



WRI TÜRKİYE

SÜRDÜRÜLEBİLİR
ŞEHİRLER



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Livable Cities Symposium 2015

Building Efficiency
Accelerator Project

Round Table - 1

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INTRODUCTION

WRI Turkey Sustainable Cities –previously known as EMBARQ Turkey- is a non-governmental civil society organization that focuses on practical applications of sustainable urban transport and development, based on global research and on-the-ground experience. Cities designed with these principles in mind can provide safer, healthier, and more fulfilling lives for all their residents. In turn, these cities can reap the social, economic, and environmental benefits of sustainable urban development, transport and public spaces.

WRI Turkey Sustainable Cities is a member of the WRI Ross Center for Sustainable Cities network, which is a signature initiative of World Resources Institute (WRI) that works to make urban sustainability a reality. Global research and on-the-ground experience in Brazil, China, India, Mexico, Turkey and the United States combine to spur action that improves life for millions of people. WRI Turkey Sustainable Cities helps to build more holistic infrastructure for cities by emphasizing sustainable and equitable integrated transport, land-use planning, and urban design. This approach allows us to influence on-the-ground planning, related policies, financing, and implementation. Our innovative research and practice bridges processes and policies through transit-led development to achieve sustainable communities that are liveable, compact and safe for all.

OUR APPROACH

We measure our success through real change on the ground. Our approach involves three essential steps: **Count It**, **Change It**, and **Scale It**.

Count It

We start with data. We conduct independent research and draw on the latest technology to develop new insights and recommendations. Our rigorous analysis identifies risks, unveils opportunities, and informs smart strategies. We focus our efforts on influential and emerging economies where the future of sustainability will be determined.

Change It

We use our research to influence government policies, business strategies, and civil society action. We test projects with communities, companies, and government agencies to build a strong evidence base. Then, we work with partners to deliver change on the ground that alleviates poverty and strengthens society. We hold ourselves accountable to ensure our outcomes will be bold and enduring.

Scale It

We don't think small. Once tested, we work with partners to adopt and expand our efforts regionally and globally. We engage with decision-makers to carry out our ideas and elevate our impact. We measure success through government and business actions that improve people's lives and sustain a healthy environment.

For safe and accessible cities, WRI Turkey Sustainable Cities mission is to catalyze and help implement environmentally and financially sustainable transport solutions to improve quality of life in cities, including:

1. Integrated Urban Transportation
 - Health & Road Safety studies

- Road Safety Audits and Inspections in cities
 - Integrated Public Transportation
 - Low Carbon Transport Solutions: Walking & Biking
 - Clean Vehicles
2. Integrated Urban Planning
- Accessibility Analysis
 - Public Life and Public Spaces Studies
 - Sustainable Urban Mobility Plans
 - Transit-Oriented Development
3. Urban Efficiency & Climate
- Air quality assessments of the low-carbon urban mobility solutions
 - Energy and Building Efficiency
 - GHG Emission Inventory and Global Protocol for Community-Scale GHG Emission (GPC)
- Regulatory impact assessment on climate change's adaptation and mitigation measures for urban transport & urban development

PROBLEM STATEMENT

Implementing energy efficient solutions to reduce energy use while maintaining the same productivity has the potential to mitigate greenhouse gas emissions, improve air quality, reduce pollution, create new jobs, and produce substantial financial savings amounting to US\$250-\$325 billion per year. But still, energy efficiency as a strategy is still underutilized.

To address this gap, the United Nations created the Global Energy Efficiency Accelerator Platform as a part of the Sustainable Energy for All initiative (SE4ALL). The Platform works with national and subnational governments to catalyze new energy efficiency policies and projects related to appliances and equipment, buildings, district energy systems, lighting, industry and vehicle fuel economy.

The building sector is a major contributor to global warming. Buildings account for about one-fourth of global energy demand and nearly one-third of greenhouse gas emissions.ⁱ The sector holds the potential for some of the greatest areas for progress towards a more sustainable future, which is insufficiently addressed today. By 2050, global building energy demand can be reduced by one-third if known energy efficiency best practices are implemented on a large scale.ⁱⁱ Improvements to buildings in the urban environment can provide multiple benefits and improve quality of life: buildings are where city dwellers spend most of their time. Benefits of energy efficiency include easily quantified indoor and outdoor air quality improvements, greenhouse gas reduction, lower energy demand and costs, and more complex benefits such as improved urban livability, worker productivity, as well as local employment.ⁱⁱⁱ

In Turkey, Energy Efficiency Law No. 5627 (2007) covers the principles and procedures applicable to increasing and supporting energy efficiency, developing public awareness about energy consumption and use of renewable energy resources in the energy generation, transmission, distribution and consumption stages, at industrial facilities, buildings, electricity generation facilities, transmission and distribution grids, and in transportation. Additionally, Prime Ministry Circular No. 2008/19 began the National Energy Efficiency Movement in 2008, which required all public agencies and institutions, municipalities and professional chambers to replace the incandescent light bulbs at the places under their responsibility with energy saving bulbs in one month. Under the “Hand-in-Hand ENVER (Energy Efficiency) Movement”, a step of the National Energy Efficiency Movement, energy saving light bulbs were distributed at primary schools; 2,800,000 lamps were distributed in 23 provinces between December 2008 and January 2009. Distribution of 2,000,000 million more lamps started in April 2009. However, there is no information as to whether such initiatives have been continued or systematized.

There are several green building certification systems in Turkey, which include BREEAM, LEED, DGNB. Moreover in 2015, “Building Certification” will be governed by Turkish Green Building Council (ÇEDBİK), which was established in October 2007 as a non-profit organization, member of the World Green Building Council.

Technically feasible and cost-effective building efficiency solutions are readily available around the world. Rather than technology or cost, the major barriers to efficient buildings are institutional and behavioral in nature. There are five major hurdles to improve building efficiency: lack of awareness of the specific opportunities and benefits of improving buildings, lack of technical expertise to evaluate options, uncertainty about the performance of efficient technology, internal capital hurdles, and insufficient funds or finance options. In addition, budgeting and procurement practices such as “lowest cost” sourcing may make investments difficult as the technology may cost more upfront but pay for itself very quickly and have a lower total cost of ownership. Building owners often view energy efficiency favorably, but not as an investment priority. These barriers mean improving efficiency is rarely prioritized and there is limited staff knowledge or capacity to implement efficiency measures.^{iv}

This report is prepared as the output of the first round table discussion to identify some challenges and opportunities regarding to the Green Building construction in Turkey.

BUILDING EFFICIENCY ROUND TABLE

Round table is conducted in two sessions; first session consists of speeches and/or presentations from Head of Özyeğin University Center for Energy, Environment and Economy (CEEE) Prof. Pınar Mengüç, WRI Ross Center for Sustainable Cities Building Efficiency Initiative Director Jennifer Layke, and Copenhagen Centre on Energy Efficiency (C2E2) Researcher Ksenia Petrichenko; second session includes building efficiency assessment tool and round table discussion. Following parts of this report provide details about the whole round table.

AGENDA

Venue: Istanbul Technical University Süleyman Demirel Convention Center

Date: 20 November 2015

| Start | Finish | Subject | Speaker |
|-------|--------|--|--|
| 09:00 | 09:15 | Opening Speech: Green Buildings in Turkey | Prof. Dr. Pınar Mengüç CEEE Özyegin University |
| 09:15 | 09:45 | Buildings as Critical Opportunities | Jennifer Layke WRI Ross Center for Sustainable Cities |
| 09:45 | 10:15 | Introduction to Sustainable Energy for All and the Building Efficiency Accelerator | Ksenia Petrichenko C2E2 Jennifer Layke WRI Ross Center for Sustainable Cities |
| 10:15 | 10:30 | Coffee Break | |
| 10:15 | 11:15 | Building Efficiency Policy Assessment Tool | Moderation: Jennifer Layke WRI Ross Center for Sustainable Cities |
| 11:15 | 12:15 | Round table discussion | |
| 12:15 | 12:30 | Evaluation and Closure | |



Photo 1 Discussion during the building efficiency assessment tool

During the speech of Prof. Dr. Pinar Mengüç from CEEE, he focused on not only the economist benefits of green and energy efficient buildings, but also on environmental and social impacts on users. He also pointed out the relation and collaboration between building efficiency and climate change's impact on buildings, impacts of buildings, cities, science, engineering, and architecture.

Jennifer Layke, Director of Building Efficiency Initiative, presented effects of human behavior & governance barriers and expansion of the built environment on building efficiency (see Appendix 1 for details). Jennifer also informed about the Building Efficiency Policy Assessment Tool and its use within Building Efficiency Accelerator Project in Turkey.

Ksenia Petrichenko, C2E2, also added UN Sustainable Energy for All (SE4All) initiative's Energy Efficiency Hub and presented briefly about SE4All and objectives which are ensuring universal access to affordable, reliable and modern energy services; substantially increasing the share of renewable energy in global energy mix; and doubling the global rate of improvement in energy efficiency by 2030(see Appendix 1 for details).

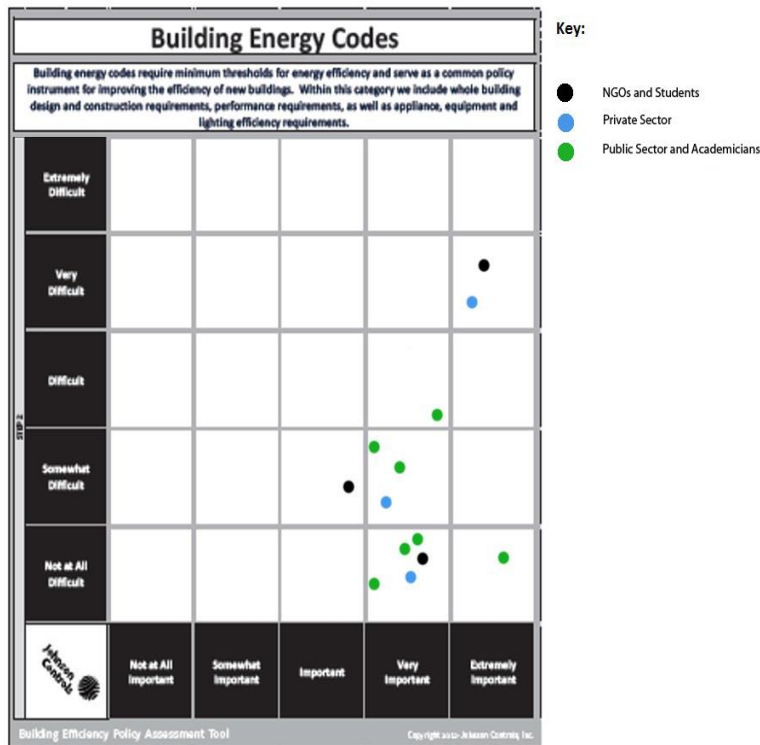
PARTICIPANT

The round table hosted stakeholders from different sectors - from public and private sectors to NGOs and academicians. List of participants is given in the table below.

| No | Name - Last Name | Organization | Email |
|----|----------------------------------|--|------------------------------------|
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OUTPUTS OF BUILDING EFFICIENCY ASSESSMENT TOOL

Assessment tool consists of three steps; first step is to voting for the current status of eight actions to improve the building efficiency in a country using sticky dots relative to their sectors. Eight actions to improve building efficiency are briefly given below and details are presented in Appendix 2.



ACTIONS TO IMPROVE BUILDING EFFICIENCY

Codes & Standards: Building energy codes and product standards establish minimum requirements for energy performance.

Targets: Targets to align interests and spur action to improve efficiency in the building sector.

Information & Certifications: Data, baselines, disclosure and certifications for market differentiation of building performance or attributes.

Finance & Incentives: Programs and incentives to provide funding to building efficiency improvements.

Figure 1 An example of the sticky dot sheets.

Government Leadership Programs: Programs to support government efficiency, including public building retrofits and innovative procurement.

Building Owner & Occupant Actions: Building operations, occupant behavior.

Technical & Financial Services Capacity: Market development and skilled workforce for private providers of building construction, services & equipment

Utility Actions: Planning and programs by utility companies for energy efficiency improvement.

According to the votes for Turkish building efficiency policies, an output chart and an importance and difficulty assessment graph are prepared. During the evaluation each and every difficulty and importance of eight actions are weighted with their coefficients. Table below shows the output of current situation of building efficiency policies in Turkey for eight actions. Moreover, Figure 2 represents the results of the table which shows Building Owner & Occupant and Utility actions are the most difficult and the most important actions for Turkey, where Finance & Incentives and Performance Information and Certification are also as important but less difficult. According to the evaluation the least difficult and the most important is to set targets which comply with round table discussions.

Table 1 Output Chart

| | Current Status | | | | | CURRENT STATUS | Importance | | | | | IMPORTANCE | Difficulty | | | | | DIFFICULTY |
|---|--|---|--|--|---|----------------|----------------------|--------------------|-----------|----------------|---------------------|------------|----------------------|--------------------|-----------|----------------|---------------------|------------|
| | No policy or planning currently in place (1) | Planning to pilot or implement policy (2) | Piloting the policy on a limited basis (3) | Limited or sub-national level implementation (4) | Comprehensive national level implementation (5) | | Not at all Important | Somewhat Important | Important | Very Important | Extremely Important | | Not at all Difficult | Somewhat Difficult | Difficult | Very Difficult | Extremely Difficult | |
| BUILDING ENERGY CODES & PRODUCT STANDARDS | 0 | 1 | 0 | 12 | 0 | 4.0 | 0 | 0 | 1 | 9 | 3 | 4.2 | 6 | 4 | 1 | 2 | 0 | 1.9 |
| BUILDING EFFICIENCY TARGETS | 0 | 0 | 3 | 10 | 0 | 3.8 | 0 | 0 | 0 | 4 | 9 | 4.7 | 7 | 5 | 1 | 0 | 0 | 1.5 |
| PERFORMANCE INFORMATION & CERTIFICATIONS | 0 | 9 | 3 | 1 | 0 | 2.4 | 0 | 0 | 1 | 3 | 9 | 4.6 | 0 | 4 | 7 | 2 | 0 | 2.8 |
| FINANCE & INCENTIVES | 3 | 7 | 1 | 2 | 0 | 2.2 | 0 | 0 | 0 | 3 | 10 | 4.8 | 3 | 3 | 3 | 1 | 3 | 2.8 |
| GOVERNMENT LEADERSHIP PROGRAMS | 2 | 5 | 4 | 2 | 0 | 2.5 | 0 | 0 | 2 | 4 | 7 | 4.4 | 1 | 5 | 3 | 4 | 0 | 2.8 |
| BUILDING OWNER & OCCUPANT ACTIONS | 6 | 2 | 4 | 1 | 0 | 2.0 | 0 | 0 | 2 | 4 | 7 | 4.4 | 2 | 4 | 1 | 1 | 5 | 3.2 |
| DEVELOPING TECHNICAL & FINANCIAL SERVICE CAPACITY | 0 | 4 | 6 | 1 | 0 | 2.7 | 0 | 0 | 2 | 8 | 3 | 4.1 | 1 | 2 | 8 | 2 | 0 | 2.8 |
| UTILITY ACTIONS | 5 | 7 | 0 | 1 | 0 | 1.8 | 0 | 0 | 0 | 13 | 0 | 4.0 | 1 | 3 | 5 | 3 | 1 | 3.0 |

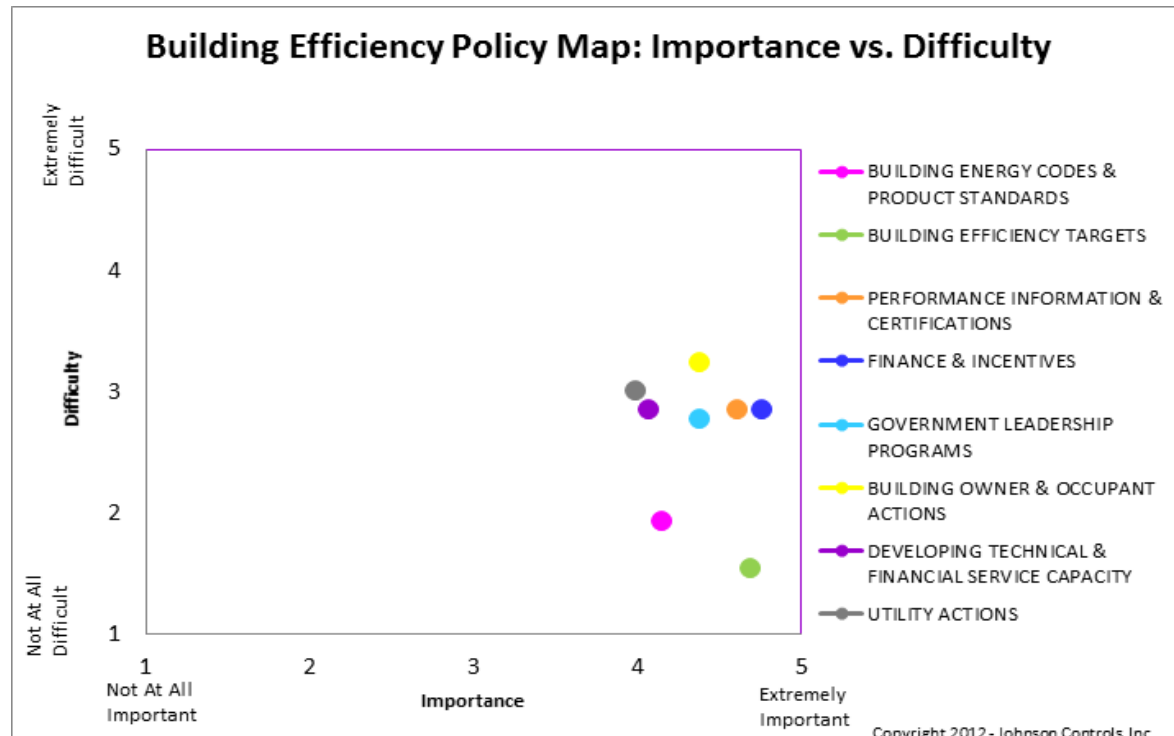


Figure 2 Assessment of Building Efficiency Policy Map: Importance vs. Difficulty

ROUND TABLE DISCUSSION SESSION

Thirteen participants from different sectors (public, Private, NGO and researchers) attended to the assessment tool and round table discussion. Round table discussion started with a question; *'If we transported ourselves 10 years into the future. what would we like to say we had accomplished because of enacting new building efficiency policies for urban areas in Turkey?'* and all participants stated their opinions on post-its. According to this cross-sectoral exercise, to have a successful building efficiency policies in Turkey, six topics require a comprehensive attention from all sectors; (i) Building Stock Data, (ii) Codes and Standards, (iii) Government Leadership and Coordination, (iv) Finance (v) Awareness Raising and Capacity Building Activities and (vi) Innovative Technologies. Discussion for these six topics are given below.

Representative from the Ministry of Energy and Natural Resources shared the vision on current situation from decision maker's perspective. Building Energy Performance Code is amended by Efficiency Law No. 5627 (2007) and Energy Performance Certificate is mandatory for new buildings. Energy Efficiency Strategy Certification is published in 2012 and studies continue to reach a sustainable building strategy until 2023. Ministry of Environment and Urbanization's Energy Efficiency Portal (BEP) is online for all sectors. Building based monitoring is available within this portal. Guarantee of purchase for renewable energy generation will continue ten more years. Eco-label standards are in process and ERKE Design is working on a web portal which includes current companies with national and international companies that produce eco-labeled products.

The ministry conducts pilot studies with UNDP and GEF. On the other hand, KfW and World Bank conduct parallel studies regarding the current situation in Turkey. Solar energy generating buildings are privileged not to apply for license moreover short term incentives are provided by Ministry. Last but not least, Ozyegin University, Istanbul Technical University, Kartal Municipality and CEDBIK talked about European Commission (EC) Framework Programmes' funded building efficiency projects in Turkey. Table 2 below gives brief description of these projects.

Table 2 EC Funded Building Efficiency Projects in Turkey

| NAME | TURKISH PARTNERS | OBJECTIVE | TIMELINE | LINK |
|---------------------------|---|---|--------------------------|---|
| BUILD UPON (H2020) | <ul style="list-style-type: none"> Turkish Green Buildings Council (CEDBIK) | Empowering stakeholders to assist public authorities in the definition and implementation of sustainable energy policies and measures | 2015-03-01 2017-03-01 | http://cordis.europa.eu/project/rcn/194605_en.html |
| CITYFIED (FP7) | <ul style="list-style-type: none"> Istanbul Technical University Soma Municipality Türkiye Bilimsel ve Teknolojik Arastırma Kurumu (TUBITAK) Soma Elektrik Üretim ve Ticaret A.Ş. Mir Arastırma ve Geliştirme A.Ş. | Demonstration of optimized energy systems for high performance-energy districts | 2014-04-01 2019-03-31 | http://cordis.europa.eu/project/rcn/197827_en.html |
| R2CITIES | <ul style="list-style-type: none"> Istanbul Technical | Demonstration of nearly Zero | 2013-07-01 | http://cordis.europa.eu/project/rcn/197827_en.html |

| | | | | |
|----------------------|--|--|--------------------------|---|
| (FP7) | <ul style="list-style-type: none"> University Ode Yalitim Sanayi Ve Ticaret A.S. Kartal Municipality Ezinc Metal Sanayi ve Ticaret A.S. | Energy Building Renovation for cities and districts. | 2017-06-30 | is.europa.eu/project/rcn/186980_en.html |
| NEED4B (FP7) | <ul style="list-style-type: none"> Ozyegin University Bg Mimarlik Musavirlik Ltd. Sti. Fiba Holding A.S. | Demonstration of very low energy consumption for new buildings. | 2012-02-01 2018-01-31 | http://cordis.europa.eu/project/rcn/103900_en.html |
| BRICKER (FP7) | <ul style="list-style-type: none"> Ozyegin University Onur Insaat Yazilim Bilgisayar Enerji Reklam Yapi Malzemeleri Laboratuari Muhendislik Sanayi ve Ticaret Ltd. Sti. Adnan Menderes University | A scalable, replicable, high energy efficient, zero emissions and cost effective SYSTEM to refurbish existing public-owned non-residential buildings to achieve at least 50% energy consumption reduction. | 2013-10-01 2017-09-30 | http://cordis.europa.eu/project/rcn/109253_en.html |
| TRIBE (H2020) | <ul style="list-style-type: none"> Ozyegin University | Project aims to contribute to a citizens' behavior change towards energy efficiency in public buildings, through their engagement in the experience of playing a social game, linked by ICT to real time data collected from 5 pilot buildings hosting around 1.300 regular users (employees, tenants...) and almost 12.000 eventual users (visitors). | 2015-03-01 2018-03-01 | http://cordis.europa.eu/project/rcn/194617_en.html |

Discussion lead to current needs and gaps in Turkey with more comments and suggestions for policy actions within 10year vision, which are given below.

| ACTION | DISCUSSION |
|---|---|
| Building Stock Data | <p>One of the most important action is to set a national database/ inventory with a long-term vision.</p> <ul style="list-style-type: none"> • According to the current buildings there is no database/inventory provided by national government. • Although it is important to constitute a national inventory, focusing on Turkish megacity, Istanbul, should be carried separately which will help to receive more and better outputs and outcomes. |
| Codes and Standards | <p>The most criticized action was current codes and standards. To build long-term codes, codes and standards should be in compliance with national strategies on energy however National Energy Strategy relies on 40% of natural gas which also causes energy security issues.</p> <ul style="list-style-type: none"> • Codes on energy performance prevent a competitive market and causes unsuccessful tendering process for local authorities. Likewise, requirements of Public Procurement Authority (KIK) are not possible to apply during tendering process. • International standards are in use such as BREEAM, LEED and DGNB. According to the current certifications of Turkish Buildings, LEED and BREEAM are more used comparing DGNB. LEED is easier to apply and shows real outcomes. • LEED requires eco-labels which are not adapted within Turkish companies; therefore, procurement process depends on importing leading to expensive budgets and excessive timelines. • Current codes are central government driven and standards are international market driven which doesn't represent national and local gaps and needs. Certification standards should be set. • Five years of adaptation period is a must as it is in European Union (EU) Directives. • Stakeholder engagement is poor in participatory steps of setting both codes and standards. • By 2016, CEDBİK is in process to launch a National Green Building Certification Standard. |
| Government Leadership and Coordination | <p>Government Leadership and Coordination is also the most important action for future success. Collaboration between public and private bodies and NGO involvement are a must for long-term vision.</p> <ul style="list-style-type: none"> • Energy Service Companies (Private Sector), academicians and NGOs work together for economic analysis on existing buildings can obtain certifications by 2017. • Lack of coordination and finance lead to cause market driven short-term adaptations causing frequent problems for local authorities. • A National Energy Agency should be established with representatives from Ministry of Energy and Natural Resources, Ministry of Environment and Urbanization, Ministry of Economy and Ministry of Science, Industry and Technology • Detailed enforcement tools should be applied after the adaptation period and Building Energy Performance Monitoring should be carried out. • Among with new incentives from Ministry of Economy, three-years redeem incentives should be applied. |
| Finance Mechanisms | <p>Finance is important to sustain a long-term vision. The current incentives should continue until 2023 when Turkey will have successfully create financing program for net-zero energy building.</p> <ul style="list-style-type: none"> • Codes must be modified to improve the current hump of non-innovative archaic financing and engineering, • Insufficient incentives for green building material manufacturers and use of energy efficient materials • Innovative financing is a must beyond tear it agent and build a taller building concept. • Ministry of Culture and Tourism implements Green Star Certification for |

| | |
|--|---|
| | hotels which doesn't significantly contribute expenses besides the small-scale electricity budgets. |
| <i>Awareness Raising and Capacity Building Activities</i> | <p>The third most important action was awareness raising and capacity building activities. Most of the participants agree on setting different capacity building tools for all sectors and series of capacity building activities for local authorities in collaboration with academicians and NGOs.</p> <ul style="list-style-type: none"> • Stakeholder mapping should be the first step to raise awareness and build capacity. • In order to increase the individual awareness aggressive and innovative campaigns should be carried out as in EU • NGOs should be supported by central government in order to raise awareness within the communities. • Importance of social and cultural aspects of building efficiency should be implemented within awareness raising and capacity building activities. • In order to sustain a systematic approach, university students within related majors –such as engineering, architecture and planning- should be supported with trainings on certification systems. • If in all NUT areas, which are 10% of all sectoral buildings -public, residential and commercial- , consume zero-energy and their economic, social and environmental impacts are calculated, energy efficiency policies will be sustainable. |
| <i>Innovative Technologies</i> | <p>In current situation innovative technologies are not prioritized unless they do not support the improvement of current situation.</p> <ul style="list-style-type: none"> • Research and development projects for innovative technologies should be supported. • Interdisciplinary approach needs to be implemented to prevent single-component based decisions. • 90% of new buildings in the world are energy efficient or NZEB 60% of existing building are renovated to be energy efficient. • In 10-year vision, new buildings should be designed in vision of user behavior. • Small-scaled smart grid systems must be applied for security of energy. |

APPENDIX 1 - BUILDING EFFICIENCY ACCELERATOR PROJECT

The building sector accounts for about one-third of global energy use and energy-related GHG emissions. Widespread implementation of progressive policies that encourage the use of best available technologies, low-energy building design, and energy efficiency renovation can deliver 25-50% reductions in energy demand from new and existing buildings. Achieving such savings would not only significantly reduce GHG emissions, but also would reduce costs, create jobs, provide cost-effective energy capacity and improve the comfort, health and environment in communities. Through public-private collaboration, governments can establish effective policies and businesses that can deliver current technologies to accelerate investment in energy efficiency and the achievement of benefits.

BUILDING EFFICIENCY ACCELERATOR

In order to double the rate of global energy efficiency improvement, a Building Efficiency Accelerator is proposed to help city, state, regional and national governments speed up adoption of best-practice policies and the implementation of projects. A global network of businesses, NGOs and international organizations, in collaboration with civil society and sub-national government leaders, will provide tools, expertise, technical capabilities, and financial support to help accelerate building efficiency policy and project initiatives.



Figure 3 Building Efficiency Accelerator Project

Source: Jennifer Layke, Director Building Efficiency Initiative (2015)

GOVERNMENT COMMITMENTS

Sub-national governments will make a commitment to double the rate of building energy efficiency by 2030 in targeted sectors within their jurisdiction. They will also commit to implement one enabling policy and one demonstration project to be announced at COP21 in Paris. The final elements of the commitment include; creating a baseline of building energy efficiency performance, agreeing to track and report annual progress, and participating in the partnership to share experiences and best practices with other governments.

PARTNER COMMITMENTS

Business, NGO, and international organization partners will support governments in achieving these commitments. They will facilitate collaborative, multi-stakeholder workshops to define and prioritize policy and project actions. The partnership will define a standardized menu of policy options and provide governments with technical support leveraging best-in-class tools, databases, and subject matter experts. Policy options will include such areas as; government leadership, building codes and equipment standards, performance benchmarking and disclosure, third-party financing models and utility programs. International financial partners will provide funding to support policy development and demonstration project implementation. Finally, the partnership will help governments communicate and promote their commitments, calculate their baseline, report progress, and provide a platform for sharing experiences, challenges and best practices with other governments.

Today, nine new subnational governments join Mexico City, Mexico, and Milwaukee, Wisconsin in the Building Efficiency Accelerator. The new cities are from Romania, Vietnam, Malaysia, Mexico, the Philippines, Japan and Poland. They have committed to enacting new policies, implementing building efficiency projects, and tracking their progress (see Table 3).

Table 3 Members of the Building Efficiency Accelerator

| New cities | Businesses and Organizations Joined 2015 | Existing Partners |
|--|--|--|
| City of Alba Iulia (Romania) | Accenture | Green Buildings Performance Network |
| City of Bucharest, District 3 (Romania) | Alstom | ICLEI - Local Governments for Sustainability |
| Da Nang City (Vietnam) | Buildings Performance Institute Europe | International Energy Agency |
| Iskandar Regional Development Authority (Malaysia) | Business Council For Sustainable Energy | International Finance Corporation (EDGE) |
| State of Jalisco (Mexico) | C40 Cities Climate Leadership Group | Johnson Controls |
| Mandaluyong City (Philippines) | China Energy Conservation and Environmental Protection Group | Philips |
| Science City of Munoz (Philippines) | Clean Energy Solutions Center | United Nations Development Programme |
| Tokyo Metropolitan Government (Japan) | Copenhagen Center on Energy Efficiency | United Nations Environment Programme |
| City of Warsaw (Poland) | Danfoss | United Nations Foundation |
| City of Alba Iulia (Romania) | Global Environment Facility | United States Green Building Council |
| City of Bucharest, District 3 (Romania) | Global Green Growth Forum | World Bank Group (ESMAP) |

APPENDIX 2 – BUILDING EFFICIENCY ASSESSMENT TOOL

CODES & STANDARDS

Building codes and appliance standards improve the cost-effectiveness of new buildings through decreased energy costs over the lifetime of the building

Building Energy Codes

Regulations that set minimum requirements for energy efficiency, including design and energy systems for different building types.

Aim is to establish technical or performance requirements for buildings, which will result in energy efficiency improvements

Appliance and Equipment Standards

Minimum energy performance requirements established by a recognized public authority for a particular product class

Aim is to ensure adoption of more efficient technologies and phase-out of inefficient ones from the market

TARGETS

An energy efficiency improvement target or goal can align interests of different actors and spur action

Policy targets & Roadmaps

Publicly announced commitments (quantitative or qualitative) to improve energy efficiency and a transparent strategy to achieve them

Aim at encouraging relevant and locally appropriate actions to increase energy efficiency through political commitment to a clearly defined target

Building performance targets

Commitments to achieve a certain level of the overall energy performance of buildings (or of a building type), typically significant lower than that of typical buildings

Aim at encouraging energy savings in buildings through a holistic approach to energy efficiency improvements

Energy efficiency obligations/ White Certificates

Obligations put on energy suppliers and/or retailers to achieve a defined amount of energy savings in a given period on the consumer premises, accompanied by monitoring and verification of energy savings and often by certification.

Aim at promoting widespread, standardized energy efficiency actions on the premises of small consumers, thus reducing the transaction costs, and fostering market change

INFORMATION & CERTIFICATIONS

Greater information and data enables owners, operators, and tenants to make informed energy management decisions and track performance against goals

Data collection & baseline development

Research and analytical efforts channeled at gathering, creating, systematizing and analyzing data on building energy performance, energy efficiency policies and building sector conditions

Aim is to support policy design, select technically feasible policies and establish a baseline for policy monitoring, reporting, and verification system.

Energy audits

Measurement of building energy performance with the aim to identify potentially cost-effective improvements, and ensuring that informed decisions are made

Aim is to provide a high quality, technically sound assessment of the current and potential energy performance of buildings, and to recommend a set of cost-effective options to improve their energy efficiency

Building certification & Rating

A rating system of energy performance of individual (new and/or existing) buildings, according to a credible set of criteria, accompanied by issuing the certificate and typically requiring its disclosure

Aim is to publicize energy performance of buildings and 'reward' top-performers, enabling owners and tenants to take informed decisions

Disclosure of Energy Performance

Certificates issued to buildings containing the information on energy consumption and in some cases CO₂ emissions, which usually have to be presented when the dwelling is sold or rented out

Aim is to increase awareness about energy consumption among building owners, integrate energy efficiency information into the real estate market, and incentivize efficiency improvements by publicizing good and poor performance

FINANCE & INCENTIVES

Funding energy efficiency efforts remains a significant challenge.

A variety of programs can be designed to support energy efficiency investments

Risk mitigation mechanisms

Definition: A guarantee of a certain low level of risk provided by the government to banks that lend to building energy efficiency improvement projects

Aim: to catalyze local sources of financing in building energy efficiency measures through lowering the cost of capital for investments and mitigating the barrier of high upfront costs

Tax exemptions and reductions

A transfer of wealth from one group (e.g. the society at large) to another group, typically investors in energy efficiency measures, which indirectly reduces the cost of energy efficiency investments.

Aim is to encourage energy efficiency building practices by lowering the investment costs for energy efficient solutions or by alleviating the financial burden of energy taxes for a specific target group

Grants and rebates

Definition: A form of financial assistance provided by the public administration to companies or individuals, in order to support energy efficiency investments

and projects in order to mitigate the lack of access to capital or financing opportunities for energy efficiency investments.

Aim: to reduce the cost of investments in sustainable technologies by directly providing capital to the investors.

Soft loans/ Revolving loan funds

Definition: Publicly supported loans offered by government agencies or banks at low interest rates to finance energy efficiency measures or to guarantee a bank's investment in energy efficiency

Aim: to provide financial assistance to overcome the high initial costs related to sustainability improvements

Preferential mortgages

Definition: Mortgages supported by the public authority through providing an incentive to commercial banks, which allow building owners to benefit from lower interest rates or extended credit options when the investment is related to energy efficiency.

Aim: to provide financial assistance to overcome the high initial costs linked to energy efficiency measures

Energy subsidies and taxes

Reduce fuel subsidies or increase taxes levied directly on the consumption of fossil fuels and/or on energy using products, based on their energy demand.

Aim is to discourage excessive energy consumption by increasing the price-per-unit of energy consumed.

Plus... Non-financial incentives

Often regulatory benefits provided to qualifying buildings, e.g. expedited permitting, density bonuses.

GOVERNMENT LEADERSHIP PROGRAMS

Public building and facility energy improvement programs

Programs aimed at improving energy efficiency of public buildings in order to demonstrate the efforts, raise awareness, and encourage energy efficiency initiatives also in other building types, through communication to relevant stakeholders.

Aim is to promote energy efficient behavior and decisions, while creating savings in the public budget, demonstrating viability of energy efficiency improvements and policies

Procurement regulations

Regulations for organized purchase by public bodies following pre-set regulations, which include provisions for energy efficiency.

Aim is to increase the energy efficiency of the buildings owned or used by public authorities or used for provision of public services

BUILDING OWNER & OCCUPANT ACTIONS

Awareness raising, education, and information campaigns

Dissemination of general information and messages on energy efficiency to the general public or to specific target groups (e.g. architects, engineers, etc.).

Aim is to induce voluntary behavioral change by influencing individual and organizational perceptions, preferences and abilities (e.g.: consumer choice, building occupant behavior, design preferences of architects, etc.)

Competition & awards programs

Events and/or programs aimed at gathering, evaluating, and selecting the best of energy efficiency practices presented through the certain application process and complied with pre-defined and announced eligibility criteria. Governments can also design competitions and reward publicly the best performers

Aim is to indirectly benchmark best-practices on energy efficiency in buildings

Feedback programs

Organized provision of information to energy users about their energy consumption patterns through their bills, directly on their appliances, or through communication, which can include recommendations on how to reduce consumption.

Aim is to encourage voluntary energy savings through provision of information to users on their energy consumption and potential measures for reducing consumption

TECHNICAL & FINANCIAL SERVICES CAPACITY

Government and private sector capacity building and workforce skill training are essential elements of energy management and energy efficiency

Energy performance contracting market

A form of financing for capital improvement, normally offered by Energy Service Companies (ESCOs), which allows funding energy efficiency upgrades in buildings through cost savings from reduced energy consumption.

Aim is to support development of energy service markets, encourage carrying out financially viable energy efficiency projects through reduction of the up-front costs

Workforce training & education

Programs that increase the skills of workers and job-seekers by providing education or training in energy efficiency.

Aim is to create skills and knowledge, which can help to improve energy efficiency in buildings and achieve energy savings

Business development for efficiency providers

Technical assistance efforts aimed at creating business opportunities related to energy efficiency improvements in buildings

Aim is to increase attractiveness of investments into energy efficiency through demonstration of the potential business opportunities

UTILITY ACTIONS

Utilities have access to energy customers and have the potential to meet the energy needs of those customers by investing in demand reduction

Public benefit charges

Charges billed to consumers as an additional percentage of the utility costs with the aim to collect funds and use them for energy efficiency improvement

Aim is to raise funds through taxing services in order to redistribute the collected budget in energy efficiency measures and/or to provide utility services to low-income groups

On-bill repayment

A loan made to a utility customer to pay for energy efficiency improvements to the customer's dwelling through the energy bill, administered by the utility directly or by a state energy office

Aim is to encourage end-users' investments in building energy efficiency through lowering the upfront costs and giving the opportunity to pay back the loan through energy savings

Revenue decoupling

A utility pricing policy that separates a utility's profits from the amount of electricity it sells through a rate-adjustment mechanism.

Aim is to remove the pressures placed on utilities to sell as much energy as possible by eliminating the relationship between revenues and sales volume and thereby eliminating the disincentive for investment in energy efficiency

Time-based pricing

Energy price program, which sets different tariffs for energy use depending on the time of the day or energy demand, with higher rates applied for larger amount of energy consumed and/or during the peak hours

Aim is to encourage behavioral change by the users towards decreasing their energy consumption

Demand response

An energy saving strategy, which includes rates, incentives and other strategies to help better manage electricity used during periods of high demand and reduce the need to build new generation to cover peak demand

Aim is to encourage consumers to reduce their demand for electricity, thereby reducing the peak demand on the utility grid

Smart metering

Technological devices that record energy consumption in (near) real-time and remotely communicate this information to the utility provider and users

Aim is to encourage consumers to reduce energy consumption by providing the data on their utility consumption, offering time-based pricing, informing on saving opportunities, connecting renewable micro-utility generation systems to the grid

APPENDIX 3 – EVENT PHOTOS



Photo 2 Prof. Dr. Pınar Mengüç's opening speech



Photo 3 Presentations of Jennifer Layke and Ksenia Petrichenko



Photo 4 “What is Success in 10 Years?” assessment of Pinar Kose

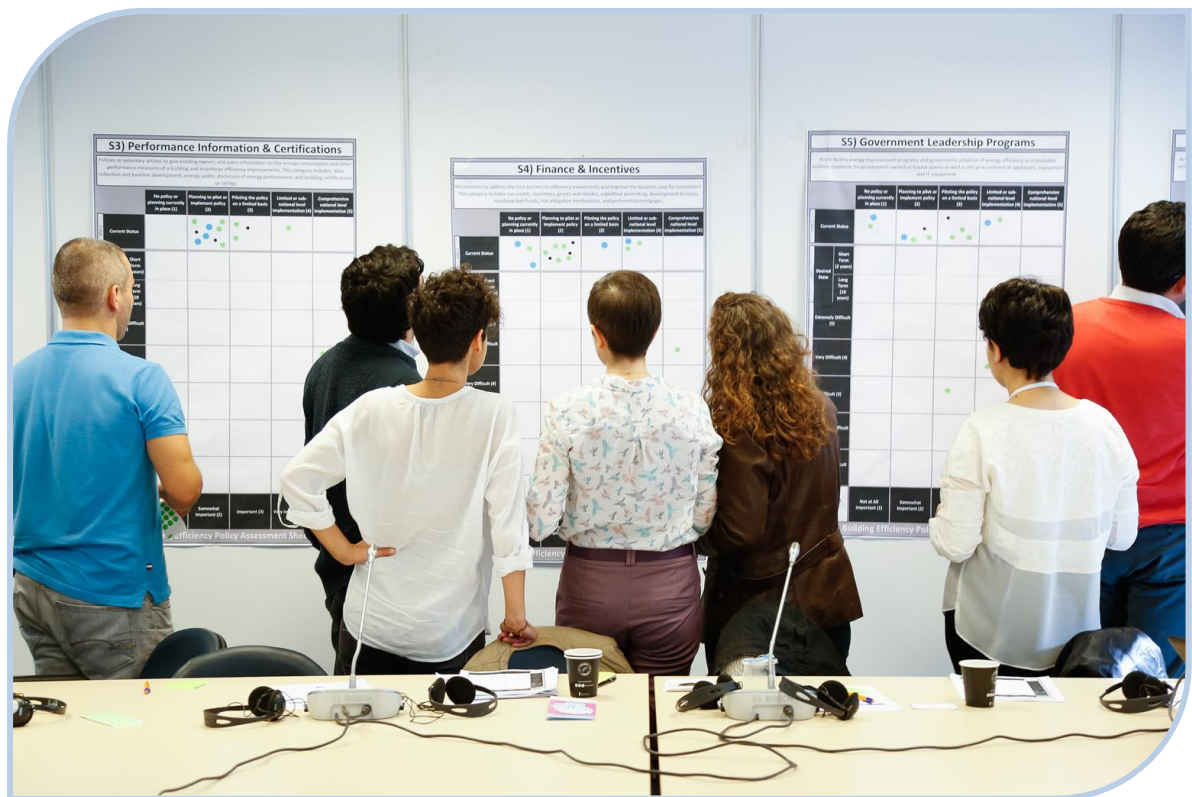


Photo 5 “Sticky dot” building efficiency assessment tool

REFERENCES

- ⁱ D. Urge-Vorsatz et al., "Towards Sustainable Energy End-Use: Buildings.," in *Global Energy Assessment*, vol. Chapter 10 (Laxenburg, Austria, Cambridge, United Kingdom and New York, NY, USA: IIASA and Cambridge University Press, 2012).
- ⁱⁱ D. Urge-Vorsatz et al., *Best Practice Policies for Low Energy and Carbon Buildings. A Scenario Analysis* (Budapest, Hungary: Research report prepared by the Center for Climate Change and Sustainable Policy (3CSEP) for the Global Best Practice Network for Buildings, May 2012), <http://www.globalbuildings.org/global-projects/>.
- ⁱⁱⁱ B Boza-Kiss, S Moles-Gruoso, and K Petrichenko, *Handbook of Sustainable Building Policies. Composing Building Blocks* (United Nations Environment Programme (UNEP), 2013), <http://sustainable-buildings-policy-assessment-tools.net/Content/PolicyPackages/ENG/SPoD-final-ALL.pdf>.
- ^{iv} K. Managan et al., *Driving Transformation to Energy Efficient Buildings: Policies and Actions, 2nd Edition* (Milwaukee, USA: Institute for Building Efficiency/Johnson Controls, Inc., June 2012), <http://www.institutebe.com/energy-policy/Driving-Transformation-Energy-Efficient-Buildings2.aspx>.