

# Multi-stakeholder Consultative Workshop on the Proposed Scope for the Development of Green Building Provisions for the 5 Million Housing Programme in Pakistan

## **WORKSHOP REPORT**

Islamabad, Pakistan | 17th October 2022

## Acknowledgement

This Report was prepared on behalf of the EU SWITCH-Asia Sustainable Consumption and Production Facility (SCP Facility) by green building expert Prof. Dr. Sarosh Hashmat Lodi, along his team members including; Dr. Farrukh Arif, Dr. Nida Azhar, Engr. Faiza Saeed, and Anton Barckhausen from adelphi consult GmbH under the supervision of Cosima Stahr. It was revised by Zinaida Fadeeva.

## Acronyms

<b>ASHRAE</b>	American Society of Heating, Refrigerating and Air-Conditioning Engineer
<b>EE</b>	Energy efficiency
<b>EU</b>	European Union
<b>GBC</b>	Green Building Code
<b>HVACR</b>	Heating Ventilation, Air Conditioning and Refrigeration
<b>IAQ</b>	Indoor Air Quality
<b>IEQ</b>	Indoor Environmental Quality
<b>MoCC</b>	Ministry of Climate Change
<b>MoST</b>	Ministry of Science and Technology
<b>NAPHDA</b>	Naya Pakistan Housing & Development Authority
<b>NEDUET</b>	NED University of Engineering & Technology
<b>PCRWR</b>	Pakistan Council of Research in Water Resources
<b>PEC</b>	Pakistan Engineering Council
<b>PGBC</b>	Pakistan Green Building Council
<b>RWH</b>	Rain Water Harvesting
<b>SCP</b>	Sustainable Consumption and Production
<b>SCPF</b>	Sustainable Consumption and Production Facility
<b>SDG</b>	Sustainable Development Goals
<b>SWM</b>	Storm Water Management
<b>UNIDO</b>	United Nations Industrial Development Organization

## Introduction

In 2015, Pakistan being the UN Member State adopted the 2030 Agenda for Sustainable Development, in 2016, the Parliament of Pakistan unanimously approved the Sustainable Development Goals (SDGs) as the National Development Agenda. Accordingly, the Ministry of Planning, Development & Special Initiatives devised seven pillars of Vision-2025, it provided a comprehensive long-term national strategy for achieving inclusive growth and sustainable development in all phases of national planning and development mentioned below:

1. Mainstreaming SDGs in Plans, Policies and Resource Allocation aligned to the 2030 Agenda
2. SDGs monitoring, reporting and evaluation capacities strengthened
3. Financing flows increasingly aligned with the 2030 Agenda
4. Innovative approaches applied to accelerate progress on priority SDGs

Pakistan prevails 5th largest population size of 220 million in the world, which is increasing as high as 2% annually. Pakistan maintains a 35% urban and 65% rural population distribution. 35% of people are associated with the construction industry. As per housing estimates, 700,000 new housing units are required to be built annually but the existing capacity is limited to 300,000 units per year, therefore, in the last twenty years, the shortage of housing units accumulated a deficit of 12 million housing units as of to date. To address the situation, then the Prime Minister of Pakistan envisioned and initiated Naya Pakistan Housing Program (NPHP) “to deliver five million housing units with allied amenities to all citizens, especially focusing on the financially underserved and middle-income communities, as a measure of comprehensive socio-economic uplift”. Naya Pakistan Housing & Development Authority is the national construction organization of the Government of Pakistan. NAPHDA is responsible for planning, development, construction, and management of real estate projects. This national challenge can easily be converted into an opportunity to transform the national construction industry with the new green built environment interventions by developing Green Building Code for Pakistan. As part of joint global efforts, in 2016, EU SWITCH-Asia in collaboration with the Ministry of Climate Change, UN Environment, and UN Habitat-Pakistan launched the Sustainable Consumption and Production (SCP) Programme in Pakistan, focused on the SDG-12 and provided guidelines for the transformation of the conventional built practices into a green built environment across Pakistan. After a robust exercise of two years, EU SWITCH-Asia SCP Programme, UN Environment, and UN-Habitat successfully developed “Policy Guidelines - Green Building Code for Pakistan, in line with the commitment of the Government to pursue climate resilient and green development initiatives. The Ministry of Climate Change along with relevant stakeholders including Pakistan Engineering Council is working on the development of the Green Building Code for greening the Building Construction Sector in Pakistan as well as the introduced the Green Building practices for the Prime Minister’s five Million Naya Pakistan Housing program in line with following aim and scope of this national project:

**Aim:** GBC is an internationally recognized integration of all building codes developed so far to reduce the impact of buildings on climate change by using modernized green products and efficient technologies. The principal aim is sustainable production and consumption of resources. Green building is the practice of creating structures by using a process that is environmentally responsible and resources efficient throughout the life cycle of the building starting from design, construction, operation, maintenance, revocation, and demolition.

**Scope:** the scope of GBC is to use environmentally responsible and resource-efficient processes throughout the life cycle of the building i.e. (1) Energy efficiency and the use of renewable energy (2) Water efficiency (3) Use of environmentally friendly building materials (4) Waste and toxic reduction (5) Smart and sustainable growth (6) Enhancement of air quality.

## Objectives

As part of the assignment, a multi-stakeholder consultative workshop on the scope of potential provisions of the Green Building Code for the Naya Pakistan 5 Million Housing Programme has been planned to be conducted on Monday, 17th October 2022 at Serena Hotel, Islamabad. The overall aim of the workshop is to coordinate with stakeholders, take up technical expertise, share knowledge, assess the scope, and gain further insights to improve it by incorporating additional potential of Sustainable Consumption and Production (SCP) principles and suggestions from additional experts and officials. Some discussion points are included in the table below.

No.	Strategic pointers	Description and rationale
1	<b>Targeted audience</b>	<p>Participants in the workshop should come from a variety of stakeholder groups, but all have in common that they are interested in the future of the GBC:</p> <ul style="list-style-type: none"><li>• Government agencies: MoCC, central and local governments, code officials...</li><li>• Naya Pakistan Housing &amp; Development Authority</li><li>• Authorities Having Jurisdictions (AHJs) - Building Control Authorities (Sindh, Punjab, KPK, Balochistan)</li><li>• Builders: Developers, contractors, architects, product manufacturers...</li><li>• Investors: Financiers, banks, realty agents...</li><li>• Civil society: NGOs, academics working on green building in Pakistan...</li><li>• Pakistan Green Building Council</li><li>• Pakistan Engineering Council</li><li>• MoCC</li><li>• MoST</li><li>• UNIDO</li><li>• UN HABITAT</li><li>• Association of Builders and Developers of Pakistan</li><li>• Institute of Planners Pakistan</li><li>• Institute of Architects Pakistan</li><li>• Institution of Engineers Pakistan</li><li>• ASHRAE Pakistan</li><li>• Construction Association Pakistan</li><li>• Institute of Building Performance Simulation Association</li><li>• HVACR Society</li></ul>
2	<b>What is the message we want to deliver?</b>	<p>The proposed scope will serve as a guide for the development of the GBC in Pakistan, so the input of stakeholders is necessary to ensure the plan promotes SCP and is ambitious, while at the same time viable.</p>
3	<b>Why is the message relevant?</b>	<p>The outcomes of the workshop will be used to further guide the development of the scope of a potential GBC and ensure that SCP concepts are well integrated.</p>

4	<b>What is needed from the participants?</b>	<p>What is needed from them?</p> <ul style="list-style-type: none"> <li>• Inputs on the implementation opportunities (with a focus on SCP)</li> <li>• Inputs on the implementation challenges</li> <li>• Inputs on the scope</li> <li>• Participation in Working groups</li> </ul>
5	<b>Content preparation</b>	<ul style="list-style-type: none"> <li>• Finalised agenda</li> <li>• Consultation documents: Report on implementation opportunities and challenges in the Policy Guidelines, Roadmap</li> <li>• Presentation</li> <li>• Registration form (collect visiting cards)</li> <li>• Stationary material</li> <li>• Concept note</li> <li>• Any relevant GBC related material</li> </ul>
6	<b>Venue</b>	Serena Hotel Islamabad, Pakistan
7	<b>Workshop</b>	<p>Conduct workshop</p> <p>Transcription of workshop minutes</p>
8	<b>Debrief of workshop</b>	<ul style="list-style-type: none"> <li>• Discussion of outcomes of the workshop between SNKE and JNKE for preparation of the report.</li> <li>• Workshop outcomes to be presented in closing session.</li> </ul>

# AGENDA

TIME	AGENDA
09:00 - 09:30	<b>Registration and Seating</b>
09:30 - 10:10	<b>Session I: Inaugural</b> <ul style="list-style-type: none"><li>• Overview of SWITCH-Asia SCP Facility – SWITCH-Asia Representative</li><li>• Model GBC Development for Naya Pakistan 5 million Housing - Dr. Sarosh H. Lodi, Vice Chancellor NED University</li><li>• Key Note by EU Representative</li><li>• Speech – Sen. Sherry Rehman Minister for Climate Change, Government of Pakistan</li><li>• Speech – Mr. Asif Hyder Shah, Secretary Ministry of Climate Change Pakistan</li><li>• Speech – Lieutenant General Anwar Ali Hyder, HI(M) (Retd), Chairman NAPHDA</li><li>• Speech – Engr. Muhammad Najeeb Haroon, Chairman, Pakistan Engineering Council</li></ul>
10:10 - 10:25	<b>Session II: Panel Discussions</b> <ul style="list-style-type: none"><li>• Title: Challenges in Sustainable and Green Buildings Initiatives in Pakistan</li><li>• Participant Organizations: NAPHDA, PEC, Ministry of Climate Change, SWITCH-Asia, PCRWR, NED, UN Habitat</li><li>• Panelist: Dr. Sarosh H. Lodi, Faiz Muhammad Bhutta, Dr. Muhammad Ashraf, Engr. Dr. Nasir Mehmood Khan, Mr. Jawed Ali Khan, Dr. Noman Ahmed, Dr. Farrukh Arif</li></ul>
10:25 - 11:00	<i>Coffee/tea Break</i>
11:00 - 11:30	<b>Session III: Energy Efficiency</b> <ul style="list-style-type: none"><li>• Energy Efficient Housing Guidelines using Simulation-Living Lab - Dr. Farrukh Arif</li><li>• Green Energy – Solarization of Buildings - Mr. Faiz Muhammad Bhutta</li><li>• Site Selection and Sustainability – Five Million Housing Project - Mr. Jawed Ali Khan</li></ul>
11:30 - 12:00	<b>Session IV: Water Use Efficiency</b> <ul style="list-style-type: none"><li>• Water Use Efficiency, Conservation, re-use in Buildings – Faiz Ul Sibtain/ Dr. Hifza Rasheed</li><li>• Initiatives of UN Habitat on Rainwater Harvesting for Buildings - Abdul Qayum</li></ul>
12:00 - 12:30	<b>Session V: Indoor Environmental Quality (IEQ)</b> <ul style="list-style-type: none"><li>• IEQ Rating Provisions for Buildings - Arc. Arqab Ali Rana</li><li>• HVAC/ Pressurized Buildings - Mr. Muhammad Riaz Baig (Hybrid Mode)</li><li>• ASHRAE Guidelines for IEQ – Engr. Abbas Sajid (Hybrid Mode)</li></ul>
12:30 - 12:50	<b>Session VI: Climate Zones</b> <ul style="list-style-type: none"><li>• An overview of Climate Zonation in Pakistan for five million housing - Dr. Imran Ahmed</li><li>• Challenges due to Extreme Weathers &amp; Climate Zones - Dr. Irfan Tariq, Ex. DG MoCC</li></ul>
12:50 - 14:00	<i>Lunch &amp; Prayer Break</i>

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## 14:00 - 15:00 Working Group Session VII: Round Table Discussions

- All Working Groups
- Site Sustainability, Material and Waste Management – Team Lead: Jawed Ali Khan
- Energy Efficiency – Team Lead: Engr. Faiz Muhammad Bhutta
- Water Use Efficiency – Team Lead: Abdul Qayum
- Indoor Environmental Quality – Team Lead: Arc. Arqab Ali Rana
- Climatic Zones– Team Lead: Dr. Imran Ahmed

## 15:00 - 15:30 Session VIII: Working Groups – Lead Presentations

## 15:30 - 16:00 Session IX: Closing

- Workshop Findings – Dr. Sarosh H. Lodi
  - Closing Remarks – Dr. Farrukh Arif
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## Inaugural Session

### Overview of Switch-Asia Presented by Dr. Zinaida Fadeeva, Team leader, Switch Asia SCP Facility

In her introductory speech she discussed the urgency and importance of this work was emphasized by the dramatic floods in Pakistan. The situation pointed at the need to facilitate development of high-quality climate-resilient housing that is optimised for low emissions.



### Introduction to the SWITCH-Asia SCP Assignment, presented by Dr. Sarosh H. Lodi, Vice Chancellor, NEDUET



Dr. Sarosh Hashmat Lodi opened the day by welcoming the participants and delegates to the meeting. He initiated by providing background information on the project. While referring to the devastating damages due to floods that climate change is impossible to prevent however, we can try to mitigate the effects and it is a global challenge not specific to any country. The government of Pakistan has developed an action plan to mitigate its effects but unfortunately, not much work is done on implementation however policy guideline was developed.

He explained that this particular project aims to develop green building code guidelines for a five million housing project that is part of NAPHDA & NAPHDA is on board for this project, which will be documented as the green building code of Pakistan and Pakistan Engineering Council has also shown its great support. Its implementation will be limited to a five million housing project. He said that the second component of this project is to have input and consultation from stakeholders and experts whereas the third component is the implementation plan of these guidelines for which we have to work closely with NAPHDA. This requires many efforts but he was glad to share that at least they have taken initiative. At the end of his speech, he said that this may be challenging but would be helpful for the future of Pakistan and he thanked European Union for its support.



## Keynote Speech



**Thomas Seiler, Deputy Head of Delegation, EU** initiated the session by acknowledging the efforts of the European Union on climate change policy all around the world. The EU is responsible for 0.9% of greenhouse gases but 55% of its budget is spent on climate change and they are participating more than any other country or organization. Climate change is a global challenge that needs global solutions and global cooperation.

As a visitor witnessing the work of the crisis management team after the flood in Sindh and after having a conversation with the community people, he suggested that it is important to develop human resilience and to spread awareness regarding the impacts of climate change. The devastating effects of flood were mostly due to a lack of awareness so he elaborated on the importance of resilience stating that resilience is

important in terms of planning, architecture & building. While climate change impacts are already visible, adaptation is possible and it is important to address climate change so building code is a great initiative in this regard. He was glad to share that funding by the EU is available for targeted areas which include the affected areas of Sindh due to flood and this is precisely for their support.

He shared that he appreciates the topics of energy efficiency, water efficiency, solarization, etc. are included in the agenda of the workshop, and presentations related to such topics are important because of the situation of the electricity crisis in Pakistan. Water use efficiency, reuse of water in buildings, purification of water, etc. is important for the benefit of the economy and community.

As every province and city of Pakistan has a distinct climate and therefore different types of structure are present all around the country, for example, buildings in Sindh is different from ones in Gilgit, climate zonation is very important and should be part of the discussion. The matter is not restricted to flood; drought or heat is also encountered sometimes so there is a need to find solutions to cool down houses without the use of electrical appliances. He spoke about the creative ideas for affordable living and said they are available all around the world so the green building code of Pakistan should include them depending on the requirements of the region considering all the mandatory parameters. He appreciated the idea of the green building code hoping that it will transform existing buildings also into green buildings. He said that all the lawmakers should include all the discussed key points in the code and implementation should be done on the five million housing project but the green energy concept should not be limited to the five million housing project only, all new projects should adopt this pattern. This will contribute to resilience and mitigation measures against climate change.

In the end, he suggested that government should initiate implementation which would encourage people to do so, by just imposing the law no change can be brought. He concluded by thanking everyone & wished success to the meeting.

### Speech presented by Engr. Rukhsana Zubari, Senator

Senator Rukhsana Zubari's speech was emphasised on how important implementation, both in terms of laws and processes, was to make sure a Green Building Code is used to its full potential.





### **Speech presented by Mr. Jawed Ali Khan, UN- Habitat Programme Manager**

He mentioned the importance of national strategies. He stated that a lot of work has gone into developing a pathway for the Green building Code, as well as the National Action Plan on SCP, supported by SWITCH-Asia, and how both lead the way to minimizing our ecological footprint, as the only way forward.

### **Speech presented by Engr. Najeeb Haroon, Chairman Pakistan Engineering Council**

He praised the initiative to bring forward a Green Building Code, and promised to bring in through the Council an expert view to the government and decision-makers, also on green buildings.



## **Panel Discussion on “Challenges in Sustainable and Green Buildings Initiatives in Pakistan”**

**Moderated by Dr. Farrukh Arif, Associate Professor NED University of Engineering & Technology, Panelist includes: Dr. Sarosh H. Lodi, Faiz Muhammad Bhutta, Dr. Muhammad Ashraf, Engr. Dr. Nasir Mehmood Khan, Mr. Jawed Ali Khan, Dr. Noman Ahmed**

Ms. Faiza Saeed introduced all the panelists. Dr. Farrukh initiated the discussion by reiterating the challenges in green building initiatives in Pakistan. He requested Dr. Nasir (Registrar, PEC) to highlight efforts by the PEC to encounter challenges faced due to Green building initiatives so Dr. Nasir spoke about the formation of PEC in 1976 and its vision for sustainability in Pakistan. He elaborated on the efforts by the PEC in the design and development of a green building code for Pakistan. He went on to highlight the importance of awareness raising for all stakeholder groups, private and public sectors. He spoke about how PEC is collaborating with code councils in the development of provisions but issues of implementation of code were highlighted. In closing remarks, it was recommended to make the green building code the essential part of five million housing projects and more housing projects.

Moreover, Dr. Farrukh asked Shahid Naveed (NAPHDA) about the challenges in green construction and especially site selection for such development programs. He introduced NAPHDA which was founded in 2020 to establish affordable housing projects and since its formation, it has been actively working for the development of green construction. He explained the strategies adopted by an organization, issues of land availability, and responsibilities such as policy making, master planning, site selection, and approval making. He highlighted the perception of environment-friendly construction in Pakistan and further projects in Islamabad, some areas of Sindh, Quetta, and other parts of Punjab. He concluded his speech by stating that development of a sound green building implementation strategy is necessary to ensure that we are able to develop our country in a sustainable manner.

Then, Dr. Farrukh requested Dr. Muhammad Ashraf (Chairman of the Pakistan council of research in water resources) to shed light on energy efficiency and water management. Dr. Ashraf explained the inclination of the world toward energy transformation and the practices of solar solutions provider companies. He elaborated that this sector in Pakistan is not given much attention and many companies are creating solar solutions such as solar sheds etc. that are very dangerous and have caused numerous accidents. Licenses are just provided to such companies but they do not maintain the quality of products and no policies are taken

care of. It was suggested to enforce provisions for proper solar system designs and energy transformation which is challenging because of dependency on international code so Pakistan needs to develop its codes for exercising green energy provisions. He explained the importance of all stakeholders working together to develop a momentum for green building and how integrating all key players will help to ensure all aspects of green building, such as energy efficiency, water management, etc.



Mr. Jawed was asked by Dr. Farrukh to elaborate that how green buildings can upgrade the living aspect and what factors would be encouraging designers & residents to implement green building provisions. He highlighted that measures that are taken to be involved in the green process might seem expensive due to initial expense but they are extremely beneficial and reduce energy needs which leads to a reduction in bills. He spoke about the benefits of adaptation of solar energy solutions in Pakistan and gave an example of his own house where after the placement of solar panels he has not paid his electricity bill since last year. Another measure i.e. wall insulation lead to a reduction in cooling energy needs and he further encouraged government and other organizations to actively participate in this green process.

Finally, Dr. Farrukh requested Dr. Sarosh H. Lodi to share the challenges for sustainability development. He spoke about the harmful effects of construction and shared the statistics on the built environment of Pakistan. He further shared the scenario after the Earthquake of 2005 in Pakistan. The contribution of the built environment towards pollution is rising day by day and this is high time we need regulatory bodies, methods, building codes, and action plans. He spoke about more issues like capacity building and implementation and suggested that the provincial government should be responsible for implementation. At the end of the session, Dr. Farrukh thanked the panelists and concluded that more attention should be given to opportunities than challenges that will help in resolving problems and that will spread awareness to key stakeholders.

## Presentation Session: Energy Efficiency

### Presentation on Energy Efficient Housing Guidelines using Simulation-Living Lab by Dr. Farrukh Arif, Associate Professor, NEDUET

Dr. Farrukh in his presentation discussed methods to assess energy efficiency (EE), shared integrated framework for EE assessment which incorporates living lab and validation of measures that have been implemented to make building energy efficient. In his presentation Dr. Farrukh described the sensor-based energy audit procedure.

He also talked about energy simulation which is followed by conceptual framework of living lab. The living lab setup collects data regarding multiple indoor and outdoor parameters such as Dew Point, Humidity,



Precipitation, Wind Speed, Wind Gust, Solar potential, Directional LUX, Temperature, Pressure. He also briefly discussed the applicable strategies which came out of this energy analysis and explained the workflow through a case study of residential building located in Karachi.



**Presentation on Green Energy – Solarization of Buildings by Mr. Faiz Muhammad Bhutta, Senior Energy Consultant and CEO TECHFA Consulting**

Mr. Faiz presented about solarization of buildings in which he briefed regarding guidelines for solar PV system, he added that before installation survey and assessment should be done, followed by the solar PV system design. He also guided about the procurement of PV system including battery storage requirement, cable, mounting structure and protection panel.

**Presentation on Site Selection and Sustainability – Five Million Housing Project by Mr. Jawed Ali Khan, UN-Habitat Country Programme Manager Pakistan**

Mr. Jawed Ali Khan emphasised on the importance of site selection. He also added that for site selection and sustainability following aspects needs to be considered such as Building Orientation, Building’s siting as per Wind direction, Openings and Sun Direction, Landscaping and Orientation, Site Preparation and Open space Utilization. He also presented a checklist for sustainable site planning in his presentation.



**Presentation Session: Water-use Efficiency**



**Presentation on Water Use Efficiency, Conservation, re-use in Buildings by Dr.Hifza Rasheed**

Dr. Hifza stressed about water conservation strategies in her presentation. She discussed strategies suitable for domestic sector. She also briefed regarding rain water harvesting (RWH) and artificial ground water recharge. She presented Zero Liquid Discharge Policy & Framework for residential and commercial settings as well. While concluding she presented PCRWR Water Use Efficiency, Reuse & Conservation Model.

**Presentation on Initiatives of UN Habitat on Rainwater Harvesting for Buildings by Mr. Abdul Qayum**

Mr. Abdul Qayum initiated his presentation with the government policies on Water resources and RWH. He discussed the National Water Policy of Pakistan in detail then he highlighted the importance of RWH. He also shared the studies of his projects on Storm Water Management (SWM) and Rain Water Harvesting in Islamabad, Nowshera. While concluding his presentation he emphasised that the green building cost around 5-10% to build but this cost can be recovered within 3 years by saving water and energy. RWH is a step to optimally use the portable water and relevant energy sources.



## Presentation Session: Indoor Environmental Quality (IEQ)

### Online Presentation on IEQ Rating Provisions for Buildings - Arc. Aqrab Ali Rana, CEO-Pakistan Green Building Council

Arch. Aqrab Ali presented the IAQ minimum performance requirements and IAQ strategies. He also talked about Low-emitting building Materials, Construction IAQ management Plan, IAQ assessment and Provisions for thermal comfort, interior lightening, daylight and quality views provisions.

### Online Presentation on HVAC/ Pressurized Buildings - Engr. Muhammad Riaz Baig, Co Ordinator Technical advisory committee/PHVACR, BOG/ASHRAE Northern Pakistan Chapter

He stated that energy standards/codes for non-centrally air-conditioned buildings does not exist. He presented some of the passive design strategies for better indoor environment. He also briefed some recommendations for energy efficiency and conservation such as Use of LED lighting, Use light sensors to turn ON/Off outdoor lights, Use of occupancy sensors, in addition with awareness through TV channels to allocate time for public service messages. He also stressed on ways of Energy Conservation incentive to be looked at and Energy threshold limits to be defined.

### Online Presentation on ASHRAE Guidelines for IEQ – Engr. Abbas Sajid - Past President ASHRAE Pakistan Chapter & Pakistan HVACR Society

Engr. Abbas's presentation was about the Indoor Environmental Quality (IEQ) understanding, difference between Indoor Air Quality (IAQ) and Indoor Environmental Quality (IEQ). He then discussed the ASHRAE standards 62.1 & 62.2 for Ventilation and Acceptable Indoor Air Quality and its applications.

## Presentation Session: Climate Zones



### Presentation on Overview of Climate Zonation in Pakistan for five million housing by Dr. Imran Ahmed, Professor NEDUET

Dr. Imran Ahmed discussed Climate zones of Pakistan. Impacts of climate change on buildings. Furthermore, he presented green building attributes. He also shared some flood resistant concept of houses around the globe. He also provided some recommendations for houses in tropical and temperate zone and houses in arid and semi-arid zone.

### Presentation on Challenges due to Extreme Weathers & Climate Zones by Dr. Irfan Tariq, Ex. DG MoCC

Dr. Irfan tariq also initiated with climate zones of Pakistan. He further discussed the challenges in building construction such as location, ventilation, shading, material etc. need to be addressed in particular context to the location and environment and requirements for building construction varies from region to region due to the climate, need for locality specific guidelines for resilient buildings. He then discussed some recommendations to overcome the above mentioned challenges such as awareness regarding green buildings and climate resilient buildings, passive architectures, efficient space utilization, planned greening of existing buildings and acceptance of green construction materials.



## Working Group Exercise



All of the respected participants were distributed in different working groups, as per their area of expertise, to review the draft of GBC provisions. The working group were supposed to provide their feedback on the completeness, relevance, and practicality of GBC draft provisions.

There were four working groups, namely; site sustainability, energy efficiency, water-use efficiency and climate zone working group. Each of the group was led by a team lead, who was supposed to discuss and compile the feedback of all participants in the group in all three aspects as mentioned above.

The group title with their team lead of each working group are as follows:

**Site Sustainability, Material and Waste Management– Team Lead: Jawed Ali Khan**

**Energy Efficiency – Team Lead: Engr. Faiz Muhammad Bhutta**

**Water Use Efficiency – Team Lead: Abdul Qayum**

**Climatic Zones– Team Lead: Dr. Imran Ahmed**

Findings of the working groups was presented by Dr. Farrukh and is mentioned in the following section of this report.

## Conclusions and way forward

**Workshop findings and closing remarks, presented by Dr. Farrukh Arif, Associate Professor, NEDUET**

To close the workshop, Dr. Farrukh Arif addressed the participants in which he shared the findings of all working groups that will lead to further improvement of the GBC code provisions.

These findings include:

**Climate Zone** working group highlighted that water resources are not discussed, climate zones are not classified accordingly, water use efficiency should be in accordance with the climatic conditions. Site sustainability has not considered climatic conditions and heatwave was considered for solution.

**Water-use Efficiency** group's findings related to completeness includes; the equivalent WVE code sufficiently covers almost all aspects relevant to water use in Buildings. However, the following subheads should be considered for inclusion:

- Roof-top Rain Water Harvesting (all aspects)
- Surface Storm water (all aspects)
- Waste Water Reuse (all aspects).

For relevance of the draft document, this working group suggested that it is less relevant with 1986 Pakistan Building Code, it has vagueness issue. It has presently no contextualization with Pakistan Housing Scenario. The standards/ type of appliances mentioned in IGCC water use efficiency has no relevance to Pakistan standards.

As far as practicality of water-use efficiency is concerned, IGCC water use efficiency housing, kitchen standards for water use should be harmonized with local Standards. Market R&D on RWM, SWM, WWM and Bath/Kitchen/ Utensils/ fixtures should be carried out. Relevance with the local public health and environmental regulation's is necessary. Leakages in water sector must be made part of the water-use code.

**Energy Efficiency** working group stated regarding completeness of the document that the standards must be customized as per local conditions (Available practice & research). The solar PV system section needs review. Solar PV panel efficiency is 20-21% under renewable electrical energy when sun shaded area for solar is taken as 100 sq.ft/KWP The draft is relevant but cost effectiveness needs to be considered as well while implementing it. In order to practically implement this code, according to working group's findings there is deficiency of Energy Manufacturers, planners and skilled workers. Political will, Incentives, awareness and trainings are required for behavior change.

**Site Sustainability** working group came up with some suggestions regarding selection, planning and development of site such as:

Sustainability:

- Physically accessible
- Financially affordable
- Environmentally suitable
- Socially acceptable
- Economically viable

Legal Provisions/ Regulations:

- Complaint to land-use plan/ Master plan
- Compatibility with local by laws
- Land title should be clear
- There should be no litigation

Financing of Project:

- Finance providing corporations
- Easy installments/ down payments
- Subsidies/ cross-subsidies
- Low interest rate

## Annex I – Nominees and Participants

### List of Participants for Consultation Workshop

Name, designation & email	Organization	Attendance Status
<b>Dr. Sarosh H. Lodi</b> Project Head-GBC Provisions Switch Asia/aDelphi	Vice Chancellor, NED University	In person
<b>Engr. Najeeb Haroon</b>	Chairman, Pakistan Engineering Council	In person
<b>Mr. Thomas Seiler</b>	Deputy Head of Delegation, EU	In person
<b>Dr. Farrukh Arif</b> Associate Professor, NEDUET Focal person, Switch Asia-EU/aDeplhi GBC Project	NED University of Engineering & Technology, Karachi	In person
<b>Mr. Asif Hyder Shah</b> Secretary	Ministry of Climate Change	In person
<b>Dr. Zinaida Fadeeva</b> Team leader	Switch Asia SCP Facility	Online
<b>Cosima Stahr</b> Key Expert South Asia <a href="mailto:cosima@switch-asia.eu">cosima@switch-asia.eu</a>	SWITCH-Asia SCP Facility	
<b>Pawinee Chindasri (Ms)</b> Office and Events Manager <a href="mailto:pawinee@switch-asia.eu">pawinee@switch-asia.eu</a> , <a href="mailto:pawinee.chindasri@giz.de">pawinee.chindasri@giz.de</a>	SWITCH-Asia SCP Facility	Online
<b>Mr Abdul Qayum</b> Independent consultant/expert	Consultant/Expert	In person
<b>Prof. Dr. Noman Ahmed</b>	Dean AMS UNESCO Chair holder “Sustainable Urban Regions”	In person
<b>Mr Adnan Amin</b> Assistant Professor, Department of Architecture Email: <a href="mailto:adnan_amin@comsats.edu.pk">adnan_amin@comsats.edu.pk</a>	COMSATS University	In person
<b>Mr Ahmed Nawaz</b> President PHVACR	PHVACR Email: <a href="mailto:hvacr.org.pk@gmail.com">hvacr.org.pk@gmail.com</a>	In person
<b>Engr. Akhtar Rehman</b> Director	Department of housing & works KPK	In person



Name, designation & email	Organization	Attendance Status
<b>Mr. Faiz Ahmed Bhutta</b> Senior Energy Consultant & CEO Division	Techfa Consulting	In person
<b>Engr. Faiza Saeed</b> Lecturer	NED University of Engineering & Technology, Karachi	In person
<b>Dr. Nida Azhar</b> Assistant Professor, NEDUET	NED University of Engineering & Technology, Karachi	In person
<b>Mr. Hamid Mumtaz</b> Project Manager	Independent Consultant/ UN-Habitat	In person
<b>Ms. Hamna Sohail</b> Project Associate Email: <a href="mailto:hamnasohail55@gmail.com">hamnasohail55@gmail.com</a>	UN-Habitat	In person
<b>Mr. Jawed Ali Khan</b> Program Manager Email: <a href="mailto:jawed.ali_khan@un.org">jawed.ali_khan@un.org</a>	UN-Habitat	In person
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<b>Dr. Irfan Tariq</b> Ex. DG MoCC Email: <a href="mailto:mirfantariq@gmail.com">mirfantariq@gmail.com</a>	Ministry of Climate Change	In person
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<b>Mr. Khadim Hussain</b> Secretary, Local Government & Rural Development Department Email: <a href="mailto:khadimhussainzia@gmail.com">khadimhussainzia@gmail.com</a>	Government of Balochistan, Pakistan	In person
<b>Mr. Khalil Ahmad</b> Project Manager	Independent Consultant/ UN-Habitat	In person
<b>Dr. Khan Zeb Jadoon</b> Professor Email: <a href="mailto:khanzaib.jadoon@iiu.edu.pk">khanzaib.jadoon@iiu.edu.pk</a>	International Islamic University, Islamabad	In person
<b>Ms. Maggie Stephenson</b> Urban Development Specialist	United Nations	In person

Name, designation & email	Organization	Attendance Status
<b>Dr. Muhammad Ashraf</b>	Chairman, Pakistan Council of Research in Water Resources	<b>In person</b>
Intern	GIZ	<b>In person</b>
<b>Dr. Naik Muhammad</b> Assistant Professor	BUIITEMS, Quetta	<b>In person</b>
<b>Engr. Dr. Nasir Mehmood Khan</b> Registrar	Pakistan Engineering Council	<b>In person</b>
<b>Senator Engr. Rukhsana Zuberi</b> Member, Senate of Pakistan Email: <a href="mailto:rukhsanazuberi@tec.org.pk">rukhsanazuberi@tec.org.pk</a>	<i>Former chairman</i> , Pakistan Engineering Council	<b>In person</b>
<b>Senator Khalida Ateeb</b> Member, Senate of Pakistan	<i>Member, Standing Committee of Senate</i>	<b>In person</b>
<b>Ms. Saba Raffay</b> PM Environment Email: <a href="mailto:sabasarfraz@gmsil.com">sabasarfraz@gmsil.com</a>	Urban Sector Planning & Management Services Unit (Pvt.) Ltd.	<b>In person</b>
<b>Mr. Sadaqat Khan</b> Technological Adviser	MoST Government of Pakistan	<b>In person</b>
<b>Mr. Shabab Qamar</b> President ASHRAE NPC Email: <a href="mailto:shababrajpoot@hotmail.com">shababrajpoot@hotmail.com</a>	ASHRAE NPC	<b>In person</b>
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<b>Prof. Uzma Nooreen</b> Member GBC working group	Green Building Code working group	<b>In person</b>

Name, designation & email	Organization	Attendance Status
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<b>Mr. Zafar Iqbal Zafar</b> DG Planning CDA Email: <a href="mailto:planner4000@yahoo.com">planner4000@yahoo.com</a>	CDA	<b>In person</b>
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<b>Prof. Zain ul Abideen</b> Member GBC working group	Green Building Code working group	<b>In person</b>
<b>Prof. Dr. Amir Khan</b> CEO	UN-Habitat	<b>In person</b>
<b>Mr. Faheem Ahmed</b>	VIS Credit	<b>In person</b>
<b>Dr. Tariq Hasan</b>	Islamabad High Court (Advocate)	<b>In person</b>
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