

Global public-private approach to city-level acceleration of energy efficiency in buildings

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Abstract

More than half of the world's population already lives in cities. It is expected that within next 20 years this share will increase to two thirds. Cities consume 75 % of world's natural resources, accounting for more than two thirds of global energy demand and 70 % of global carbon emissions from the energy sector.

To accommodate future population and economic growth, energy use in cities is expected to increase exponentially during the next 25 years, with final energy use for space heating, cooling and hot water estimated to grow by at least 50 % globally. This puts cities on the frontline for cutting carbon emissions, making them key to meeting the targets of the Paris Agreement and Sustainable Development Goal 7: ensure access to affordable, reliable, sustainable and modern energy for all. However, city governments and stakeholders need tools and resources to improve the energy efficiency of buildings such as capacity building, national government guidance, and assistance in accessing funding for energy efficiency projects and policies – just to name a few.

The Building Efficiency Accelerator (BEA) under the Sustainable Energy for All initiative has created a network of cities and global organizations to tackle barriers to energy efficiency in buildings. The BEA provides technical assistance to municipal governments and supports policy and project development to accelerate energy efficiency in the building sector. As of March 2017, the BEA works with 28 cities around the world driving

policy change and market transformation towards higher levels of energy efficiency.

This paper presents the BEA's approach for city-level support throughout the policy development cycle: from commitment through to implementation and improvement. This approach distinguishes between different levels of engagement based on the city's needs and resources available. Work with cities is grounded on a global network of partners providing thematic expertise, support for stakeholder engagement, capacity building and creation of tools and targeted knowledge products for city governments. The paper describes the BEA approach and provides an overview of progress made in six selected cities to date.

Introduction

With more than half of the world's population already living in cities, and more than 80 % of people's time being spent inside buildings, it is clear that the urban built environment will have a huge impact on global populations for decades to come (Becque et al. 2016). Energy efficiency has been considered as 'the first fuel' and one of the most cost-effective ways to reduce carbon emissions and use of fossil fuels (OECD/IEA 2014). As two thirds of global energy demand can be attributed to urban areas according to recent estimates, cities are becoming the most important actors in driving energy efficiency improvements and implementation. Urban planning policies for energy efficiency are considered a crucial priority action for the global building sector in order to follow a sustainable energy path by 2050 (Dean et al. 2016).

However, cities often lack the resources to overcome institutional and financial barriers (IPCC 2007) to improve energy ef-

efficiency in the building sector. Cities around the world, especially in developing countries and emerging economies, need technical assistance from the international expert community and access to funding and financing opportunities in order to design and execute energy efficiency policies and projects. To address this, the global United Nations initiative Sustainable Energy for All (SEforALL) established the Global Energy Efficiency Accelerators Platform. This platform is a cross-sectoral multi-stakeholder network of public and private institutions and experts united under one goal: to double the global rate of energy efficiency improvement by 2030 (see Table 1) (SEforALL 2016).

One of the accelerators of this Platform – the Building Efficiency Accelerator (BEA) – is a public-private collaboration that turns global expertise into action to accelerate local government implementation of building efficiency policies and programs around the world. The BEA encourages partner cities to engage a broad set of stakeholders, supports dialogue to determine what the main local priorities and barriers are for building efficiency actions, and then provides technical resources to help cities implement the building efficiency actions they most want and need to pursue.

Background

SUSTAINABLE ENERGY FOR ALL

One of the key outcomes of the Rio+20 Conference on Sustainable Development in 2012 was the agreement to develop a set of Sustainable Development Goals. The UN General Assembly declared 2012 to be the ‘International Year of Sustainable Energy for All’ and launched the Sustainable Energy for All (SEforALL) initiative – the personal initiative of the UN Secretary General. SEforALL is a global coalition of public and private sector organizations, as well as civil society, based on three interlinked objectives:

- to ensure universal access to modern energy services (including electricity and clean, modern cooking solutions);
- to double the global rate of improvement in energy efficiency; and
- to double the share of renewable energy in the global energy mix (World Bank 2013).

To track the progress towards achievement of these objectives, the World Bank together with the International Energy Agency

established indicators, estimated the starting point for each of them based on the aggregation of the country level data, and arrived at global starting points and objectives for each indicator (see Table 1).

In 2015, the world’s leaders agreed on 17 Sustainable Development Goals (SDGs) (UN 2015b). SDG 7 aims at achieving access to affordable, reliable, sustainable and modern energy for all by 2030, including targets on universal access to modern energy services, increasing the share of renewable energy in the global energy mix and improving energy efficiency. These targets for SDG 7 are very much in line with the objectives of SEforALL (UN 2015a). In this regard SEforALL can be considered as a delivery mechanism for SDG 7.

The achievement of SDG 7 is essential for reducing energy-related greenhouse gas (GHG) emissions and limiting the increase in the global average temperature to “well below 2 °C above pre-industrial levels”, as declared in the Paris Agreement adopted by 195 nations at the 2015 Climate Conference of Parties (COP21) (COP21 2015).

Energy efficiency is often viewed as an essential first step towards a more sustainable energy future and it is often considered the ‘first fuel’ to emphasize its importance and significant potential (OECD/IEA 2014). About half of potential cost-effective energy savings required to stay on the pathway below 2 ° by 2030 are estimated to come from energy efficiency improvements (IEA 2015). Moreover, in addition to reducing the use of fossil fuels and related GHG emissions, energy efficiency results in many other benefits such as reducing fuel poverty, strengthening energy security, improving air quality, and improving health and productivity of inhabitants. (IEA 2014). Analysis shows that the realisation of SEforALL’s energy efficiency objective has synergies with the other two objectives: increasing the share of renewable energy in the energy mix by 2030 (IRENA and C2E2 2015) and opening opportunities for improving energy access (Pachauri, Urge-Vorsatz, and LaBelle 2012).

SEFORALL GLOBAL ENERGY EFFICIENCY ACCELERATOR PLATFORM

Acknowledging the significance of energy efficiency for addressing global energy-related issues, SEforALL launched the Global Energy Efficiency Accelerator Platform. The Accelerator Platform is ‘a public-private partnership programme established to scale up energy efficiency policy, action and investment, with the aim of doubling the rate of improvement in energy efficiency worldwide by 2030 (UN-World Bank 2016).

Table 1. SEforALL objectives and their indicators for tracking the progress.

	OBJECTIVE 1		OBJECTIVE 2	OBJECTIVE 3
Proxy indicator	Universal access to modern energy services		Double global rate of energy efficiency improvement	Double share of renewable energy in the global energy mix
	Percentage of population with electricity access	Percentage of population with primary reliance on non-solid fuels	Rate of improvement in energy intensity	Renewable energy share in TFEC
Historic reference 1990	76	47	-1.3	16.6
Starting point 2010	83	59		18.0
Objective for 2030	100	100	-2.6	36.0

Notes: TFEC – Total Final Energy Consumption. Source: World Bank (2013).



Figure 1. Six accelerators and their convening organisations.

The partnerships, or Accelerators, that make up the platform are working with national and sub-national governments and stakeholders to drive energy efficiency actions through implementation of policies and projects in six key sectors: buildings, lighting, appliances, district energy systems, transport and industry (SEforALL 2015).

Each accelerator includes numerous partner institutions from public, private, civil society sectors and academia. Partners collaborate on providing technical assistance to policy-makers at various levels of government and offer opportunities for government officials to engage with a variety of relevant stakeholders and experts. Through these exchanges, experts' knowledge of policy best practices, technologies, markets, financial instruments and implementation approaches can support the development of energy efficiency policies and projects.

Key institutions that convene the different Accelerators at the global level include: World Resources Institute, Johnson Controls, UN Environment Programme, Danfoss, Philips, FIA Foundation, UNIDO, Carbon Trust, and the International Copper Association (Cu). Many other organizations are active partners of one or more sectoral Accelerator, and Accelerators aid in the implementation of specific projects and policies at the national and local levels by engaging several organisations, companies, and other global experts and local stakeholders.

The Copenhagen Centre on Energy Efficiency (C2E2) in Denmark serves as the energy efficiency hub for SEforALL. C2E2 coordinates across the sectoral efforts of the Accelerators, ensuring effective communication, knowledge exchange, and exploration of cross-sectoral opportunities among them (UN-World Bank 2016).

Different Accelerators follow different approaches to working with countries, cities, partners and stakeholders. This paper focuses on the Building Efficiency Accelerator (BEA) and its model for working with cities in designing and implementing building energy efficiency policies and projects and tracking progress towards cities' commitments and the contributions of those commitments to national and global goals.

ENERGY EFFICIENCY IN BUILDINGS

Buildings are one of the most important aspects of modern life. People spend more than 80 % their time and activities in buildings of different kinds (WCM-Q 2016). Approximately 70 % of building energy use for space heating, cooling and hot water takes place in urban areas, making cities crucial places of action for improving the energy efficiency of the building sector (Urge-Vorsatz et al. 2012).

In emerging economies and developing countries, up to 80 % of the building floor area expected by 2030 – with new construction driven by growing population, rapid urbanisa-

tion and improving living standards – is yet to be constructed. Therefore, in these countries, the energy efficiency of new buildings is a crucial area for cities' policy development to ensure the sustainability of urban development.

In developed countries, where the majority of the building stock is already in place, energy efficient renovation of existing buildings offers one of the most significant opportunities to improve sustainability of the sector (Becque et al. 2016). The most recent analysis of various scenarios of urban energy use in buildings demonstrates that for highly urbanized regions, emissions from urban infrastructure may continue to grow unless cities invest in energy efficiency improvements, including retrofitting their existing built-up areas (Güneralp et al. 2017). Although the retrofitting of the building stock is very slow, large scale retrofitting of buildings is a key strategy to sustainably revitalising the economy with the development of a green construction economy underpinned by a healthy retrofitting industry (Campos et al 2012).

However, most new and existing buildings around the world are still constructed and renovated without substantial attention to energy efficiency, reinforcing the danger of locking in high energy consumption. In these cases, the potential energy savings available at no or low cost when a building is constructed or renovated is lost until the next costlier renovation cycle. At the global scale, such a lock-in risk in 2050 is estimated to be as high as 80 % (Urge-Vorsatz et al. 2012).

To avoid this lock-in effect and meet global goals such as SDG 7 and the Paris Agreement, there is a strong and urgent need to accelerate building efficiency action and establish markets that enable wide-scale implementation of cost-effective, low-carbon solutions in buildings (Becque et al. 2016).

The Building Efficiency Accelerator and its approach, discussed below, works at making such solutions available for different cities worldwide. Its global network of partnering institutions and experts, as well as effective communication channels and progress tracking framework, enable cities to learn from global experts, share experiences, learn from each other and lead by example.

The Building Efficiency Accelerator

GLOBAL PARTNERSHIP NETWORK FOR MARKET TRANSFORMATION

The Building Efficiency Accelerator (BEA) builds global and local partnerships of businesses, NGOs, and local governments that, through public-private engagement, create innovative platforms that can transform local markets toward more efficient buildings. BEA partners share best practice, leverage in-market experience and support cities aspiring to accelerate building efficiency policy and project action. Local policy lead-



Figure 2. Building efficiency accelerator program plan 2016–2017.

ers implement new policies, projects and track their progress in commitment to the SEforALL platform.

The BEA develops place-based and global partnerships, and helps align the supply and demand sides of the building efficiency market. The partnership incentivizes local leaders to prioritize implementation of efficiency strategies and through technical assistance to cities, including localized assessments of barriers and opportunities, enables local governments to actively drive forward the development of building efficiency policies and projects. This work at the subnational level to deliver demonstrable market transformation in cities creates a pipeline of projects and policies for investment.

The BEA offers assistance to partner cities and sub-national jurisdictions in the following key ways:

1. Prioritizing local needs and elaborating energy efficiency actions, which can respond to them;
2. Supplementing local capacity with global technical knowledge and resources over an extended period; and
3. Providing concerted, catalytic focus on energy efficiency improvement, uncovering common interests among many stakeholders beyond energy savings, that otherwise could be overlooked.

The BEA engage cities with the partnership in a variety of ways, shown for the 2016–17 program in Figure 2. The partnership first reaches out to a broad set of cities—at least 50 cities in 2016–17 – to build awareness. Then a subset of those cities – at least 30 in 2016–17 – join the BEA and commit to implement one building efficiency project and one policy, track progress, and share best practice. All of the 30 cities that sign up are provided tools and training to track and measure actions. A select group of “Deep Dive” cities in emerging economies – 6 in 2016–17 – are selected by the BEA Steering Committee. In these cities, a local partner receives funding to staff a local facilitated process to gather multi-stakeholder input and begin market transformation through public-private engagement and project development.

As of March 2017, the BEA has 28 cities committed to the partnership (see Figure 3), consisting of “inspiring” cities that have been pursuing building energy efficiency and are leaders already, and “aspiring” cities seeking to expand their sectoral focus and build capacity locally to implement and demonstrate action. The BEA aims to recruit at least 2 more cities in the first quarter of 2017.

The BEA is open to participation from all subnational governments with an interest in accelerating the pace of building efficiency actions and high-level political buy-in from the Mayor or other executive. Both inspiring and aspiring cities are partners to the BEA, with a focus on sharing successes from inspiring cities and building technical capacity in aspiring cities in developing and emerging economies.

The BEA also encourages cities to join that have a local partner or local presence of a global BEA partner that can lead or support the city’s engagement with the BEA. Organizations such as national Green Building Councils, ICLEI, Carbon Trust and WRI can serve as city liaisons and regional leads within the partnership. A private sector partner such as Johnson Controls can also fill the city liaison or regional lead role, acting as an impartial convener and offering technical solutions. These roles help the BEA provide more consistent, targeted support to BEA network cities even without deep dive engagement.

The presence of a local partner is a critical element for Deep Dive cities. Deep Dive cities’ focal points participate in the regular status calls organised by the BEA coordination team, where their progress, lessons learned and difficulties are presented and discussed together with other cities and international experts.

The BEA is a broad and deep partnership of policymakers, private sector companies, technical organizations, associations, NGOs, and international institutions (see Table 2). The partners each bring their networks and knowledge and act together in a “learning by doing” model to accelerate action, building efficiency policy commitment and project implementation efforts.

Many of the global partners in the BEA have deep experience in markets around the world, which reinforces the work

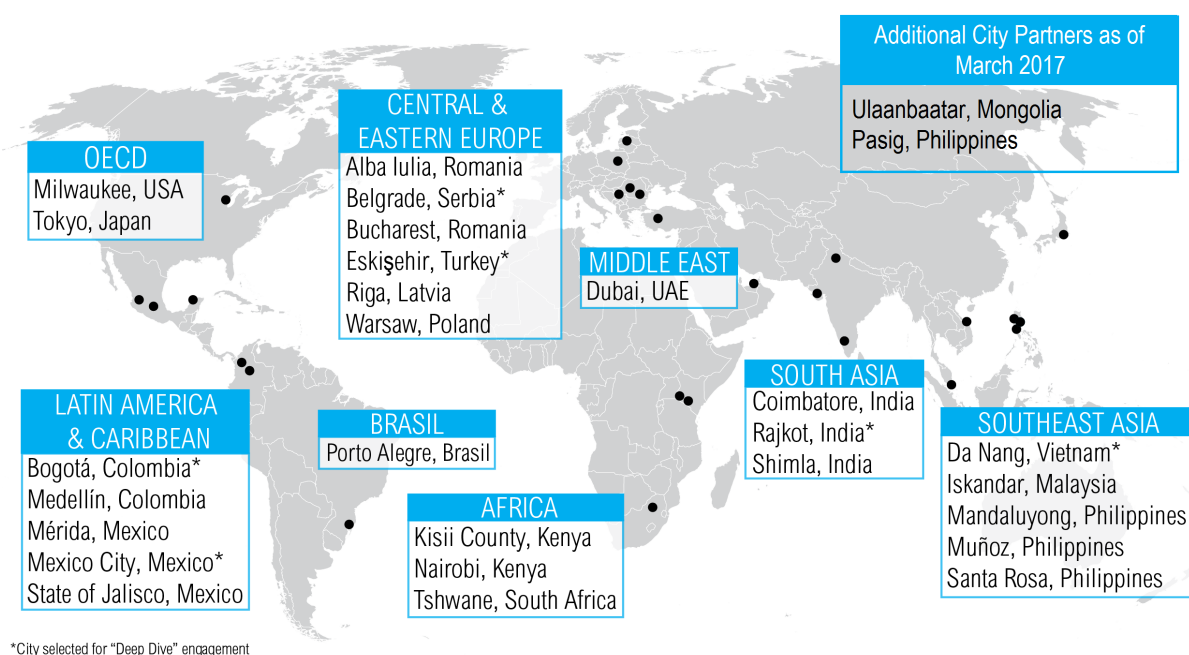


Figure 3. BEA participating municipalities as of March 2017.

Table 2. BEA global organizational partners as of March 2017.

NGOs/Associations/Multilateral Organizations	
100 Resilient Cities	International Finance Corporation – EDGE
Architecture 2030	Investor Confidence Project
Buildings Performance Institute Europe	Natural Resources Defense Council
Business Council for Sustainable Energy	UN Development Programme
C40 Cities Climate Leadership Group	UN Environment Programme
Clean Energy Solutions Center	United Nations Foundation
Copenhagen Centre on Energy Efficiency	US Green Building Council
Global Buildings Performance Network	World Bank Group – ESMAP
Global Environment Facility	World Business Council for Sustainable Development
Global Green Growth Forum	World Green Building Council
ICLEI – Local Governments for Sustainability	World Resources Institute
International Energy Agency	
Service Providers/Companies:	
Accenture	Ingersoll Rand
Alstom	Johnson Controls
The Carbon Trust	Philips
China Energy Conservation and Environmental Protection Group	Saint-Gobain
Danfoss	Schneider Electric
	TECNALIA

catalyzed through the BEA and leads to sustained action and market transformation. Bringing this broad and focused set of building sector experiences to subnational markets makes the BEA partnership unique.

The partnership has expertise in a broad set of technical competencies ranging from new building design to retrofit and equipment experience to design of building policies. This expertise serves as the backbone of the technical knowledge that helps cities accelerate action.

To capitalize on these competencies of global partners, the BEA has organized six thematic working groups (see Table 3) to curate existing resources, develop training packages, and de-

liver technical assistance to cities with selected policy or project actions in each thematic area. These working groups, each led by a different global partner, regularly organize thematic BEA webinars to explore various topics on energy efficiency in buildings in more detail and involve cities in the discussion of their practical experience in particular areas.

Through the BEA Working Groups and regional leadership roles, regional thematic, training and capacity building workshops support city activities and provide opportunities to share partner experiences. In 2016, the BEA held several in-person regional trainings including prioritization of participating cities' building efficiency activities in Singapore in

Table 3. BEA working groups and technical expertise.

BEA WORKING GROUPS AND TECHNICAL EXPERTISE	
BUILDING ENERGY CODES	Policies to enact building codes to establish minimum requirements of energy performance
ABOVE CODE & CERTIFICATIONS	Certification programs for green buildings that go beyond traditional minimum energy code requirements for buildings
FINANCE	Funding programs and financing tools to support and encourage building efficiency improvements
PUBLIC PROCUREMENT	Policies and actions to incorporate energy efficiency considerations into government procurement practices
RETROFITTING EXISTING BUILDINGS	Initiatives to renovate existing buildings to improve energy performance
TRACKING PROGRESS	Methods and tools to generate data, baselines, and record progress towards building efficiency goals

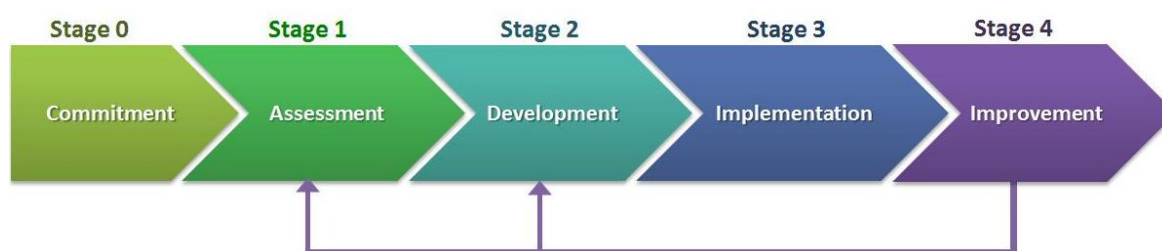


Figure 4. Building efficiency accelerator's city engagement model.

September, and code development for Philippine cities in December.

There is no fee for cities to participate in the BEA, and the partnership does not directly fund city projects or policies. The BEA works with cities to develop a pipeline of investable building efficiency actions, and to help prepare and link cities with funders and investors interested in supporting the development and implementation of specific building efficiency projects and policies.

APPROACH TO ACCELERATING BUILDINGS' ENERGY EFFICIENCY IN CITIES

The main idea of the methodological approach followed by the BEA is to establish a standardised model of engaging a city and relevant stakeholders to accelerate energy efficiency in buildings through policy and project development. The BEA can then help replicate this model in other cities that join the partnership.

This model has been developed by the BEA's coordinating team and includes five stages a city goes through when joining the BEA: commitment, assessment, development, implementation and improvement (see Figure 4).

There is also a progress tracking framework, developed by the C2E2 specifically for the cities engaged under the BEA, that follows these five stages. It includes key steps the city may take in designing its policies and projects on energy efficiency in buildings. It provides recommendations on how progress can be tracked in simple qualitative and, where applicable, quantitative ways for each of the stages. The framework also includes a reporting template, which city representatives can fill in and submit to the BEA to demonstrate their progress to date.

Stage 0 – Commitment

The process of working with the BEA starts with a city's commitment. The city commits to identifying and implementing locally-appropriate actions to improve energy efficiency in buildings. The BEA has identified three main components of the city's BEA commitment:

1. Pursue a new policy to scale energy efficiency in buildings;
2. Implement projects to demonstrate city leadership and build market experience; and
3. Track and report progress against announced building energy efficiency goals.

Stage 1 – Assessment

Once the commitment has been made, the city (with the help of the BEA and/or its partners) conducts a baseline analysis and identifies potential policy instruments that can be used to overcome existing barriers to energy efficiency. This should include stakeholder and expert consultations to ensure the key actors are aware of the opportunities and can support the development and implementation of energy efficiency policies and projects.

Based on the results of the analysis, the city's policy priorities, and the feedback received from local stakeholders, potential areas for policy interventions are identified. These areas may include, for example, implementation of building energy codes at the city level, introduction of building energy performance certification programs, development of capacity building and training programs, or utilisation of energy efficiency finance schemes to encourage investments.

Box 1. Stakeholder engagement

The BEA encourages the city to partner with key stakeholders to support the scale up of building efficiency activities, policies and projects. This provides the city with a variety of viewpoints about the priority building efficiency actions to take, and brings new and relevant knowledge, best practices and tools to the attention of local stakeholders in addition to policymakers.

To build a robust community of practice to support transformative change, strategic stakeholders are drawn from the following categories:

- Government (national, state, and municipal)
- Building technology and service providers (architects, contractors, product suppliers, etc.)
- Building owners, managers, and occupants
- Civil society/academia
- Financial institutions/investors
- Energy and water utilities

The BEA provides cities with a template for engaging stakeholders and soliciting their initial feedback on priority local building efficiency actions through an online market feedback tool, an in-person workshop, or a combination of these two approaches.

Once the city prioritizes one or more policy instruments to work on, they can perform an assessment of the local enabling environment for each one considering current market barriers, existing policies, opportunities for policy harmonisation with other jurisdictions, and existing global best practices. An effective outcome of the assessment stage is an energy efficiency policy roadmap that can be used to clarify goals, identify policy timelines and communicate the commitment.

Stage 2 – Development

The city uses the assessment findings to create a policy and project development process for selected policy instruments in line with the local context, priorities and availability of resources. The BEA offers technical assistance and support to the city through its partnership network. The BEA ensures that during this stage, key stakeholders are involved in setting both the process and technical requirements for activity development.

To enable policy harmonization and reduce policy development effort, adaptation of successful policies from other jurisdictions is often recommended. The BEA collects and shares resources and tools on best practices, case studies and guidelines, which can help in accelerating energy efficiency in buildings at the city level.

An effective outcome of the development stage is a medium-term work plan (12–18 months) including clearly-defined and mutually shared objectives, activities, and targets for the local activities of the BEA. For each of the three BEA commitments this typically includes an action package and a description of the supporting funding and process needed for implementation.

Stage 3 – Implementation

The city uses the outcomes of the development stage to formally approve and fund the building efficiency policies and initiate related projects. Once the policies are adopted, the enforcement and verification steps of policy implementation are also conducted during this stage in accordance with the work plan. An outcome of the implementation stage is the achievement of im-

proved energy efficiency in buildings as a result of the executed projects and implemented policies. In addition, data collected in the verification process helps the city clearly describe the locally-relevant benefits of the building efficiency actions and enables future policy improvement.

Stage 4 – Improvement

The city uses the data collected at the previous stage to identify process and technical improvements that can be used in future energy efficiency policy development. The work plan created in the Assessment stage (Stage 1) should be used in coordination with data collected through the verification element of Implementation (Stage 3) to update the work plan or initiate a new round of policy development.

DIFFERENTIATED NEEDS AND PROVIDED RESOURCES: NETWORK VERSUS DEEP DIVE

The cities committed to the BEA do not each require assistance at every stage presented in Figure 4, and the BEA and its partners do not have the resources to offer such in-depth support to every city. Therefore, in terms of the depth of its support, the BEA distinguishes between the broad group of BEA network cities and a few selected deep dive cities. For all network cities, the BEA assists on commitment, assessment, and development (Stages 0 through 2 of the process outlined above). The BEA helps all network cities to establish a commitment to the BEA and goals related to building efficiency. The partnership also assists all network cities to assess and prioritize actions through resources such as technical assistance, decision support tools, and peer exchange.

Such assistance aims to enable cities to continue through the development and implementation stages, while continuing to make use of the BEA's available global resources and partnership networks. The BEA complements existing networks of cities and facilitates engagement with private sector partners and technical experts. The city moves forward through the additional stages itself using the tools and, where needed, technical

advice from the BEA, its partners and peer cities through exchanging knowledge and sharing lessons learned.

For the deep dive cities, the BEA's engagement model presumes a much more detailed and active set of support and guidance throughout all the stages of the process presented in Figure 4. The BEA provides resources to a local partner in deep dive cities to enable locally-based staffing for a local partnership development process to shape and launch policies and project actions over an initial 18-month period.

The first round of BEA deep dive cities were selected by the BEA Steering Committee in May 2016 at the recommendation of the coordination team and network partners. The BEA considered several factors for selection, including high-level political commitment by the city, no local elections in the 2 years following the selection, strong local presence among BEA partners including a lead partner to facilitate action, geographic diversity, an assessment of the opportunity/challenges identified and the strengths of the partners to help address those specific needs, and finally the possibility for replication of the working process across other cities.

KNOWLEDGE SHARING AS A DRIVER FOR ACTION

Knowledge sharing is at the core of the BEA's approach to working with cities. This requires the cities to track, document and report on their progress against their goals and objectives to enable timely and effective adjustments and improvements. It also provides invaluable information to cities and global partners on lessons learned, best practices and practical solutions, which can be used and adapted by other cities in the network. Knowledge sharing helps cities to receive expert knowledge on a wide variety of topics free of charge and on a regular basis. Examples and practices shared by peer cities can inspire policy and project development and increase effectiveness of the local action as cities take into account the lessons learned by their peers.

To share information across the partnership network, the BEA uses several tools described below.

C2E2 Knowledge management system

Through the Copenhagen Centre on Energy Efficiency's Knowledge Management System (C2E2 2016c), the BEA has set up a series of curated resources (C2E2 2016a) on specific building efficiency topics that correspond to the six BEA Working Groups (see Table 3), as well as general resources, tools and case studies. These resources are freely available for any government or stakeholder seeking to work on building efficiency policies or projects. In addition, all BEA webinars (C2E2 2016a) are recorded and available on this platform.

Basecamp

To facilitate connections among the many BEA global partners and participating subnational governments, the BEA has an active Basecamp website for project management. This platform, available to all BEA partners and cities, enables participants to share and access materials, engage in dialogue, share upcoming events and webinars, and make connections on specific topics. With over 200 users on this Basecamp platform, cities share work plans and workshop outcomes (often available in a local language and English), access a calendar of events and webinars populated by global organizations, and can connect directly with technical experts as needed.

BEA website

Launching in March 2017, the BEA website provides an on-line platform that collates publicly available information for all BEA cities including their selected building efficiency actions (policy and project) to pursue with the BEA, results from the stakeholder market feedback activity where applicable, news items of workshops and engagement across the network, and any work plans, presentations, or other documentation of BEA-related building efficiency actions.

MODEL FOR REPLICATION: THE STORY OF MEXICO CITY

Commitment

Mexico City was one of the inaugural cities globally to officially join the BEA platform at the UN Climate Summit in September 2014 in New York City. The city, through the Secretary of Environment, quickly identified the two building efficiency actions they wanted to pursue: as their policy, to implement a building energy code, and as their demonstration project, to retrofit a set of public buildings. World Resource Institute (WRI), as a BEA partner with an established office in Mexico City and extensive relationships with the city and its Environment Secretariat, volunteered to act as the local coordinating partner. Dozens of other global BEA partners engaged and provided advice and assistance throughout the process in Mexico City.

Assessment

In March 2015, Mexico City held a workshop to mark the kick-off of BEA activities. One hundred policymakers, business leaders, and representatives of civil society joined to establish a joint vision and begin developing an action plan to implement a building energy code and complete energy retrofits on public buildings. The kick-off workshop received support from high-level officials in both national and local government, showing the importance of strong government leadership to reinforce the importance of building efficiency and integrate energy efficiency actions in the local political agenda. The local government has integrated the BEA project into Mexico City's Climate Action Program as an important element in achieving their climate change goals.

The workshop in Mexico City successfully motivated stakeholders from the public and private sectors, laying the foundation for the local partnership in Mexico City. The partnership comprises an advisory group and four multi-stakeholder working groups on: (1) local building energy codes, (2) finance, (3) retrofits, and (4) administrative actions. The main responsibility of the advisory group is to provide input and advice to ongoing BEA activities, balancing short term and long term goals. Each working group is led by two co-chairs, one representing the Mexico City government and the second from a partner business or non-profit organization. Each thematic working group is responsible for developing goals, recommending specific actions for the government to pursue, and providing technical support to decide and implement a locally-appropriate work plan for its action area.

Development

Working Groups met several times between March and September 2015 to discuss and finalize their recommendations to the government on energy codes and building retrofits. In

October, BEA partners presented their recommendations to Mexico City's Secretary of Environment. The Ministry of Environment approved the recommendations, and at the first-ever Buildings Day at COP21, on 3 December 2015, Mexico City Mayor Mancera announced a plan for energy code implementation in Mexico City.

Implementation

A series of events and workshops between January and October 2016 moved forward Mexico City's work plan under the BEA. Mexico's national Energy Conservation Code (building energy code) was formally announced in March 2016, paving the way for the adaptation and adoption of a new building energy code in Mexico City in June 2016. An implementation training was held in October 2016 for key government stakeholders from Mexico City, as well as two other cities, Mérida and Guadalajara, on the fundamentals of implementing a building energy code as a first step for helping these municipalities implement a related policy in their jurisdictions.

In the retrofits work stream, Mexico City published a procurement tender for energy audits of four public buildings in October 2016. The audits were completed in December 2016, and the retrofits are expected to begin in 2017. Simultaneously the city and its BEA partners have begun to develop a "buildings challenge," which will encourage owners of both public and private large buildings to track their energy use, set targets for improvement and take actions through capital investments or improvements in operations.

SCALING UP: THE BEA'S ACTIVITIES IN OTHER 'DEEP DIVE' CITIES

With the receipt of project funding from the Global Environment Fund, the BEA scaled up its activities in 2016, including through selecting and assisting additional deep dive cities. Building upon the Mexico City lessons and methods, the global partnership selected five new, diverse cities for deep dive engagement and a global BEA partner with existing local relationships to lead the engagement process in each. As of March 2017, all five of these cities had begun the BEA process through a kick-off stakeholder engagement workshop, the formation of one or more stakeholder working groups, and the drafting of an 18-month work plan.

Deep dive cities get a unique value from the BEA: dedicated support from one or more local partner experts brought in specifically to support the selected BEA actions. This full-time support is the key to acceleration of building efficiency actions in the deep dive cities, as this expert can ensure that the selected actions remain front and centre among the many competing priorities of a resource-stretched local government, while simultaneously building the technical expertise of and engagement among the local government and stakeholders.

Belgrade, Serbia

A large stock of Communist-era, multifamily housing provides homes to thousands of residents in Belgrade. Energy to heat 22 million square meters of homes and business, which cover roughly half the city, comes from a district heating system that pipes heat from central sources to individual buildings. City leaders have identified that better building insulation would lower energy costs for residents and the utility company, while enabling the expansion of efficient district heating throughout

the city. As its priority policy and project actions, the city and its BEA partners, coordinated by United Nations Environment Programme, have identified:

- Development of standardized technical and financial procedures for building retrofits that can be customized to each of the major building typologies found in the city. These procedures would eventually be applied in the city's building retrofit plan which is under development.
- Selecting one or more visible public or multifamily residential buildings that represent a common building type to demonstrate in the near-term feasibility and benefits of building energy renovations.

Bogotá, Colombia

As the nation's capital and largest city, Bogotá has significant local government capacity. However, because of limited experience with the topic, the local government lacks technical expertise to implement a new national building energy regulation or otherwise encourage more efficient construction. The city also has a focus on providing opportunity for all residents as it grows and redevelops, including an emphasis on sustainable development of new or revitalized districts. As its priority policy and project actions, the city and its BEA partners, coordinated by Consejo Colombiano de Construcción Sostenible (CCCS), the national Green Building Council, have identified:

- Local adaptation and implementation of national regulation for building construction, including energy, and integrating these into city master or district plans.
- Construction of a new private building within a master plan to apply the new regulation and demonstrate its benefits. The project may also be used to help identify financial or non-financial incentives to encourage construction that is more efficient than required.

Da Nang, Vietnam

Residents of Da Nang, Vietnam's third-largest city, face hot and humid weather, particularly in the summer. As the climate changes, heat waves could pose health risks to citizens in buildings without effective and efficient cooling technology. Because Da Nang's population is growing rapidly along with its industry and tourism, electricity demand, related pollution and strain on the grid are also growing. Da Nang's government has prioritized building efficiency as part of its new Resilience Strategy to address public health and economic risks from climate change. Local leaders are exploring creative ways to signal to property developers and building managers that efficiency is a public priority. As its priority policy and project actions, the city and its BEA partners, coordinated by the City of Da Nang's Climate Change Coordination Office in cooperation with 100 Resilient Cities, have identified:

- Developing a directive with building efficiency standards and incentives.
- Implementing energy efficiency solutions for a hotel as a demonstration project in instil leadership and energy management practices in the tourism sector.

Eskişehir, Turkey

Home to Europe's largest university, Eskişehir has a knowledge-driven economy, and values creating liveable spaces as it grows. Eskişehir is currently pursuing multiple district redevelopment projects to improve construction quality and public spaces. Demand from Turkey's national government for better energy performance has placed pressure on building owners to improve efficiency. The city wants to improve its buildings while also protecting the city's character. As its priority policy and project actions, the city and its BEA partners, coordinated by WRI Sustainable Cities Turkey, have identified:

- Assisting with the implementation of national-level mandate for energy performance certificates for all large buildings.
- Including building efficiency measures in one or more planned district-scale urban transformation projects.

Rajkot, India

One of the fastest growing cities in the world and a national leader in general low emissions development planning, Rajkot is beginning to expand its activities on priority sectoral actions, including building efficiency, to reduce emissions and improve services. Fast growth and the economic opportunities available in the city has heightened the need for affordable housing. As its priority policy and project actions, the city and its BEA partners, coordinated by ICLEI South Asia Secretariat, have identified:

- Incorporating India's Energy Conservation Building Code (ECBC) and a new requirement for solar hot water systems for certain buildings into construction regulations and incentives.
- Integrating building efficiency standards into social housing development.

Conclusion

The Paris Agreement has set a goal crucial for the planet to limit the global temperature increase, and it has put a spotlight on cities as the focus of policy agendas and scientific analysis given the immense urban opportunity for sustainable energy. The importance of cities around the world should not be underestimated: understanding the benefits of energy efficiency improvements for the environment and society, more and more cities strive to lead by example and implement sustainable energy actions. While there are great examples of cities that have been already very active in this field (C40 2014), the number of jurisdictions that still need substantial technical assistance to accomplish this challenging task remains significant.

This paper has presented an approach for engagement and work with cities on improving the energy efficiency of their building sector under the Building Efficiency Accelerator (BEA), which is part of Sustainable Energy for All Global Energy Efficiency Accelerator Platform. Through its global network of partners from the public, private, and civil society sectors, the BEA is localizing building efficiency assistance for cities to design and implement energy efficiency actions in buildings.

As of March 2017 there are 28 BEA cities from different parts of the world, all committed to implementing building efficiency actions through at least one building efficiency policy, one building efficiency project, tracking their progress and sharing lessons with other cities and partners.

Mexico City was the first deep dive city, joining the BEA in 2014 with a strong motivation to implement a building energy code at the city level and carry out an energy efficiency renovation project covering several public buildings. The process the city has undergone so far during its first two years of collaboration with BEA partners is a success story and a model for replication in other cities. To date, the BEA is guiding five more cities through a similar deep dive process, taking into account their local context and priorities. The paper has presented concise snapshot stories about the work in each of these cities.

While 2016 was a year of planning and prioritization for the BEA, 2017 will be focused largely on implementation in partner cities. The global partnership is excited to see impacts already in both network and deep dive cities on engaging stakeholders and prioritizing building efficiency actions, and will continue to disseminate findings as the BEA ramps up implementation in 2017. Just as the SEforALL goal is to double the global rate of improvement of energy efficiency by 2030, the BEA plans to continue scaling up the work and lessons from this first set of partner cities to increase the impact of the partnership. As more cities join and create strong regional networks, there is a significant opportunity for economies of scale through continued and scaled-up national and regional collaboration among partners and.

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