Dr. Ashvini Kumar, Senior Director, Renewable Energy Technologies Division, TERI

15:30 - 16:30

/enue – Amaitas Hall

MODERATOR:

Dr. Sumit Sharma, Senior Fellow & Director, TERI

SPEAKERS:

Mr. Gaurav Joshi, Senior Environmental Specialist, World Bank

Dr. Valentin Foltescu, Senior Science and Programme Manager, Climate & Clean Air Coalition, United Nations Environment Programme (UNEP)

Dr. Nitish Dogra, Associate Professor, International Institute of Health Management & Research

Q&A session

Plenary Session 5: The Governance Challenge

Globally, governance has shifted from welfare-state model towards economic development model, which demands governments to be more innovative and entrepreneurial in an increasingly competitive world. Governance is now associated with digital technology to develop approaches that can make cities smarter.

Indian cities contribute more than 60% of the national economic output, nearly 80% of the total tax revenue, and it is estimated that by 2021, over 70% of new jobs shall be concentrated in India's cities. However, the state of development and maintenance of urban infrastructure and public service delivery in Indian cities remains unsatisfactory, challenging its potential to drive sustained economic development.

India, the largest democracy in the world, started its 'Smart Cities Mission' in 2015, with a US\$7.5 billion investment over 5 year and the statement that such urban areas should drive economic growth, improve the quality of life of all its citizens, and promote a sustainable environmental footprint. Among 11,000 submitted proposals in the last few years, 2,300 became active projects across 100 cities in India.

This session intends to run deliberations on developing a governance framework which stimulates multiple sector collaborations and public-private partnerships with mutual benefits, to promote capacity building and entrepreneurship, and also nurture community engagement.

17:00 - 18:00 Venue - Stein Auditoriun

MODERATOR: **Dr. Simone Z Leao,** Associate Dean - International (joint), Built Environment, UNSW

SPEAKERS: Mr. Anand lyer, Chief Project Manager, NIUA

Mr. Sanjay Mitra, Former Defence Secretary & Distinguished Fellow, TERI

Brig. R. R. Singh, Director General, National Real Estate Development Council (NAREDCO)

Dr. Madhumita Roy, Professor, Department of Architecture, Jadhavpur University

Valedictory, EP Awards Ceremony & Cultural evening	18:00-19:30 hrs Venue - Stein auditorium, IHC

Welcome Remarks: Dr. Ajay Mathur, President, GRIHA Council and DG, TERI

Special Remarks: Mr. Anuj Aggarwal, Member (HR), AAI

Valedictory Address: H. E. Mr. Freddy Svane, Ambassador, Royal Danish Embassy to India

Exemplary Performance Awards Ceremony

Vote of thanks - Prof. Helen Lochhead, Dean, UNSW Faculty of Built Environment, UNSW Sydney

Closing Remarks - Mr. Sanjay Seth, Chief Executive Officer, GRIHA Council & Senior Director – Sustainable Habitat Programme, TERI

Cultural Evening

Dinner Reception

Closing of 11th GRIHA Summit

19:30 onwards

Technical Workshop on 'Life Cycle Assessment'

New Delhi, November 15, 2019



technical workshop on 'Life Cycle Assessment' was conducted by Mr Harish Borah, Advisor and Life Cycle Practitioner - ADW Developments on November 15, 2019, at TERI, IHC as a prelude to the 11th GRIHA Summit. The objective of the workshop was to provide the participants with a better understanding of life cycle assessment with respect to sustainable development and its importance in analysing the cost benefits and sustainability quotient of a building/project/product.

The workshop focused on the basics of using 'life cycle assessment' as a tool for evaluating the payback, its impact, and measure how resource intensive a process is. Key exercises were conducted during the workshop which targeted live projects using the example of the cement, fabric, and building material industry. It also included the usage of relevant codes, such as IPCC and ISO 14040, for calculating the impact assessment.

The workshop was attended by students and professionals from architecture, engineering, and related fields. It was very well received by all the participants.

Approach to Integrated Sustainability

'Prayaas' – An Effort towards Cleanliness New Delhi, November 16, 2019



A clean-up drive 'Prayaas' was organised by GRIHA Council in association with Green Dream Foundation at Hauz Khas on November 16, 2019 which facilitated in collection, segregation, and disposal of waste at Hauz Khas Village parking area.

The clean-up drive was an effort towards cleanliness aimed not only to generate awareness but also to drive action among the people of New Delhi about ill-impacts of littering and inefficient waste management.

Depicting a rich cultural heritage in the capital, the Hauz Khas Fort is littered with a huge amount of waste in adjoining areas. This kind of land pollution is not only blemishing the beautiful landscape but is also a threat to the local biodiversity. Illegal burning of such litter also contributes significantly to air pollution in a city which is already one of the most polluted cities in the world.

More than 60 volunteers participated in the clean-up drive and included officials from South Municipal Corporation (South Zone) and students of a local school. The drive was a success resulting in collection of more than 300 kg waste in the parking area of Hauz Khas Village, which was later handed over to the SDMC for its safe disposal.

'Prayaas' delivered a message of cleanliness to the community. The drive inspired the public to keep their surroundings clean and manage waste better through segregation, recycling, and proper disposal such that the environment and the biodiversity of the city is unharmed.





Introduction to Mud and Bamboo Architecture

By Ar. Revathi Kamath Date: November 23–24, 2019 Venue: TERI Gram, Gwal Pahari

A two days' workshop was conducted on 'Mud and Bamboo Architecture' at TERI Retreat Centre, Gwal Pahari by Ar. Revathi Kamath, as a prelude to the 11th GRIHA Summit. The workshop aimed at providing participants with the knowledge needed to evoke their sensibility towards benefits of using these materials in architecture and techniques for sustainable integrated development.

The workshop commenced with a presentation by Ar. Revathi Kamath explaining some important facts and properties of mud and bamboo as a sustainable building material. Ar. Kamath also showcased specific case studies of her projects and shared her experience of working with these materials. The students were inspired by the innovative and in-depth design of her projects which embodied the ecological principles of recycling, flexibility, diversity, and as a consequence of all those – 'sustainability'.

The presentation was followed by a one and a half days hands-on workshop where the participants were given the opportunity to learn how to construct a dome, arches, roof and walling structure using bamboo and mud. During the hands-on training, Ar. Kamath also explained how traditional architectural methods can be incorporated into contemporary context. The participants also learnt the methodology of soil testing and making mud bricks.

The workshop was attended by 35 participants comprising of architects, consultants, academicians, and others. The workshop was highly informative and very well received and appreciated by the participants.



Site Visit at Headquarters Building for Unique Identification Authority of India (UIDAI)

(5-star GRIHA Certified project) New Delhi, December 14, 2019

As a prelude to the 11th GRIHA Summit, GRIHA Council organized a 'Green Building Tour' to Headquarters Building for Unique Identification Authority of India (UIDAI), New Delhi, a five-star GRIHA certified building (Provisional rating) on December 14, 2019.



The tour demonstrated green innovations that have been incorporated in the building design and the building's O & M protocols. It was an exciting opportunity for the delegates to explore a green building.

Delegates were able to familiarize themselves with various green building strategies integrated in the project as a case study for their reference. The site visit helped to circulate knowledge and create awareness on sustainable habitat.

Around 45 delegates comprising of architects, students, researchers, green building consultants, engineers, and Government official, participated in this site visit.



Curtain Raiser

The Claridges Hotel, New Delhi December 16, 2019

A stellar event to mark the inauguration of the 11th GRIHA Summit 2019, with the theme 'Approach to Integrated Sustainability' was organized on December 16, 2019, at The Claridges Hotel, New Delhi.





Speaking on the occasion, the President GRIHA Council Dr Ajay Mathur revealed supremely inspiring ongoing progress in the direction of achieving sustainable development in the country. He stated that of the total buildings constructed in the year 2019 in India, 5% were GRIHA rated, which was only 2%, three years ago. Dr Mathur emphasized that these numbers definitely create a positive productive impact; wherein more stakeholders are encouraged to adopt the green building concept at various levels. Recalling the regional summit, he added that the Government of Maharashtra has undertaken path-breaking initiatives to ensure reduced carbon emissions from the existing and new construction

activities, through the GRIHA framework. He stated that in order to bust the myths of green buildings and sustainable development in India and to enrich the acceptance of the concept, fostering an inclusive and long-term partnership is the key. He urged the delegates to actively participate in the GRIHA Summit, the flagship event of the GRIHA Council and benefit the most from it.

"Inclusive partnerships should be fostered to give momentum to sustainable development in India."

-Dr Ajay Mathur

Professor Ian Jacobs, President and Vice Chancellor, UNSW, Sydney, expressed confidence and pride in portraying UNSW and GRIHA Council as powerful symbol of partnership to build resilient buildings and cities, in both countries, through exchange of knowledge and technological advancements. While speaking about the institute's 40 years of knowledge and expertise in the field of built environment, he conveyed gratitude for being associated with GRIHA Council for the GRIHA Summit, as an important partner. While welcoming all, he added that this strategic collaboration will produce practical solutions for the 21st-century living.





"GRIHA is a credible assessment tool to build sustainable urban future for all of us and there should be synergetic solutions that address climate -H E Ms Harinder Sidhu

H E Harinder Sidhu, Australian High Commissioner to India, in her keynote address enumerated challenges of urbanization that are similar for both India and Australia. She added that these challenges further get complicated by the risks of climate change. Talking about the need to make homes and cities livable and resilient, she said, GRIHA is a credible assessment tool to build sustainable urban future for all. She concluded by emphasizing the importance of having synergetic solutions that address climate change risks and reduce emissions from our built environment.

The final rating plaques of projects under the GRIHA for Existing Building (GRIHA EB) variant was awarded in the presence of the esteemed personages.

Mr Sanjay Seth delivered the vote of thanks and acknowledged all the invited guests and delegates for gracing the occasion by their solemn presence. He briefly presented the summit line-up and invited everyone to attend the power-packed days of the Summit.





Signing of Memorandum of Understanding

A Memorandum of Understanding was signed between GRIHA Council and National Real Estate Development Council (NAREDCO) by Mr. Sanjay Seth, CEO, GRIHA Council & Brig. R. R. Singh, Director General, Naredco.

Inaugural Session

The inaugural session of the two-day event – The 11th GRIHA Summit 2019, hosted by the GRIHA Council and TERI in association with UNSW Sydney, was held on December 17, 2019, at India Habitat Centre, New Delhi. The grand event was marked by the presence of honourable dignitaries – Shri Nitin Jairam Gadkari, Hon'ble Minister for Road Transport & Highways and MSMEs, Gol; H E Mr Freddy Svane, Ambassador of Denmark to India ; and H E Ms Harinder Sidhu, Australian High Commissioner to India.



The session proceeded with lighting of ceremonial lamp by the dignitaries followed by welcome remarks by **Dr Ajay Mathur**. He expressed his gratitude to all the esteemed dignitaries for gracing the event with their presence and UNSW for their endearing partnership with GRIHA Council and TERI. Rendering the picture of awareness regarding climate change in the recent past, Dr Mathur emphasized on the success story of GRIHA and its acceptance in the construction industry. He concluded by thanking the dignitaries, partners, and the audience for their continuous support and embracing GRIHA.



_ighting the lamp ceremony at the inagural of the 11th GRIHA summit



Prof. Jacobs, welcoming the dignitaries and audience, cited the everincreasing concern regarding climate change and the recent worrisome consequences seen in Australia. He emphasized on the importance of government intervention in dealing with greenhouse gas (GHG) emissions. He reaffirmed his faith in the synergies between the two organizations – UNSW and GRIHA Council, and the way forward to deriving fitting solutions to the climate change challenges. Throwing light on the climatic resemblance that India and Australia hold, Prof. Jacobs spoke of the practical solutions the two nations can create by a collaborative approach.



Gracing the dais with his presence, **H E Mr Freddy Svane** addressed the audience on the various aspects of sustainability that should not just focus on the environment but the social aspects as well. The first step to attaining sustainability, he emphasized, is change in mindset followed by unhindered support from the people for their government. He appreciated the Government of India and the citizens of the nation for their collaborative approach towards sustainability. "Future collaborations between Denmark and India would offer fruitful results," he added while thanking the hosts for the commendable job in the construction industry.





H E Ms Harinder Sidhu elucidated the need for integrated sustainability that would address the issues of energy and water management, along with building cities that are resilient to natural disasters. "Australia and India, with similar climatic conditions accompanied by challenges of urbanization, should aim at creating innovative solutions to the ground challenges through productive associations," she added with equanimity.

Shri Nitin Gadkari, Union Minister for Road Transport and Highways and MSMEs, enumerated that creating employment for the rural people, who add up to 65% of the Indian population, along with the tribal people is at utmost priority for the government. "Achieving the goal with advancement in knowledge, technology, and innovation will drive sustainable development in India," he added.

Speaking about the various green initiatives of the government, Shri Gadkari emphasized on the ideology of 'Waste to Wealth'. In line with the ideology, he highlighted about the policy on biofuels in the transport sector and the plans to make bio-CNG from rice husk in Delhi. He acknowledged GRIHA's effort and promised to take up its agenda to the highest level.



Citing the example of Nagpur, the Hon'ble Union Minister said the city earns nearly 300 crore from recycling sewage water and nearly 80 buses in the city are plying on bio-CNG, made from sludge and various kinds of biowaste. The use of fly ash waste in the construction industry and the mandatory use of 8% plastic in road construction have been the other significant solutions to minimize the detrimental impact of the construction industry on the environment. In Maharashtra, the rejuvenation work of rivers and nullahs in a few districts is underway. "Deepening of the water bodies and using the derived material for making aggregates will tremendously reduce the requirement of virgin material to be used in the construction of roads and highways," he added.

The 11th GRIHA Summit also witnessed the release of the new version of GRIHA rating – Version 2019 in the presence of the eminent dignitaries. The Inaugural programme was concluded with presentation of awards to GRIHA certified buildings, across the country. Subsequently, Mr Sanjay Seth delivered the vote of thanks and acknowledged the presence of all the invited guests and participants.



Plenary Session 1: Approach to Integrated Sustainability (Grand Challenge on Rapid Urbanization)

At India Habitat Centre, New Delhi December 17, 2019



Dr Ajay Mathur commenced the session with his welcome address and he also briefly introduced the theme of the session by stating that it focuses on the grand challenge of urbanization. He explained that urbanization is a challenge for different reasons in different parts of the world. Elaborating, he said in India, it is a challenge as three things are happening simultaneously – (i) Growth in Cities, (ii) Looking towards livable cities, and (iii) Reduce and reach to zero as far as emissions are concerned. Citing the example of Delhi, he emphasized on how the city and its satellite towns, which are fully populated urban conglomeration, should be able to talk to each other for being sustainable. He concluded by saying that converting the infrastructure to climate friendly and resource efficient that is affordable is also considered to be a major contributor for sustainability.



Prof. Helen Lochhead walked the audience through the work carried out by UNSW in Sydney. She stated that Sydney is growing exponentially and by 2050 it will be 80% larger than what it is today. She explained that the growth would pose a range of challenges that are not just environmental but also social and economic. These would be disparities such as low-density sprawling, poor access to transport, work, climate and educational opportunities, low humanity, core infrastructure, increased dependency on cars, and so on. Prof. Lochhead highlighted that multifaceted, evidence-based solutions are required to deal with these challenges to have integrated response in shaping the future cities. She added that these cities should be fundamental with human centric design approaches, and should also encompass a socially inclusive agenda underpinned by new and emerging technologies to aid in decision making for resilient city planning.



Dr Madhumita Roy stated that challenges lead to innovation. She explained the definition of 'urban area'. She highlighted that the building rules, Floor Space Index (FSI), and floor area ratio (FAR) need to be formulated afresh considering the current scenario rather than replicating the old ones. She also questioned about the justification of having a blanket FSI for the city. She

stressed on understanding the importance of types of trees for landscaping in the perspective of its suitability and adaptability for birds rather than aesthetics.

"Urban area is defined based on population and density but the physical planning parameters were never considered."

-Dr Madhumita Roy

Prof. David Sanderson presented few case studies of how urbanization and climate change resulted in some major natural disasters such as 2011 earthquake in the sea that caused tsunami, earthquakes in India and Japan, volcanic eruption in New Zealand, which further lead to deaths. He talked about a new initiative called 'Transparency, Accountability and Disasters' by built environment, UNSW Sydney, geo. It is a Harvard humanitarian initiative around humanitarian action aimed at finding out what made these disasters so bad. He spoke about the regional conference: Combating Corruption in Infrastructure Projects in Asia-Pacific by Asian Development Bank (ADB) and the Organization for Economic Co-operation and Development (OECD) in Hanoi that deliberated about infrastructure transparency initiative and also corruption index.



"Corruption is also leading to disasters, which proves of abuse of entrusted power for personal gain."

-Prof. David Sanderson



Mr Peter Søgaard explained that the city of Aarhus is working towards becoming fossil fuel free city by 2030, adopting new ways of building construction techniques, energy production, construction of resilient infrastructure, making blue green city, and applying more nature-based solutions He elaborated on one of the projects which was reopening of the river flowing from outside the city to harbour area which had to be cleaned and central spaces made with green pockets for people to enjoy during summers. Another such project Mr Søgaard spoke about was climate adaptation by backyards, by collecting rain from the roof from backyards collecting it in small ponds which can take up to ten years of rain, increasing

biodiversity, and social activity in the backyards. He concluded by stating that the evidence of benefit of clean living and surroundings is being observed in the population.

The session was concluded with a vote of thanks to all the speakers who came together for sharing their experiences and knowledge in their respective subjects.

Thematic Track 1: Changing Consumer Behavior



The session was kicked off with the thematic address by **Ar. Habib Khan**, who identified the topic under discussion as singularly responsible for the environmental and sustainability concerns plaguing the world today. He put forward the need for active research into the problem, identification of alternatives, and the systematic implementation of workable solutions. Ar. Khan emphasized on the need to make consumers aware of their behaviour with respect to their consumption of products, daily needs, essentials, non-essentials, power, water and other natural and man-made resources and improving pro-environmental attitudes, behaviour and habits of individuals who form a collective base of consumers. He went on to elucidate the idea of de-growth – a belief that overconsumption lies at the root of long-term environmental issues and social inequalities. It calls for a future

where societies will live within their ecological means, with open localized economies and resources more equally distributed through new forms of democratic institutions where material accumulation no longer holds a prime position in the cultural imagination of the populace. Ar. Khan exhorted for the end of GDP and all other quantitative measures used as indicators of well-being, not a decline in population size, but a reduction in humanity's self-destructive lifestyle. He concluded by advocating reduced consumption without individual martyrs and a decrease in well-being, but with a hope to maximize happiness through non-consumptive means – sharing work, consuming less, while devoting more time to art, music, family, and community.



DAY 1



"Citizens of developing countries are sustainable by default — thrift, re-use, and minimal consumption are valued. The problem is that we are now trying to emulate Western models."

-Dr Sapna A Narula

Dr Sapna Narula explained how spearheading a course on business sustainability focused on people, planet, and profit altered her perspectives to the point where she decided to step away from teaching conventional marketing. She went into details on how technology is influential in altering consumer opinion and behaviour by businesses. She espoused that equating consumers from developed and developing countries would be a mistake and that awareness notwithstanding, willingness to pay and fraudulent greenwashing through media campaigns remained obstacles in the path of sustainable consumption patterns. Dr Narula went on to illustrate examples and possible ways to address these issues and emphasized that citizens of developing countries are sustainable by default – thrift, re-use, and minimal consumption are inherently valued.



Mr Saurabh Diddi re-iterated the fact that the impacts of climate change were inducing consumers to move towards energy-efficient alternatives. He explained that the Bureau of Energy Efficiency (BEE) was working on influencing consumer behaviour through a carrot and stick approach – consumers would be incentivized to adopt certain schemes, whereas policy changes would ensure compliance in other aspects. Mr Diddi also spoke at length about BEE's efforts to enhance and expand their star rating system to encompass entire buildings and explained that with ongoing improvements in technology, it was possible to mandate increasingly higher standards of efficiency.



Ms Amrita Chatterjee emphasized the importance of studies and discourse on consumer behaviour – both sustainability and millions of livelihoods dependent on it. She illustrated a brief case study on her work with the concept of a circular economy where skill development training for first generation artisans has enabled both the creation of entrepreneurial lifestyles as well as the upcycling of waste into useful products.

"Problems and solutions may be known, but it is impossible to act on sustainability if consumer behaviour is not discussed."

-Ms Amrita Chatterjee

Mr Sriram Kuchimanchi explored graphs indicating that although client demand in India for green buildings was lower than the global average, there has been a consistent increase in the willingness to pay for sustainable products – from 49% in 2011 to 57% in 2018. He interacted with the panelists who shared their own experiences with this phenomenon and collectively concluded that big data and gamification would play a big part in changing consumption patterns. Mr Kuchimanchi summarized the session by talking about a study in Bengaluru that clearly demonstrated that the difference between awareness and action was empathy – the only way to influence consumer behaviour positively would be through the cultivation of empathy with our natural environment. He concluded saying that our choice laid in how we want to be remembered – as the generation that knew everything and did all the right things, or the one that had all the knowledge but chose not to act.



Thematic Track 2: Women in Sustainability



The session commenced with moderator **Ms Alka Bhargava**, opening with a quote by Shri Rabindra Nath Tagore, which said "Women are the builders and moulders of a nation's destiny". She stated that with changing times, nowadays women are much more empowered, on-the-job, and gritty. She spoke of various government schemes that are in place to empower women. However, she also emphasized that these schemes are not very well known by the potential stakeholders and a methodology should be worked out for better outreach of the schemes.

"Empowerment and gender equality are synonymous to sustainability, and the only means to attain this is through literacy and education."

-Dr Alka Bhargava



Dr Sunita Purushottam spoke on how opportunities lost by women due to gender gap are 'denied rights'. She stated that not giving confidence is a 'denied right'. She added that someone dictating what should be done and what should not be done, is a 'denied right'. Eliminating this cycle is where the real struggle is in most parts of the country. She mentioned that women are not given the chance to take decision on matters where they are concerned. "Access to basic infrastructure, such as lighting, transportation, media, technology, and so on, instils a sense of security, safety and confidence in women," she added. Dr Purushottam concluded by saying that including women in the process of development can address many issues that the country is facing.



Dr Parveen Dhamija spoke on the energy aspect, where the role of women is vital in environment management. She explained that women face many issues ranging from vulnerability, inequality, wage gap, weak access to education, poor workforce to discrimination at home and workplace, as they do not have control over the resources. She added that improved energy services implemented in rural India through various government schemes have shown significant impacts in the lives of rural women. Dr Dhamija emphasized that the younger generation is readily accepting LPG or induction cooktops as compared to biomass. She closed her address by stating that in order to have a sustainable development, equality of men and women are important.



"Women have to be involved in the process of sustainable development." -Dr Parveen Dhamija



Ms Poonam Sandhu highlighted an economic picture relating to the women of the country. She stated that women empowered with adequate resources have the potential to be contributors to a healthy, educated, and an aware society. There is inequitable distribution of benefits from economic growth as far as women are concerned. She added that women work 2.6 times less paid or unpaid work as compared to men. She continued that there is lower social security and higher vulnerability to poverty suffered by women, especially in old age. Ms Sandhu elucidated that trainings and workshops are a way to enable and empower women with access to financial knowledge. She concluded by highlighting the need for collective action to empower women.

Ms Trupti Doshi presented her project 'Sharanam', which was developed by incorporating three important feminine qualities – care, comfort, and no wastage. She explained that utilization of resources was optimized, and over 450 local villages were trained in over 20 building skills. She added that operational energy for achieving thermal comfort was reduced to a minimal and generation of construction waste was zero. This project was chosen by the United Nations Environment Programme as a model for sustainable development in India.



The session ended with a discussion with the audience who shared their experiences on this topic in relevant fields.

Thematic Track 3: Vernacular Architecture: Reconciling with the Past

Dr Shikha Jain commenced the session with a brief on the emergence of vernacular architecture and its association with the culture and natural landscape. She established links between the cultural environment and tangible design elements that have evolved over time through community structures and sustainable practices to create optimum relationships between people and their places. She iterated examples of such practices from different cultural landscapes and world heritage sites and emphasized on the need to preserve such sites as examples of design with nature.







Ar. Yatin Pandhya discoursed on the functionality of vernacular architecture and how it transcends beyond nostalgia to create pillars of sustainable architecture. He elaborated on the five components of assessment that contribute to the superior performance of vernacular architecture – timeless aesthetics, socio-cultural appropriateness, environmental sustainability, economic affordability, and structural stability. He presented examples of buildings from cities across the globe and highlighted the lack of cultural identity due to modernist approach that disregarded ethnicity of native architecture. He cited the case of Singapore, which had lost its identity as a result of such transitions, but regained it afterwards due to restructured policies for preserving the traditional architecture. He argued that vernacular architecture relies on pluralism of existence and a sense of

shared values that acknowledge moorings from the past and aspirations for tomorrow to develop holistic solutions. The concept of stepped well, kinesthetic structures, and creation of shared spaces through use of doors instead of windows are all elements of sustainable design from examples of vernacular architecture. **Ms Line Kjær Frederiksen** scaled down the discussions to talk about building materials and how they contribute to the overall sustainability footprint of vernacular architecture. She showcased examples of traditional eelgrass roofs from Denmark and its contemporary adaptation as part of her research on renewable biomaterials with low environmental impact. Further, Ms Line also briefed on the 'Building Materials Pyramid' developed by her through life cycle assessments, that will help practitioners choose building materials based on their environmental impacts.

"Adaptation of vernacular architecture in a contemporary design can help integrate sustainability and showcase future possibilities."

-Ms Line Kjær Frederikser





Mr Uday Andhare delved into the discussion on building materials and design elements of vernacular architecture with a focus on process driven design and aesthetics. He asserted that his design principles are anchored around four aspects – site, programme, water and thermal comfort. He argued that architectural designs should draw from traditional wisdom to reduce environmental impact while addressing the need of the residents. He stated the example of Ajrakh Studio, a building designed by his firm in the Kutch District which relies upon radiative cooling, rainwater harvesting, low impact and thermally-suitable building material to integrate vernacular concepts the modern built forms. He emphasized on the need to tap local resources as a means to disseminate knowledge across platforms and understand the underlying principles.

Dr Ajay Khare presented on traditional built forms and built structures, resilient to natural disasters such as earthquakes. He cited examples from Uttarakhand and Gujarat to explain systems of traditional knowledge that adapt to climatic and physiographic conditions and contribute to such functional superiority. Discussions during the question and answer session were centred around the availability of local resources, building materials, and technology and how it can be adapted across landscapes in an economic manner.

"Components of vernacular architecture can help reduce the physical vulnerability of settlements for disaster resilience."

-Dr Ajay Khare



To conclude, the panelists emphasized on the need to share and spread knowledge related to the traditional construction techniques and locally sourced materials to keep costs economical.
Plenary Session 2: Energy Challenge

Scientia Prof. Deo Prasad began the session by emphasizing on the importance of striking a balance between economic growth and global greenhouse gas (GHG) emissions. He stated that in India it is evident that behavioural change can be a very significant driver of change. In Australia, he said there is about 7 GWp installed capacity of rooftop solar photovoltaics. This, he added was kickstarted by the feed-in tariff, however, now the increase is because of socio-behavioural factors. Prof. Prasad further enunciated the various initiatives taken at UNSW apart from the research development capabilities such as off-site photovoltaics (PV) which offsets one hundred per cent of the university's electricity demand. In conclusion, Prof. Prasad spoke about the several on-ground initiatives taken by the university in Perth for establishing net-zero communities, and concluded by stressing that integration is key to economic and livability benefits.



"Over the last decade, economic growth has occurred measurably without consequent increase in GHG emissions."

-Scientia Prof. Deo Prasad



Mr Pramit Patel explained how key philosophy of 'Guardian Glass' was exploring the possibilities with glass which helps them constantly innovate and in turn has helped them create several unique and mega structures across the globe such as the Burj Khalifa and the upcoming tallest building – Jeddah Tower, which will be clad in guardian glass. He informed that the US-based company is one of the largest float glass and coated glass manufacturers in the world. Their advanced coatings affect various aspects of the glass ranging from performance, aesthetics, processability, durability as well as well-being. Bearing a note of caution, Mr Patel spoke about the advantages of clear coated glass and added that Gujarat Guardian Limited offers a wide range of products and services catering to different project requirements.

Mr Sanjay Seth addressing the esteemed gathering stated that as reorganization is occurring due to challenges around waste, water and governance. He conveyed that GRIHA council is looking at design interventions to address these challenges and ensure that buildings in the future are not very resource intensive. With the underlying principle of what gets measured gets managed, GRIHA Council is constantly monitoring and assessing building performance data to minimise impacts on the environment. Commending Dr. Agarwal and Prof Deo Prasad on the relevant facts and figures and the regulatory provisions being brought out by the Bureau of Energy Efficiency as highlighted by Mr. Bhakre, Mr Seth concluded that the presentations sum up that with increasing urbanization and aspirations, monitoring the growth in infrastructure is extremely important.





"With 24x7 regime for electricity, there is enough flexibility for the aspirations of the consumers." -Mr Abhay Bakre

Mr Abhay Bakre gave an overview of policymakers' perspectives as well as the actions needed in the forthcoming years. He explained that the country now is an energy surplus with the peak demand reaching 184 kilo Watt, the installed capacities have been doubled. While homeowners have more flexibility in meeting their aspirations with respect to homes and appliances they own, it puts a greater challenge in meeting the increasing and varied demands. Adding that electricity distribution may be privatised in the future, consumers will be able to choose the most economical plans which in turn will lead to consumers purchasing more appliances. To maintain an energy surplus, buildings will have to be designed to consume less electricity. He mentioned that ECBC codes for both residential and non-residential buildings will be instrumental in this. He cautioned that mere notification of the Codes in states and Urban Local Bodies (ULBs) will not be sufficient.

Mr Ashwani Pahuja started by sharing the encouraging statistics of the Indian Cement sector compared to the global scenario. He added that certain policy level changes are required to further enhance the energy performance of the cement sector. He further elaborated the initiatives taken at Dalmia Cement for becoming net-zero by 2040. Under the RE100 scheme, Dalmia cement has committed to switching to renewable forms of energy from fossil fuel-based energy by 2030, as well as other circular economy principles to drive towards carbon neutrality. He concluded by stating that with more enabling policies; such as carbon taxing and economies of scale for development of alternative technologies the private sector will also come forth in their commitment towards reduced carbon footprint and climate action.





Dr Anna Agarwal presented data on energy demand transitions and changing household appliance ownership and the resulting implications, particularly on peak demand in the Indian context. She further discussed energy efficiency measures as well as the role of behavioural changes and local practices in shaping energy demands. She added that energy demand is undergoing a fundamental transition with cooling being the major contributor. Dr Agarwal went on to discuss the concepts of summer night time peak, stressing that one needs to focus not only on appliance ownership but also appliance use by the owners. She stated that due to inefficiencies in the overall energy supply chain, every unit of energy conserved on the demand side leads to multiple units of primary energy saved. "The impending energy transitions offer a potential advantage in terms of locking in low consumption patterns to shape energy demands in the future," she concluded.

The session was concluded with a vote of thanks to all the speakers who came together for sharing their experiences and knowledge in their respective subjects.

Thematic Track 4: Reducing Global Carbon Footprint



"With efficient and sustainable design practices, the building sector has the largest potential for cost-effective reduction in GHG emissions."

-Dr Pradeep Kini



Mr R R Rashmi, the moderator, initiated the session by introducing the topic of discussion. He highlighted that the focus of the thematic track was to understand potential steps in the current environment for promoting energy efficiency in buildings, reducing its carbon footprint, addressing the infrastructure issues and the issues of urban development specific to the building sector which consume a lot of resources and has a large carbon footprint. **Dr Pradeep Kinni** laid emphasis on the need for efficient and sustainable design practices. While highlighting his work at Manipal University, he stated that there is a huge potential for cost-effective carbon emission reduction in the building sector. He added that there is a need to develop sustainable strategies for thermal comfort in buildings. He concluded by stressing on the need for finance and support mechanisms to promote building design from a climate change perspective.

"Without strong monitoring and reporting systems in place, we will never even know if the efforts for reducing emissions from building sector has made any difference." Mr Swastik Harish



The thematic speaker, **Mr Swastik Harish** emphasized the aspect of reducing the carbon footprint from buildings with a focus on policy level reforms by citing results of research work conducted by IIHS (Indian Institute of Human Settlements). He highlighted that the European Union was successful in controlling emissions from the buildings by using a regulatory approach in contrast to developing countries in South America and India where an incentive-based approach is being used for the same. He stressed on the need for having structural bylaws, focusing on full life cycle including management of construction and demolition waste. In conclusion, he suggested a few policy approaches to reduce the carbon footprint of buildings like improving adoption of Energy Conservation Building Codes (ECBC), integrated land use planning, support for retrofit of existing conventional buildings into green buildings, green construction skill development, and developing corpus for green development.



Mr Pratap Padode elucidated various projects under the Smart Cities mission and how it serves as an excellent platform for demonstrable, innovative solutions which focuses on reducing greenhouse gas (GHG) emissions. He cited the example of how the energy-efficient LED bulbs are a success in India saving energy costs and reducing GHG emissions. He even emphasized on the rising energy needs as air conditioning is turning into a necessity in India and has in turn led to growth in air conditioning industry.

Mr Krunal Negandhi spoke about 'bamboo', a sustainable material. He mentioned about the strength, resilience, and carbon sequestering abilities of bamboo. He stated that even though India has a large biomass of bamboo, most of it is in the forests, which makes it difficult to harvest and utilize for value added products. He even highlighted the thermal advantages of bamboo structures which could significantly bring down the cooling needs in houses. He concluded by emphasizing on the need for establishing bamboo ecosystems for production and value addition of high-quality bamboo for various works including construction.





Mr Pankaj Bhatia provided a reporting and monitoring perspective into reducing global carbon footprint from the building sector. He explained his work at the GHG protocol and the methodologies to estimate emission savings from actions. However, he emphasized on the need for GHG accounting of the entire value chain and not just a particular case. He warned that accounting only for a particular section, entity, geography or lifecycle stage may show reduction in GHG emissions but may actually be just shifting the emissions to a different part of the full value chain.

MoUSigningbetweenGRIHACouncil & First Construction Council by Mr Sanjay Seth, CEO GRIHA Council and Mr Pratap Padode, President, First Constrution Council



Thematic Track 5: Sustainable Low Impact Materials

Dr Sanjay Pant initiated the session by explaining the theme of the summit and went on to state that sections named 'Approach to Sustainability' and 'Integrated Approach' were introduced in the National Building Code. He further explained that it is important to understand that materials and technologies themselves are not sustainable but the approach/method of using them makes them sustainable. He also stated that individual elements in the environment might be sustainable, but unless the whole ecosystem is sustainable, the purpose of integrated sustainability gets defeated.





Mr Amar Tendulkar began his discussion by emphasizing that the study of materials should be institutionalized in order to test their properties and study their impact on the environment. He elucidated about the Mahindra-TERI Centre of Excellence – which was primarily built for testing building materials. "A building alone cannot be sustainable, but the entire ecosystem has to be green and sustainable."

-Dr Sanjay Pant

Mr Ravi Sarangan commenced by stating that architects realize they would definitely be altering the environment and subsequently damaging it in some manner, but what is important is that they also try to compensate these negative effects by implementing actions that balance out this damage. He went on to state that a conscious effort needs to be made for preserving the environment by designing buildings efficiently so that the next generations could appreciate and learn from the current generation. He also stated that common sense is used while designing buildings by using local labour, materials, and so on, and be conscious about the impact that is being caused on our environment.







Mr Chris Thurlbourne delivered a presentation on a project undertaken in the city of Aarhus. He mentioned that the project was a collaborative effort between the Royal Danish Embassy and the municipalities of the cities Aarhus and Aalborg. He stated that the project focused on the important aspects such as excessive waste generation which eventually leads to pollution. He concluded by stating that the processes of disassembly and up-cycling of materials are necessary in order to reduce waste generation.

"When you recover a material, you give new life to it along with a new purpose." -Mr Chris Thurlbourne

DrSRajkumar began by stating that envelope optimization, payback and life cycle analysis, etc., should be carried out while designing buildings in order to minimize the impact on environment. He emphasized that during the design stage, all stakeholders should work in an integrated manner and brainstorm ideas for building the structure efficiently so that it causes least negative impact on the environment.





Ms Megha Behal initiated the discussion by stating that it is difficult to understand whether the materials used in buildings are actually sustainable in nature and if consumers are aware of their properties. She explained that consumers are generally unsatisfied as they don't have a clear picture about the materials that are used in the buildings they live in. She explained that the Mahindra-TERI Centre of Excellence – a laboratory has been set up at TERI Retreat Centre, Gwal Pahari, Gurugram, for testing building materials for their thermal conductivity values and other properties.

The session was concluded with a vote of thanks by Dr Pant to all the speakers who came together for sharing their experiences and knowledge in their respective subjects.

Thematic Track 6: GWI Hackathon



The session commenced with moderator **Prof. Greg Leslie** shedding light on the Global Water Hackathon event conducted by the UNSW, Sydney. He stated that 90% of the carbon emissions in the food industry is due to transportation. He explained that there can be several ways to reduce the carbon emissions while producing food, but the carbon emissions due to transportation will still be present. He warned that farmlands are coming under stress, with the rapid conversion of agricultural land to build up spaces. He specified that in order to find possible solutions to this issue, students had come together to find possible solutions to the issue of food production in urban context.

Mr Kapil Garg spoke about rooftop agriculture for the urban population. He explained that the idea his team proposed was based on connecting the agricultural producers and the consumers. Base product for some crops will be readily available for installation on rooftops. Mr Garg elaborated that sites, such as schools, institutes, railway stations, and so on, were identified for rooftop farming. He concluded that the main idea was to ensure everyone grows their own food at their own site, which will cut down transportation cost by a huge margin. He mentioned that this will be facilitated through a web-based model.





Mr Devesh Singh shared his idea of using hydroponics for smart agriculture. He delineated that with urbanization, there is water scarcity and rapid climate change, which affects the yield of the food. To reduce transportation issues, the sources of food could be brought closer to the consumers. To enable this, his team at the Hackathon came up with the idea of hydroponics, which is plantation without soil. This he explained was done with the use of water only. The water would contain the nutrients and minerals that can be reused and recirculated to use it for different plants. He stated that hydroponics can lead up to 50% higher yield and

"Traditional agriculture depends heavily on the climate conditions and the water availability." -Mr Devesh Singh growth. Mr Singh concluded that this will allow the consumers to easily grow their crops at home, and any excess product can be sold off to the market.



Mr K V S Teja explained that his team decided to address the issue of lack of availability of farming lands near Delhi based upon the idea of vertical farming and hydroponic agriculture. By increasing farmlands in Delhi, he opened that transportation and production costs can be cut down. They proposed rooftop farming and farming on the boundaries of apartment complexes. He iterated that in apartment complexes having 4–6 blocks with an area of 3 acres, an area of 0.7 acres is available for farming. With Delhi having more than 10,000 complexes, this idea could be capitalized. The team had explored commercial viability of the model and found that breakeven can be achieved in the first year.

Mr Vinay Ghai raised issues and shared his study on wastage of wheat. He explicated that India is the second largest producer of wheat with about100 million tonnes of wheat produced annually, out of which only 10% is stored in cold storage. The rest is randomly stacked in jute bags and stored in a haphazard manner. He stated that in the process, 21% wheat is damaged due to moisture seeping in the stored wheat. To solve this issue, he shared his idea of fabricating a composite storage bag, made using jute and polylactic acid, which is biodegradable in 600 days. He also added that these bags are water resistant and can be stored anywhere. A PDA strip can be added which will change colour if the wheat goes bad. It can be further digitalized and these bags can be tracked with the addition of a QR code.





Dr Sapna A Narula emphasized on how the world is suffering due to the insensitive business models that have been in practice. She explained that sustainable production always takes on precedence rather than sustainable consumption. "However, this has to change and consumer behaviour needs to take a paradigm shift," she added. She concluded that businesses treated natural raw materials as free resources and did not manage it well enough when it was available and now resources like water and air will have to be purchased.

"A sustainable business solution is one which keeps people, planet, and profit happy." -Dr Sapna A Narula



Plenary Session 3: Water Challenge



Professor Greg Leslie, the moderator of the session, laid emphasis on the extreme water stress that is being witnessed by both India and Australia and how the two nations are focusing on mitigating the challenge. Experts' intervention from the governments along with mass consciousness are vital to ensure water security for all. "With the positive change in the

"With the positive change in the mindsets and lifestyles, there is hope amid the severe water crisis." -Prof. Greg Leslie

mindsets and lifestyles, there is hope amid the severe water crisis," he added as he laid a platform for the session to proceed.

Dr Syamal Kumar Sarkar, with his expertise on natural resources and economics accompanied by the vast experience of working on government policies, made SDG6 as the focal point of his talk. Access to clean water, improved water quality, and enhanced water efficiency are paramount to India's survival. With a large part of the country's population lacking access to clean water, he emphasized that the reason behind the crisis is poor economics and not the insufficiency of the planet to supply adequate fresh water. As the water demand in India soars with the rise in the population, the irrigation sector becomes the primary consumer that is extracting maximum groundwater. "However, the efficiency being less than 30% is the cause of concern that makes the situation alarming," he said, as he drew similar concerns in the domestic and industrial sectors. "The government's goal to provide tap water connection to all by 2024 is difficult without improved legal framework and change in the mindset of the water managers," he said as he concluded.





As global water challenges were being discussed, **Mr Dan Alluf** focused majorly on the solutions derived to mitigate the water crisis in Israel, which is primarily a desert and how the same is intended to be implemented in India. With most of the desert land in Israel receiving 0% precipitation, the water needs of Israel are met by recycling wastewater and desalination. The whole chain of water supply and usage in Israel has been well defined with one autonomous water supplying agency, the strategic location of STPs (sewage treatment plants) between the agriculture fields and cities to minimize losses during transportation, employing efficient irrigation systems, charging people for water consumption to imbibe conscious utilization, and capacity building and training programmes.



Taking the discussion forward on water conservation and management, **Mr Divyang Waghela** emphasized on the role of local communities in empowering a nation and meeting the country's water needs. He added that Tata Trust is aiming at building a nation of sustainable communities by providing water to the underserved regions and empowering the local people. With only 8% of the total rainwater being captured in the country, context-specific solutions should be derived by engaging the local communities and understanding the indigenous strategies of water conservation. "Water contamination is the next big challenge, which needs to be addressed widely," he added. As he concluded, he foregrounded that the core solution lies in engaging the native inhabitants and understanding the diverse solutions available with them.

Dr Sherly MA elaborated on the state of the water crisis in the country by presenting case studies of New Delhi, the national capital that receives medium to low rainfall and Mumbai, the financial capital of the country that receives high rainfall. With the change in climate, the overpopulated cities are getting hotter which would further increase the demand for water. In addition, due to the exploitation of groundwater in Delhi and lack of infrastructure to manage rainwater in Mumbai, the situation is becoming grave. She reiterated that the solution to India's water needs lies in proper management and conservation of the natural resource.





Mr Amar Tendulkar, representing the real estate developer's fraternity focused on the role of developers in facilitating water conservation. Speaking in line with Mr Divyang Waghela, he emphasized on the need to understand the microclimate before deriving solutions to the water issues at hand. It is necessary to use the right construction strategies and water management practices that are not enforced on the environment but are adopted by it.

"Mismanagement of natural resources is the major cause of water crisis globally."

-Dr Sherly MA



Thematic Track 7: Social Aspect of Sustainability



Setting the theme of the session, **Mr Ajay Shankar**, said enough hard headed studies show that the time is running out across many verticals in terms of global warming, GHG emissions, and climate change.

"The challenge of sustainability is to overcome the perception and narrow focus of both producers and consumers who are unable to factor in sustainability fully."

-Mr Ajay Shankar

Thematic speaker **Dr Shalini Sarin** shared her experience with Signify Foundation providing access to lighting and creating social entrepreneurs in this area to make sure the programme is sustainable. She quoted a few cases like a solar football field, which was visited after a year brought to light issues like stolen panels and worn-out batteries. This highlighted the fact that the solution can fail due to lack of ownership of the solution. Though the solution was apt, it ended up only generating waste with no exit strategy, no local community development and transfer of ownership of the work to the local community. She added that these experiences paved the way for strategizing the process of work, keeping three aspects at its core. Firstly, frugal manufacturing, secondly distribution, and lastly partnering for microfinance and investing in local communities for training technicians and entrepreneurs.





Mr H S Suresh gave an overview of how all the airports across the nation are contributing to sustainability through generation of solar power, solid waste management, and rejuvenation of water bodies. Through corporate social responsibility, the Airports Authority of India is training rural youth in the aviation sector and has trained 800–900 trainees till now in soft and hard skills. "To promote social equality, the first transgender legal advisor was hired last year," he said with pride. The neglected aspect of 'social sustainability' deserves immediate attention because of its instrumental relevance to social cohesion. While concluding, he said that social sustainability has always been subordinate to economic and ecological considerations. **Ar. Ankit Bhalla** briefed on the recently launched GRIHA v 2019 and explained various aspects of the rating. The three pillars of sustainability, that is, social, environment, and economic sustainability looks at improving the quality of life. Primarily, the social section of the GRIHA rating looks at the safety and sanitation of the construction workers. In India, it was observed that the workers were being treated inhumanely and were deprived of basic facilities and amenities with compromised safety precautions. He emphasized that the situation persists due to lack of awareness of their rights, in terms of safety and welfare. Other aspects like the provision of basic facilities for people with special needs, the percentage of green cover within the site are also addressed in GRIHA rating. He added, "as an initiative, providing transgender toilets, SOS systems, emergency buttons in open areas have also been included in the GRIHA v 2019."





"Social sustainability is not a choice but should be a mandate that can be achieved through triple bottom line approach for its continuous sustenance." -Mr Ashish Sachdeva

Mr Ashish Sachdeva explained that people, planet and prosperity, all need to be addressed in any initiative to be successful. Social sustainability is not a choice but should be a mandate. He said that the project should have a positive effect on people rather than negatively imposing stress on them. Hence, they follow innovation in education, engagement, and consultation different to regular presentations and classes. He further illustrated their programme 'paint my city' associated with the municipality of Saharanpur, Uttar Pradesh, that worked on the triple bottom line. "They engage with

professional painters providing regular income along with health benefits and also engage with students of the city to paint the city with varied themes of sustainability," he added. The firm has also been working on dealing with multi-layered plastic (MLP) which otherwise ends up in the landfill through the triple bottom line concept.



Mr Ajay Shankar concluded the session saying that, the challenge of sustainability is to overcome the perception and narrow focus of both producers and consumers who are unable to factor in sustainability fully. "Unless consumer preferences and societal attitude demands sustainability, it is not possible to achieve it," he added.

Thematic Track 8: Sustainability for Schools: Dream or Reality

The session on 'Sustainability for Schools: Dream or Reality' aimed at exploring how schools could play a critical role in bringing behavioural change among students and nudge them towards sustainable lifestyles through experiential learning in green campuses. Curriculum and infrastructure were identified as the key instruments that enable education to facilitate sustainable development.

Dr Livleen K Kahlon, in the capacity of a moderator, greeted all the panelists and the audience. Reiterating the traditional linkage between Indian culture and sustainability, she recalled the Gandhian thought, "Live simply so that others may simply live".







Mr Heath Reed emphasized the role of design thinking in supporting a holistic approach to sustainability education in schools. It was exemplified by an outline of the Project Playponics. The project involves establishing hydroponic playground-cum-gardens in schools. He added that integrated technical solutions are arrived at by researching local materials, education policy & curricula design, local geographic conditions, the value of physical play, learning modes, and science & technology.

"Education can bring fundamental shift in how we think, act and discharge our responsibility towards one another and the planet." -Mr Heath Reed

Ms Shilpa Bharti informed the audience how the Billabong High International School (BHIS) was transformed by the Project Green Dream. The project targeted energy, water, and waste management in the school, along with upcycling of plastic waste. The school takes pride in becoming the first school in the Delhi-NCR region to get equipped with the Aerobin waste management facility. Besides, 60% of the total annual energy consumption of the school is offset through the installation of renewable energy sources on-site, primarily solar panel grid.





"Teachers and students need to come together and work along to make schools more sustainable." -Ms Gaura Saxena

Ms Gaura Saxena citing the impact of air pollution on students and studies asserted that it was the need of the hour that the conventional learning system in schools is replaced by a sustainable learning system. She explained, in detail, GRIHA's methodology for contributing towards this endeavour through the framework of 'GRIHA for Existing Day Schools'. The framework evaluates and rates environmental performance of existing schools, by engaging students and teachers in the form of 'ECO Team', and thereby, creates a proactive attitude among students and teachers to reduce their environmental footprint and adopt a greener lifestyle. The framework consists of sixteen weighted criteria divided into seven sections including, energy management, occupant health and comfort, air quality, water management, solid waste management, and well-being and social aspects. She described how GRIHA weaves various stages such as online registration, orientation workshop, primary data collection, documentation, site visits, verification and review into an integrated rating process that eventually leads to the award of a 'GRIHA Star Rating' on a scale of one to five.

Ms Tanya Spisbah acknowledged the gender and inter-generational equity among the audience. She reasoned that sustainable schools are designed to act as living laboratories because empirical studies suggest that they not only use 33% less energy and water than conventional schools, but also ensure better studying conditions and increased student engagement leading to significant increase in the test scores. She expressed that education must try to cultivate a shift in values from competition to cooperation and interconnectedness with nature. She discussed the 'Australian Curriculum on Sustainability', the 'New Education Policy' of India, and presented the case studies of the Fab India School (Rajasthan, India), the Kendriya Vidyalaya (Kerala, India), the Coolbinia Primary School (Perth, Australia), and Eltham North Primary School (Australia) as models of sustainable reality.





Mr Pradip Burman elaborated on how ethical leadership is being promoted by the Centre for Science and Environment (CSE) and the Climate Reality Project by developing booklets on energy, waste and water management for green schools. He also explained how the Mobius Foundation has envisioned and is building a sustainable school—the World Environment School—in Coorg, Karnataka. The school would blend indigenous knowledge within the fabric of contemporary solutions and technologies to create a live example for students to learn from. For instance, the concept of 'Devghat' in Indian villages, i.e., an earmarked area wherein medicinal plants are grown, would be incorporated in the school.

Thematic Track 9: Sustainability in the clothing industry

This session aimed to bring together experts to deliberate on the various challenges being faced by the clothing industry, strategies for enhancing the sustainability of the sector and policy level interventions required to cater to the issues prevailing in the fashion industry. Eminent speakers from various backgrounds came together and shared their work and experiences in this field.

Mr Gaurav Shorey commenced the session by speaking about the changing of clothing choices which were driven by fashion industry. He highlighted the fact that nowadays the clothes people wear don't change with climate, unlike the practice followed previously. It is all flattened to the point where the fashion choices of people are driven by the fashion industry, instead of being the other way around. He voiced questions highlighting the responsibilities of fashion experts towards climate change. He emphasized the need to sensitize the designers of tomorrow to consider climate change aspects while designing with regards to the selection of fabric, dyes, and so on. He further stressed on preserving and nurturing the local sustainable skills, to pass on to the next generation.







Dr Banhi Jha accentuated aspects of design, development, consumer pattern, and reuse of clothes in sustainable ways and yet have an edge over others in the fashion business. Fashion eventually has to sell and the industry has to sustain the people whose livelihoods depend upon

"It is imperative to find a balance between economics and sustainability when dealing with fashion." -Dr Banhi Jha it. She voiced the difficulty in finding a balance between commerce and sustainability and drew attention to the possible repercussions of advancing technology in the fashion industry. She emphasized the need to link fashion education with the fact that the industry consumes an immense amount of resources and has a status for being the second most polluting industry. **Mr Gautam Gupta** emphasized the need to make consumers aware of the differences between handmade and machine-made fabric and voiced disagreement with the fact that the two could not compete. He stated that handloom is luxury in India and ought to be positioned like that. The consumer has to be made aware of the skill and efforts that go into handmade clothes and established that the market plays a significant role in creating demand for handloom clothes. He raised the issue of weavers requiring daily work to sustain their livelihood. Given the fact that it takes 10–12 years for a weaver to graduate, Mr Gupta felt that the designers need to reach out to the clusters where weaving traditionally takes place and work towards spreading education, awareness, and the promotion of the handloom profession.





"Conscious consumerism is the need of the hour –following a trend is the mass movement today, not keeping it trendy anymore." –Ms Rajul Jain **Ms Rajul Jain** drew comparisons between the local and international fashion markets and the importance of understanding whether the Indian fashion industry could create its own identity. She highlighted that sustainability is integrated into our roots and one needs to simply have to look back and draw inspiration. She said that the Indian fashion industry is in a transitory phase and that the potential exists to make a serious change. She emphasized on making conscious choices such as how many clothes to buy every year, to embolden sustainable demand and production cycle. She said that sustainability was not about products but people and that the deteriorating mental health was also an important facet of the fashion industry. Moreover, she suggested that young designers trying to make their career in the industry should work with traditional craftsmen and artisans to better understand fashion and work towards creating a new identity for India in the realm of fashion.

Mr Vineet Mohan spoke about how recently the sustainability concept has fairly emerged in the fashion industry. He highlighted the fact that people today are purchasing four times the clothes than the generations did and that our minds were programmed by the advertising and promotions to stay trendy in a fashion, whereas in reality we are doing quite the opposite by merely following the masses. Fashion is a \$2.4 trillion industry, employing over 60 million people globally. He stated that change supported by the people involved could lead to a remarkable transformation. Mr Mohan emphasized that fashion was not just a style statement but a tool of communication. He spoke about the empowerment of women in the fashion industry and that fashion was driven by women and for women. Around 68% of women work globally in the fashion industry and major decisions were taken by women. While concluding he quickly touched upon psychology and how people de-stress through shopping.



Plenary Session 4: Waste Challenge

The session contemplated the diverse kinds and types of waste generated in urban areas and the strategies being adopted by different kinds of stakeholders to try their hands at managing them. The session was chaired by Scientia **Professor Veena Sahajwalla**. She accentuated that there are various kinds of materials that have been developed in the past with a specific purpose and functionality and are getting dumped in the landfills, without being explored for their restructuring. All materials and products could be recycled and refurbished; however, different methodologies and processes need to be adopted to recycle different kinds of products and these have to evolve to maximize recovery. Giving an instance, she said there are about 20 different types of plastics, with each grade having its own defined usage. At UNSW, Prof. Sahajwalla has set up micro-factories that are considered to be adding the 4th R to the waste management process, that is, reforming.







Mr S K Ray, who works in the ICPE, calls plastic a wonderful invention for the food packaging industry owing to its high shelf life, affordability, and keeping the product safer for longer time. The majority of the plastics are inert in nature and do not have any harmful effect on food as far as packaging is concerned. Thus, plastic, if used judiciously and cautiously, can be considered a blessing. Moving from plastics to e-waste, **Mr Nitin Gupta** of Attero Recycling is working towards recycling Lithium-Ion batteries—extracting lithium, carbonate, graphite, nickel, copper, manganese dioxide, and aluminium to name a few. The biggest challenge in waste management is the collection and segregation of waste. So, the issue is to find technological solutions that could be turned viable commercially. Safety is a major concern for workers working in the field of e-waste management. Profitability in this sector needs to be combined with the safety of the manpower, to make this a truly sustainable process of e-waste management. Attero is the only company that is getting carbon credits per tonne of electronic waste recycled since the processes developed are energy efficient which extracts precious elements, such as gold, silver, and platinum.





Dr Suneel Pandey drew attention towards the EPR (Extended Producer Responsibility) whose implementation and regulation are currently being developed by the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India. Many recycling facilities are being created, however, the waste is not reaching these locations and thereby these facilities are not working at full efficiency. This is the challenge that EPR is trying to address. He further added that several incentivizing schemes are being developed by the manufacturers for the waste pickers, since they are the one to aid the process of waste segregation and collection as the prime agents driving the waste collection sector. Several corporate giants are working towards the waste management sector through their CSR activity. The government is making efforts towards formalizing the role of waste pickers in the waste management process.

Ms Radhika Abrol portrayed the challenges that she and her team have faced in keeping the South Delhi area under their jurisdiction clean. She illustrated that the major concern encountered while delivering her duties was handling the rigidity and behavioural complexities of the residents. Individuals need to bring in change in their consumer behaviour to reduce the amount of waste that goes out of their houses into the landfill. At the municipal corporation, a lot of initiatives are being taken like the installation of various sculptures all around the city to create awareness amongst the citizens specifically at the grassroots level. These sculptures act as a model to showcase people that instead of dumping wastes into landfills we should engage in innovative strategies to divert and manage waste; thus turning it into a resource.



Thematic Track 10: Sustainability in Water Supply

The session envisaged to cater to the aspect of water supply, both at the urban as well as rural layout. To set the tone of the session, **Mr Vishwanath S** placed emphasis on the fact that water is as critical a resource as others, and to drive the nation's attention and to concentrate government's effort towards the cause – a dedicated ministry by the name of Ministry of Jal Shakti has been created.

"The water problem today can only be solved by the joint efforts of society, the government, and the market." -Mr Vishwanath S





Dr Nupur Bahadur focused on the management of wastewater and the development of an innovative technology to treat wastewater called TADOX technology. The technology will turn out to be a boon for the management of industrial wastewater. The merits of the technology include fewer stages of purification along with the usage of novel chemicals, advanced oxidation, and nano-technology. The process would help in removing TDS up to 40% and would involve only a single stage RO for the final purification. The entire process would help in reducing sludge up to 100 times.

Ms Arushi Sharma primarily works in the field of water management and its distribution through an innovative technology called – The Water ATMs. These water ATMs dispense water which is clean, affordable, and accessible. They are achieving sustainability by reducing the need to buy plastic water bottles. Swajal caters to the two-pronged challenge of the pyramid, one is the wastage of water and plastic waste generation and the second is the availability and affordability for the underprivileged. The water ATMs by virtue do not add to the carbon footprint as once installed these would continue to dispense water until the system works; thereby setting an example of a more sustainable solution.



DAY 2

Dr Himanshu Kulkarni talked about aspects of sustainability in groundwater management. He emphasized on the different attributes, which lead to the pattern of water usage change tremendously after the 19th century. He insisted on devising a common measurement matrix or water footprint for usage in the urban domain. He pointed out the need to redefine community water management strategies as water scarcity often leads to conflicts. The equitable distribution of water resources reduces the chances of marginalization of society. However, one would need to go back to the learnings of the past, to achieve evenhanded supply. While concluding, he talked about the use of shallow water aquifers in the past and its discontinuation in today's time due to newer technologies and equipment. Those strategies may be revived for better management of the resource.





"Non-revenue water accounts for 49%–50% of the losses in terms of physical and apparent losses." -Mr J Venkatesh

Mr J Venkatesh talked about smart water management and digital intervention that L&T has the expertise for. Owing to the increasing gap between demand and supply, there is a burgeoning need to diligently manage our water resources. Referring to the various steps of management of water resources at the city level, Mr Venkatesh mentioned that having a strong network which is primarily handled by the utility is vital, as NRW (Non-Revenue Water) management, which accounts for 49%–50% of the losses in the water supply, is not benchmarked for most of the Indian cities due to lack of adequate monitoring measures. Sequentially, asset management

is indispensable as it accounts for the database and maintenance of existing systems and pipelines which aids the process of water supply. Lastly, measurement; where metering plays a pivotal role followed by the distribution of water. Further on, he elaborated various measures being adopted by L&T in several of its projects to help in better management of the water resources.

Mr Akash Deep stated that since the last decade sustainability has been put in the first gear, however, it is mostly perceived to energy efficiency rather than an integrated approach towards environmental sustainability. He emphasized the importance of rainwater and how it is being mismanaged in the current times resulting in flooding of several parts of the country. "If rainwater is harnessed, we could easily be able to meet the water requirements of our cities," he added. He briefly elaborated on how this important resource is being catered in the newer rating version of GRIHA (Version 2019). The water section has been given a weightage of 16%, however, in totality; the water-related aspects account for 29% in the entire rating framework, including the construction water management and performance monitoring sections as well. GRIHA has introduced the concept of WPI (Water Performance Index) to target the self-sufficiency of any project.



Thematic Track 11: Switching to Cleaner Fuels

The session focused on the importance of future-driven energy solutions which need to be accelerated through the development of effective policies, private-sector actions, and public-private cooperation. Eminent speakers of various areas of expertise in the field of sustainable and cleaner fuels deliberated and shared a glimpse of their currents projects, research areas, and the challenges.



Thematic Speaker and Moderator **Mr Richie Mittal**, Managing Director, Overdrive Engineering Pvt. Ltd., gave a prelude about the increasing demand in the fuel requirement and the need of switching to cleaner fuels.



Ms Manju Menon enunciated the context of the need to switch to cleaner fuels in the transport sector. She mentioned that the percentage of the transport sector that has switched to cleaner fuels is minuscule. She gave a brief about the intervention named 'Namma Auto' for the auto rickshaw segment that aimed at the adoption of cleaner technologies in Bengaluru city. She also stressed the importance of mobility transition that caters to the last-mile connectivity. She stated that behavioural change of commuters, stakeholders, manufacturers, and various players in the field plays a major role in envisioning a switch to cleaner fuels. Financial support and incentives also prove to be one of the driving forces for this switch.

Dr Ashvini Kumar discussed the necessity of cleaner fuels and a holistic framework for the various scopes of work. He mentioned that as per the 2015 Paris agreement, 40% of the installed power capacity should be from non-fossil fuel sources by 2030. "India has already reached 36%–37% of it and it is estimated to reach 63% by the targeted year," he added. "The ways to achieve the 40% of power generation from non-fossil fuel by 2030 can also look at dealing with the wastes that could contribute to energy generation," he said on a concluding note.

"The ways to achieve 40% of power generation from non-fossil fuel by 2030 can also look at dealing with the wastes that could contribute to energy generation."



Mr Neeraj Kuldeep discussed the need, roadblocks, and possible solutions in the Indian context especially focusing on rooftop solar. He said that by 2030, the urban population will grow by 40%, adding significant stress on the power distribution and transmission infrastructure due to the increase in usage of appliances, especially air conditioners. This trajectory will raise the per capita energy consumption of households. Rooftop solar is one such technology that will help generate power locally with ease of distribution and transmission process avoiding huge investment for infrastructure. He briefly mentioned about the 100 GW target of the solar policy, out of which 40 GW is primarily targeted towards the building sector. Out of 40 GW, the implementation of only 4 GW has been achieved so far. This slow pace of development is due to various factors, such as lack of awareness, no clear understanding of the functioning of the technology, various schemes, subsidies, policies, and programmes rolled out by the government, the process of application of net metering, various vendors in the market, upfront cost of the installation of rooftop, and lack of loan or finance options. While concluding, he said that creating consumer awareness should accelerate the progress.





"Net-zero energy buildings are not only renewable energy generators but should also be considered as frugal consumers of energy."

-Mr Prasad Vaidya

Mr Prasad Vaidya briefly introduced net-zero energy building integrating electric transportation. He emphasized buildings to be considered as a storage mechanism and also a contributor to green fuels. Net-zero energy buildings are not only renewable energy generators but should also be considered as frugal consumers of energy. He spoke about the effect of sea-level rise in Mumbai and that the city will be partially submerged in the next 30 years. "Rather than adaptation, mitigation perspective needs to be concentrated more on this issue," he added. India's fifteen hottest days have happened after 2014 and July 2019 was the hottest month in history. He informed about the competition named 'Solar decathlon' which is scheduled to be launched in 2020. It will be open to all the colleges and universities across the world with a team of students of architecture, engineering, media communications, and management with a mentor from faculty with a real project and advisory firms that come up with market-ready solutions, which is cost-effective and scalable.



DAY 2

Thematic Track 12: Air Pollution – A global menace

The thematic session contemplated on the issues and the challenges being faced in India due to air pollution. Eminent speakers from various backgrounds came together and deliberated upon the work they have done in this field and provided a platform for various stakeholders to discuss the mitigation strategies.

Dr Sumit Sharma spoke about the impacts of air pollution on the wellbeing of humans and the catastrophic results it may lead to if not addressed now. He briefly explained the journey of the air pollutants and how it escapes from inside the room through various sources of emissions, impacting the ambient air and eventually the whole planet and its ecosystems. Some of these pollutants are climate warmers, facilitating the increase in global warming potential. Except for the rainy season, the air quality index shuffles between poor to hazardous levels in most parts of the country. Citing the example of Delhi, he

said that winter is the most polluted season. However, various initiatives have been taken up by the government to control the adverse effects of air pollution from different sectors.



"Dust can travel to very long distance as it does not have any barrier and can move across boundaries."



Mr Gaurav Joshi, having his primary interest in outdoor ambient air quality, fleetingly mentioned about World Bank's work as a development institute, assisting the government, to develop various types of facilities, such as schools, colleges, and hospitals and also provide an assessment tool for its evaluation. "GRIHA has a way to inspire to build buildings in a meaningful manner to improve outdoor air quality," he remarked. Given that the buildings are porous, allowing outdoor air along with pollution whether we want or not, adds to the complexity of designing and maintenance. Accentuating on the fact, he said that indoor air quality is 3.5 times worse than outside air quality.





Dr Nitish Dogra focused on the serious concerns about air pollution and its impacts on human health. The positive initiative of Delhi metro to reduce in-transit time, to reduce the pollution levels was narrated. "Timely corrective and preventive measures can lessen the adverse effects of air pollution," said Dr Dogra, with certitude.

"The absence of evidence is not necessarily the evidence of absence." –Dr Nitish Dogra

Dr Valentin Foltescu elucidated various ways to reduce air pollution in residential apartments. As per his study, around 300 million people will be living in new cities by the year 2040. He highlighted a few measures which may be considered in new constructions like insulating the houses with innovative sustainable material which lock the outdoor pollutants from entering the livable spaces, installing an air purifier system as an active measure to improve the indoor air quality. Also, he focused on the key sources of emission and the mechanism required for its proper ventilation. "The air quality in India will not see improvement in the upcoming years if the main sources of pollution and the indirect attributes like dust traveling from long distances are not addressed at the initial stages," he added. On a concluding note, he said India has its own defined parameters and the infrastructure in place to monitor the air quality and to take corrective measures to tackle the menace.



Plenary Session 5: Governance Challenge

Dr Simone Z Leao commenced the session by emphasizing on having a responsive system of governance that enables the implementation of technology to achieve conservation and resource efficiency. She shared her experience of working on a project 'Geo-designing City's future' in Sydney which was developed in collaboration with various stakeholders. The project team faced challenges; nonetheless, it brought opportunities regarding governance. It was a good example of collaborative effort where various stakeholders representing different government agencies and academicians were involved to come up with a holistic solution. Furthermore, a platform was created to contribute, deliberate, analyse, and develop future planning alternatives that will cater to population and employment growth patterns, demographic change and so on. She summed up on the note that successful governance can be achieved by collaborative working, collective understanding, exchanging knowledge, sharing data, and looking for potential scenarios to achieve a sustainable and liveable future.





"Increasing demand for quality living catering to all age groups is in itself a major challenge for governance in urban areas." -Dr Madhumita Roy Portraying the current demand in urban areas for quality living, Dr Madhumita Roy shared her experience of working with urban local bodies (ULBs) and deliberated on challenges in governance. She highlighted that inadequate distribution of manpower, lack of political will, and abuse of general rules and regulations are some of the key challenges in governance. Government authorities, the business community, citizens, and residents are key players in urban governance. Earlier there was a negative image of ULBs and concerns about their credibility, equity, and transparency were raised, since more than 80% of buildings were unauthorized, in spite of having rules and regulations in place. To address such issues her team successfully developed an online building plan sanctioning software, to enable a transparent mechanism to control construction and avoid delays and ambiguity in the whole process of sanctioning, which was also envisioned by the urban housing minister of West Bengal. However, she shared that it took three years to accept and adopt the online sanctioning software by the local bodies and she had to take charge to demonstrate its applicability as chief architect at New town, Kolkata.



Articulating the challenges of governance, Mr Anand Iver stated that city administration lacks in having a mechanism that controls the factors that affect sustainability. Major challenges of governance are encountered in urban areas, where the authority administers a certain geographical area, whereas; the dependency on resources and permissions may be beyond the jurisdiction boundary. The solid waste management and permissions related to building construction are the two areas on which the city administrative authorities have the control, which in itself is a complex one to tackle. Rest all areas such as road construction, availability of water, electricity, and so on are the subjects that are beyond administrative control and demand coordination with other departments. Understanding these capacity constraints, a special purpose vehicle (SPV) was introduced to work in tandem with the city authorities to set the vision and implement the objectives of the smart city mission. He summed up on the note that smart city mission and Solar PhotoVoltaics (SPV) can act as a catalyst to leverage financial and technical resources and bring innovation in design, which was otherwise amiss.

Stating the necessity of sustainability for one of the fastest-growing countries, such as India, Brig. R R Singh shared his views on governance challenges in real estate. He stated that almost 1 crore people migrate to urban areas every year, leading to the challenging task of providing shelter. The government has come up with various programmes to cater to this and related challenges. Formation of Real Estate Regulation and Development Act, 2016 was one of the initiatives to transform the real estate and construction sector and to streamline developer and buyer relations. He added that this act being transparent focuses on the implementation part, circumventing improper land titles, unauthorized construction, and protects the buyers. Additionally, it ensures that the finances involved in the property are used only for the construction purpose by the developer which will definitely lead to timely delivery of the property. This act has the authority to even penalize any developer if he/she fails to meet the timeline or declares insolvency to finish the work. He added that currently redevelopment is the need since the existing infrastructure is falling short to meet increasing demand in urban areas. He added that half of the cities are yet to be built, housing deficiency is quite high and ideally, it should be designed and developed on sustainable principles





"Sustainable development has to reach the smaller towns in India as these are going to be future cities." -Mr Sanjay Mitra **Mr Sanjay Mitra** shared his views on Indian urban organizations, that are facing enormous issues concerning governance. There are various initiatives such as liveability index by the Ministry of Housing and Urban Affairs, Government of India; GRIHA national green building rating system, and so on, wherein a fair amount of weightage has been given to participatory approach in implementing strategies. "However, at times it becomes techno-centric and at the same time, it is not an integral part of any regulation or code," he said. Until these initiatives become mandatory it will not transform the business-as-usual scenario to sustainable business case for the future. He stated that elected representatives from ULBs should be involved in adopting such change to ensure its implementation along with professionals and academicians.



Valedictory, Exemplary Performance Awards Ceremony & Cultural Evening

The valedictory, exemplary performance awards ceremony & cultural evening was organized on the second day of the 11th GRIHA Summit to celebrate and reward all the projects which have pushed their boundaries and worked tirelessly towards the pursuit of sustainability.



Dr Ajay Mathur, President, GRIHA Council and Director General, TERI delivered the welcome address. He extended a warm welcome to all the speakers, delegates, and participants and announced that even though the valedictory session marked the conclusion of the GRIHA Summit, it also heralded the commencement of the 12th year of all parties working together towards the common cause of sustainable development. He elaborated that the GRIHA rating system provides a platform to measure everything that has been done and showcases others everything that could be done.



Mr Anuj Aggarwal quoted American politician Gaylord Nelson as having famously said that the ultimate test of man's conscience may be his willingness to sacrifice something today for future generations whose words of thanks will not be heard. He touched upon various topics discussed during the two days of the Summit and stated that the last decade has seen significant growth in the infrastructure and that nearly 9% of India's GDP was spent on infrastructure. Mr Aggarwal elaborated on the enormous growth seen by the aviation sector and spoke about the commitment of the AAI towards meeting human development goals while ensuring that the best sustainable practices were put in place. He announced the goal of securing the GRIHA 4 star rating for every upcoming project of AAI, as an intrinsic part of their commitment.





H E Mr Freddy Svane spoke about the groundbreaking work being done on sustainability in India and expressed interest in forming green alliances with all parties involved. Impressed by the immense scale of the impact India's actions have on global efforts, Mr Svane said that a sustainable planet would not be possible without having India on board. He expressed appreciation for the work that was done towards mitigating climate change through improving codes and processes in the building sector and ended with the hope that India, being one of the most innovative countries in the world, would emerge as a green superpower in the days to come.

Prof. Helen Lochhead congratulated everyone involved in ensuring a successful summit and commended the GRIHA Council on the launch of the new version of the rating system. She exhorted that sustainability was no longer an option and expressed satisfaction with the various new partnerships proliferated over the course of the summit and the plethora of experts who had shared their views in the numerous sessions, all of which would be instrumental in facilitating further knowledge exchange. She concluded by expressing interest in ensuring the continued partnership between GRIHA Council, TERI, and UNSW.





Mr Sanjay Seth thanked all the dignitaries, media partners, sponsors, participants, and colleagues present at the summit. He reiterated the need to push the sustainability agenda and the importance of new partnerships and collaborations to accelerate the movement. He concluded by once again thanking the AAI, the Royal Danish Embassy to India and UNSW for their invaluable time and support extended during the summit.

The closing remarks were followed by a dance performance by the Matrix dance group and networking dinner.







List of Rated Projects for the year 2018-19

S.No.	Project	Location	Rating type
1	Titan Corporate Office - "Integrity" Campus	Bengaluru	GRIHA 5-Star
2	ITC Kohenur	Hyderabad	GRIHA 5-Star
3	NACIN	Bengaluru	GRIHA 5-Star
4	IIM Kozhikode Campus (Phase V)	Kozhikode	GRIHA 5-Star
5	Mixed Use Commercial Project developed by Ireo Hospitality Company Pt. Ltd & Others	Gurugram	GRIHA 5-Star
6	Bihar Museum	Patna	GRIHA 5-Star
7	New Administrative Building of Collector Office	Pune	GRIHA 5-Star
8	Neer Shakti Sadan, NHPC Office Complex	Faridabad	GRIHA 4-Star
9	Indian Institute of Science Education and Research, Pune	Pune	GRIHA 4-Star
10	Guest House Building at IITB	Mumbai	GRIHA 4-Star
11	Tower A, AIPL Business Club	Gurugram	GRIHA 4-Star
12	Indraprastha Institute of Information Technology Delhi, Academic Block and Seminar Block	New Delhi	GRIHA 4-Star
13	JIPMER International School of Public Health (JISPH), JIPMER Hospital Campus , Puducherry	Puducherry	GRIHA 4-Star
14	Construction of Super Specialty Block Annex and Screening OPD Block, JIPMER Hospital Campus (Old name : JIPMER Phase III)	Puducherry	GRIHA 4-Star

S.No.	Project	Location	Rating type
15	Up-gradation of JIPMER Rural Health Centre in Ramanthapuram	Puducherry	GRIHA 3-Star
16	IIT DESE & CESE Building	Mumbai	GRIHA 3-Star
17	"OTM ACCN at 505 Army Base Workshop, Delhi Cantt	Delhi	GRIHA 3-Star
18	Bhamashah State Data Center	Jaipur	GRIHA 3-Star
19	Kalpana Chawla Government Medical College – Hospital Block, OPD Block and Cafeteria, Karnal, Haryana	Karnal	GRIHA 3-Star
20	The Crest, DLF5	Gurugram	GRIHA 3-Star
21	Staff Quarters, Transit Camp, Community Center of RHQ Complex	Bengaluru	GRIHA 3-Star
22	Sukoon	Indore	SVAGRIHA 5-Star
23	Mess and consumer store building for RCSM medical college Shenda Park, Kolhapur	Kolhapur	SVAGRIHA 5-Star
24	PWD Division & Sub Division Office Buiding At Deglur Dist. Nanded	Deglur, Dist. Nanded	SVAGRIHA 5-Star
25	Singapore International Preparatory School	Gurugram	SVAGRIHA 4-Star
26	Boys Hostel at P.G. College	Agastmuni, Distt Rudraprayag, Uttarakhand	SVAGRIHA 4-Star
27	Varindera Construction Limited, Corporate Office	Gurugram	SVAGRIHA 4-Star
28	Construction of Backward Class Girls Hostel at Bhivkund Visapur, Dist. Chandrapur	Bhivkund Visapur, Dist. Chandrapur	SVAGRIHA 4-Star

S.No.	Project	Location	Rating type
29	STPI Office Building, Allahabad	Allahabad	SVAGRIHA 3-Star
30	Office Building for Punjab & Sind Bank	Gurugram	SVAGRIHA 2-Star
31	HPCL Nalagarh Revamping Project	Nalagarh	SVAGRIHA 2-Star
32	Pradhan Mantri Awas Yojana – AHP Project, Smart Ghar- 3, Rajkot	Rajkot	GRIHA for Affordable Housing 2-Star
33	Dalmia Vidya Mandir Rajgangpur	Odisha	GRIHA for dayschool 5-Star



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