

DRIVING TRANSFORMATION TO ENERGY EFFICIENT BUILDINGS

Policies and Actions: 2nd Edition

Taking Action

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FOREWORD

Current projections indicate that 70 percent of the world's population will live in cities by 2050. Buildings form the fabric of these rapidly growing urban landscapes. Sustainable development objectives can only be met if we increase the energy and resource efficiency of our buildings, aligning economic, social, and environmental objectives

The UN Sustainable Energy for All initiative aims to double the global rate of improvement in energy efficiency by 2030. This goal is achievable; however, the scale and pace of current actions around the world are insufficient to transform buildings into engines of the sustainable, energy efficient economy. Government policies can accelerate the rate of growth in energy efficiency in buildings.

This report reviews policy options that can accelerate those energy efficiency improvements and introduces a building efficiency policy assessment tool that provides a simple framework to help decision-makers set policy priorities through dialogue and input from key stakeholders.

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TAKING ACTION

Getting Started

Designing a Financial Pathway

Private Sector Role and Perspective

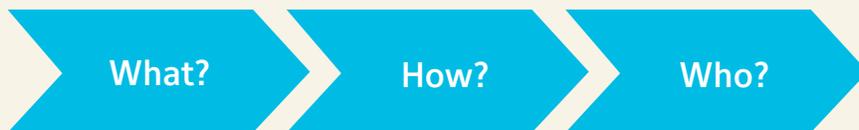


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GETTING STARTED AND TRACKING RESULTS

A central question for many policymakers is: **How to get started?** No universal approach exists to design a policy pathway for delivering building efficiency. Policymakers can meet building efficiency objectives through a wide array of policy tools and mechanisms. Governments can take advantage of the multiple lessons from pioneering efforts and modify them as needed to apply to their local circumstances.

The nature and depth of a policy package will vary depending on the national objectives, the institutional conditions, and the market structure, among other factors. For example, in some cases, a national objective may be to increase the efficiency of new buildings, whereas in other instances the priority may be to retrofit the *existing* building stock. One possible way to organize the process that leads to a long-term policy pathway is to address some core questions.



WHAT? PRIORITIZING POLICY OBJECTIVES AND INSTRUMENTS



Scoping

A potential first step is to **assess** the institutional and legal setting, the data availability, and the key stakeholders. Ideally, this scoping exercise is done for each segment of the building's market (residential/commercial, new/existing), and also for each key phase of the building lifecycle. It is also necessary to examine first-order obstacles to building efficiency, as this informs the selection of a set of countervailing measures (and incentives for change) that can overcome context-specific barriers.



A central question policymakers face is how to get started with building efficiency actions and policy development. Policymakers may organize the process into three related categories:

- **What?** Prioritizing policy objectives and instruments
- **How?** Defining the sequence to support policy implementation
- **Who?** Creating a framework to deliver effective governance

To confirm that policy goals are being met, policymakers should include in their planning the metrics and evaluation approaches for tracking progress over time.

At the building level, there are protocols already established for measuring and verifying energy upgrades made in buildings that can help build confidence and reduce risk to owners and managers.

At the tenant level, new displays, dashboards and computer/phone applications can provide analysis of energy use in tenant space as well as in entire buildings.

Targets

The scoping phase focuses on the selection of objectives and targets. Countries and cities can choose to set broad targets in terms of, energy savings, CO₂ reductions, or other specific benefits. These broad targets – for example, reducing government building energy consumption by 20 percent over 10 years – need to be filled in with detailed interim milestones and targets and must include an action plan to support implementation. National and sectoral baselines can be useful in selecting targets. In order to facilitate implementation, any target should be stated simply and should be straightforward to monitor. Common options are:

- Defined improvements in performance (GWh or CO₂)
- Intensity (energy consumption or CO₂ emissions per unit of economic activity)
- Benchmarks (energy consumption or CO₂ emissions relative to others)
- Transactional (number of buildings constructed or retrofitted or compact fluorescent lamps installed)

Once a target is chosen, it is necessary to set a clear **time frame** – for example, annual, mid-term (5–20 years) and long-term (20+ years) targets with interim reviews. When defining the **scope** of the targets, a choice should be made early on: Will the strategy focus on the design and construction of new buildings? Will it tackle retrofits? Will it combine both? A key element that will affect the implementation of the policy strategy is the **level of aggregation**: Who in the lifecycle of buildings will be the targets of the policy intervention? Common options include the construction company, energy service provider, building owner, or manager of public and commercial buildings.

Priorities

Designing a strategy to transform the built environment to be more energy efficient is not a simple process. No single government policy can drive the transformation on its own, but a combination of policies can help transform buildings to be far more energy efficient over time. The Building Efficiency Policy Assessment Tool, presented in the section by that name, provides a simple framework to help decision-makers set policy priorities with input from stakeholders.

The Building Efficiency Policy Assessment Tool supports a collaborative process for exploring building efficiency policy options based on the local importance of each policy option and the relative difficulty of achieving it, as well as the current policy status and a vision of the suite of policies that would best foster energy efficiency implementation. The tool includes a facilitator's guide for how to run a workshop, along with templates and analysis tools. The workshop is designed to support consensus-based, multi-stakeholder collaboration and uses visual tools to build consensus and prioritize building efficiency policy options and strategies.

As decision-makers set policy priorities, they should begin with an analysis of the barriers to energy efficiency in their market or country and match the policy options that address those barriers. One way of doing this is to match the first-order barriers that were identified with the most appropriate policy solutions. A hypothetical example is offered in Table 1.

Table 1.
Policies Enable the Market to Overcome Specific Barriers to Energy Efficiency

BARRIERS		Codes	Targets	Awareness						Incentives				Utilities				Capacity Building					
		Building Energy Codes Appliance and Equipment Standards	Building Efficiency Target Government Procurement	Data Collection and Baseline Development	Competition and Awards Programs	Audits - Voluntary and Mandatory	Rating and Certification Programs	Disclosure of Performance	Public Awareness Campaigns	Grants & Rebates	Risk mitigation guarantee	Revolving Loan Fund	Energy Performance Contracting Enablers	Tax Incentives	Tax Lien Financing	Utility Public Benefit Fund	On-bill Financing	Revenue Decoupling	Advanced Metering Infrastructure	Time-based Pricing	Demand Response	Direct Technical Assistance	Workforce Training
Market	Split incentives																						
	Transaction Costs																						
	Dispersed Market Involving Many Sectors																						
	Price Distortions in Energy Market																						
Financial	Up-front Cost, Constrained Budgets																						
	Perception of Investment Risk																						
	Low Financial Institution Awareness																						
	Lack of External Finance																						
Technical	Small Transaction Size																						
	Lack of Technical Capacity in Market																						
Awareness	Lack of Affordable Technology in Market																						
	Lack of Information about Energy Performance and Improvement Opportunities																						
Institutional	Low Government Capacity on New Policy																						
	Inter-agency Coordination Challenges																						
	Little Public-Private Coordination																						

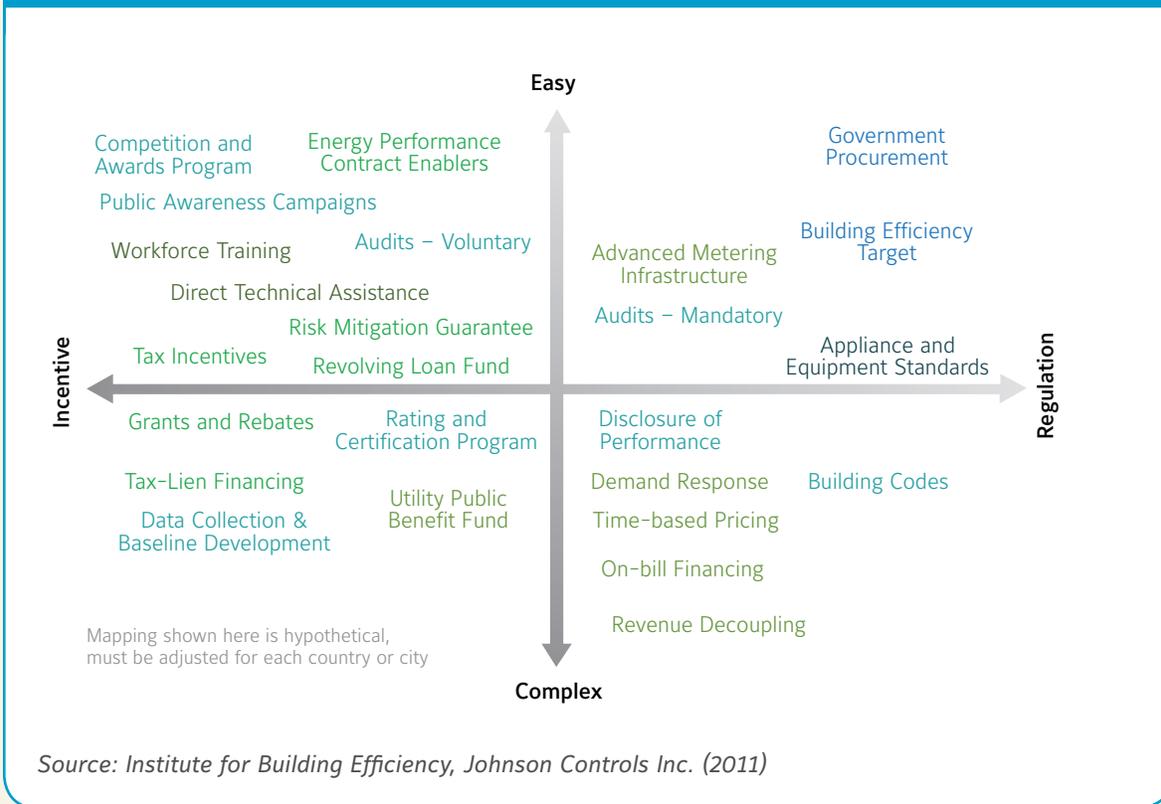
Source: Institute for Building Efficiency, Johnson Controls Inc.(2011)

The Building Efficiency Policy Assessment Tool generates a map of difficulty vs. importance for each of the policies, thereby showing easy and important policies that might make good starting points, and difficult yet important policies that might make good long-term goals. In addition to the analysis of difficulty vs. importance, difficulty might be mapped against other policy attributes. In particular, policymakers might analyze the pros and cons of using incentives versus mandatory requirements (carrots versus sticks) to achieve the right balance and promote complements. Figure 2 offers a potential categorization of the most common policy options and instruments in use today.

The horizontal axis captures the diversity of options that exist when policymakers need to choose between *regulation*, which offers a strong signal when efficiency goals need to be met by a certain date; and *incentives*, which can improve market transparency and motivate voluntary changes in energy consumption. Ideally, the goal is to make both types of instruments reinforce each other.

The vertical axis captures the ease or complexity associated with each of these policies as they are developed and/or implemented. Each country, state or city that aims to develop a building efficiency policy needs to examine the viability of each priority option under the local circumstances. For the initial phase, it is necessary to go through a careful selection of initial measures that can be positive starting points, building confidence and demonstrating the *feasibility* of building efficiency policy.

Figure 2.
Illustrative Trade-offs Among Policy Options



HOW? DEFINING THE SEQUENCE TO SUPPORT POLICY IMPLEMENTATION



Action Plan

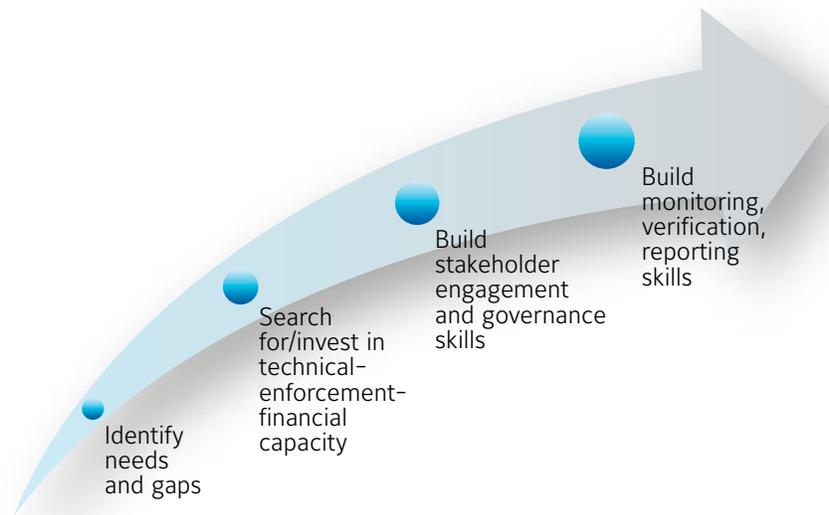
Complementing the guiding objectives with an action plan is the first step in the transition to implementation. In some instances, countries have designed ambitious national strategies (e.g. sustainable development or climate action) but lack the *executive roadmap* that will guide actions on the ground. An action plan is based on a set of performance indicators that allow policymakers to assess progress over time. How to track progress is a fundamental task and will be addressed separately.

Capacity

An early identification of capacity needs can inform the definition of a package of technical assistance on aspects related to enforcement, legal affairs, and technological issues. The

effectiveness of implementation and the assessment of performance depend, to a large degree, on the quality of training of the staff working on enforcement. Building the right capabilities takes time and requires an explicit plan with the right allocation of funding. International cooperation programs can play a catalytic role in helping developing countries build the right capacities.

Figure 3.
Building Local Capacity: A Suggested Pathway



Source: Institute for Building Efficiency, Johnson Controls, Inc. (2011)

Finance

The design of a policy package will benefit from paying specific attention to the finance dimension of the actions the government will mandate or incentivize. Will private capital be leveraged? If so, how? What public-private partnerships will be necessary to finance building efficiency? Some governments may map the pools of capital that could be mobilized: public and private, local and international, grants and loans. Ultimately, the objective of this exercise is to identify potential financing gaps and to understand the link between these gaps and the pace of implementation. (How to build a financial strategy is treated in the section on Financial Pathway).

WHO? CREATING A FRAMEWORK FOR DELIVERING EFFECTIVE GOVERNANCE



Institutions

Experience from OECD countries that have implemented energy efficiency policies shows the difficulties associated with intra-governmental agency coordination. Coordination within and among ministries does not always occur, and once one ministry sets a policy, ensuring policy coherence at other levels of government may pose challenges. In order to tackle institutional challenges and ensure that the right capacities are in place, it is necessary to specify *key roles and players* early on.

Stakeholders

In tackling institutional challenges, it is helpful to adopt a proactive approach to engaging the relevant players in delivering building efficiency. The creation of multi-stakeholder processes is necessary before and during the policy design process. Buy-in from critical players is likely to bring benefits in the long term. Engaging incumbents is also necessary.

Without formal mechanisms for collecting private-sector feedback with respect to policy options and finance, these measures are unlikely to have buy-in. Lack of buy-in, in turn, may harm the prospects of private investments in efficient buildings. The process will vary from country to country. The common task, however, is to tailor an institutional roadmap with explicit steps for engaging stakeholders and to understand their roles at different stages of a building's lifecycle.

Governance

When energy efficiency policies fail to deliver their full potential, it is most often because little attention was paid to the governance underpinning the implementation. In order to define a governance framework, it is necessary to define *who* within government will be responsible for what parts of the action plan. The responsibilities need to be set at different levels and must be explicit and transparent. The institutional responsibility of the monitoring system also needs to be planned at the outset. Often in developing countries, the capacity for monitoring is limited, and good governance and a system for gradual improvement may play a critical role.

TRACKING RESULTS

To confirm that policy goals are being met, policymakers should include in their planning the metrics and evaluation approaches for tracking progress over time. The results of building efficiency actions can be tracked at the city or national level or the individual building level.

Performance tracking offers a key area for combining know-how in the assessment of energy savings at the building level (M&V) and in the assessment of policy, called Measurement, Reporting and Verification (MRV) in the case of the UN Framework Convention on Climate Change. In some buildings, new technologies are also enabling individual tenants to track, in real time, their energy use and their progress toward energy efficiency goals.

Tracking progress at the policy level

Up-front planning for how policy performance will be tracked over time is essential in order to confirm that building efficiency goals are being met. Several methodologies are available to help policymakers assess progress: Are the policies and measures in place delivering the energy efficiency objectives? As a starting point, policymakers in national and city governments could build a tracking system using some or all of the following tools:

- **Policy impact studies.** An independent assessment is carried out to assess a specific policy at the national, provincial or city level. There are many examples of this type of macro-analysis, often in the form of comparative or benchmarking studies. These assessments play an important role as governments try to justify publicly a particular policy or budgetary contribution needed to achieve energy savings objectives. There is still an ongoing debate on who should lead the verification of performance: Should it be done in-house or through third parties? For example, in the United Kingdom, a Committee on Climate Change was created as an *independent* body under the Climate Change Act of 2008 to assess U.K. performance in meeting its climate targets and annual carbon budgets, and to disclose the results to the public on an annual basis.¹
- **Energy consumption surveys.** These surveys take a sample of buildings, analyze their energy-related characteristics, energy consumption and expenditures, and extrapolate the results to represent the entire population of buildings. The process helps track progress toward energy efficiency goals. One example is the survey of commercial buildings that the U.S. Energy Information Administration has conducted for 30 years.²
- **Assessments by utilities or government agencies.** Utilities and government agencies have developed evaluation, measurement and verification using an array of methods to assess energy savings from their policy efforts and thus demonstrate good stewardship of ratepayer and taxpayer funds. California, for example, has developed several detailed protocols.³

The ambition and scope of a monitoring system will vary depending on the policy choices each country makes, such as *geographical scope* (national, sectoral or city performance), *time frame* (short, medium or long term) and *level of aggregation* (performance at the building unit or aggregated information according to types of buildings: public, commercial, residential). Consequently, a variety of tracking systems will *co-exist* internationally before a standardized set of best practices is identified.

Adding impetus to the search for best practices in tracking performance in developing countries is the commitment by developing countries in the United Nations context to monitor, report and verify emission reductions associated with nationally appropriate mitigation actions (NAMAs). Because there is no universally accepted methodology for designing MRV systems, countries are still in the pilot phase, and many are requesting financing for building capacity in this area.⁴

Tracking progress at the building level

Protocols already established for measuring and verifying energy upgrades made in buildings can help build confidence and reduce risk to owners and managers. *Uncertainty of savings* is one of the key barriers to individual building energy efficiency projects, especially among practitioners in emerging economies, according to the 2011 Global Energy Efficiency Indicator (EEI) survey.⁶ As a result, a central challenge in developing a credible system for tracking results is to conduct assessments of energy savings by using methodologies that relevant stakeholders find reliable.

At the building level, measurement and verification (M&V) of energy savings is the process of "quantifying a reduction in energy use, peak demand, greenhouse gas emissions, or some other quantity, usually resulting from a program or project."⁷ Because M&V plays a key role in scaling up energy efficiency and carbon reduction, decision-makers in governments and the private sector are paying increasing attention to these activities. The basic concept behind all types of M&V is the comparison between *actual* and *business-as-usual*

Box 1. Common Carbon Metric⁵

This metric aims not only at measuring, reporting, and verifying energy savings but also greenhouse gas emissions (GHG). The metric can potential to provide a international measurement for both policy and individual building's GHGs. The International Organization for Standardization is considering adopting the Common Carbon Metric as the international standard.

What does it do?

- CCM defines buildings using the UNFCCC building typologies.
- CCM provides two key metrics, the first on **energy** (kWh/m²/yr) and the second on **climate** (kgCO₂e/m²/yr and kgCO₂e/occupant/yr)
- It combines a bottom-up and top-down approach to measurement.
 - Top down: performance of a whole region or nation performance based on estimated data on fuel and electricity consumption.
 - Bottom up: performance of individual buildings. The bottom-up data can then be used to verify the accuracy of the top-down approach.

How is the Metric evolving?

- Pilot Phase 1: To road test the methodology, developed consensus methodology using 9 country participants and 49 buildings on several continents.
- Pilot Phase 2: More building types were included and work was done to improve the comparability of top-down and bottom-up calculations. Eighteen countries participated.

Source: www.unep.org

consumption. In practice, calculating the baseline – what would happen if the project had not been done – poses one of the biggest challenges for M&V.

The specifics associated with different levels of M&V – stakeholders, practical limitations of the measurement, and the right methodology – will vary considerably depending on the nature and scope of the project. At the building level, international organizations have focused on standardizing approaches to measuring and verifying the performance of energy efficiency, and development of standards and guidelines has increased in recent years. For example:

- **The International Performance Measurement & Verification Protocol (IPMVP)** offers best-practice techniques for verifying the results of energy efficiency, water efficiency, and renewable energy projects in commercial and industrial facilities. It is supported by the Efficiency Valuation Organization⁸ and has worldwide application. It provides four M&V options depending on the *scope of the project* (single piece of equipment or whole building), *predictability of savings* (climate sensitivity, operational factors) and the *availability of data*.⁹
- **The Sustainable Buildings & Climate Initiative** is a partnership led by the U.N. with public and private stakeholders in the building sector. It developed the Common Carbon Metric (see Box 1), which consists of a calculation that defines MRV for energy savings and greenhouse gas emissions associated with the operation of buildings in particular climate regions. It is designed for national, regional, and local governments.¹⁰
- **The U.S. Department of Energy's Federal Energy Management Program (FEMP)** offers guidelines for U.S. government decision-makers conducting M&V of energy, water, and other efficiency projects.¹¹ The FEMP guidelines are a cornerstone of the Energy Savings Performance Contracts program¹² for retrofits of U.S. government facilities.

Tracking performance at the tenant level

In some buildings, new technologies are also enabling individual tenants to track, in real time, their energy use and their progress toward energy efficiency goals. In the case of M&V of building performance and consumer behavior, scalable and rigorous practices will rely especially on:

- **Standardization**, which continues to improve and gain wider acceptance (although more work is needed at the national and international levels¹³).
- **Metering**, such as smart metering that makes M&V simple and scalable.
- **Automation and controls technology**, which enables consumers to approve automated controls for simple everyday needs.

It is precisely the improvements in M&V hardware that help scale up energy efficiency efforts, thus helping countries, cities and companies meet mitigation objectives.

Over the long term, consumer behavior can help decide the success of energy efficiency initiatives. Real-time information about energy usage and pricing can lead to different decisions by consumers.¹⁴ Utilities in several developed countries (and increasingly in developing countries) have designed a variety of approaches to engage energy users including

smart meters. Rolling out advanced meters and improving the resolution of customer energy data creates valuable customer information. New technologies can help turn this data into a driver of greater efficiency by providing consumers with better energy information. Choices include real-time monitoring systems and monthly comparative reports using neighbors and peers.

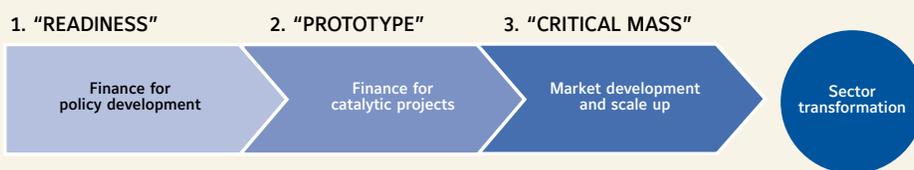
REFERENCES AND RESOURCES

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2. The Commercial Buildings Energy Consumption Survey is available on the Energy Information Administration's website. 2011. <http://www.eia.gov/>
3. The California Public Utilities Commission (<http://www.cpuc.ca.gov/puc/>) discusses common approaches in the U.S.
4. One example is the World Resources Institute's Measurement and Performance Tracking (MAPT) initiative to build capacity in Brazil, Colombia, Ethiopia, India, South Africa, and Thailand in the design and implementation of national measurement and performance tracking systems. See <http://www.wri.org/project/low-carbon-development/measurement-and-performance-tracking>
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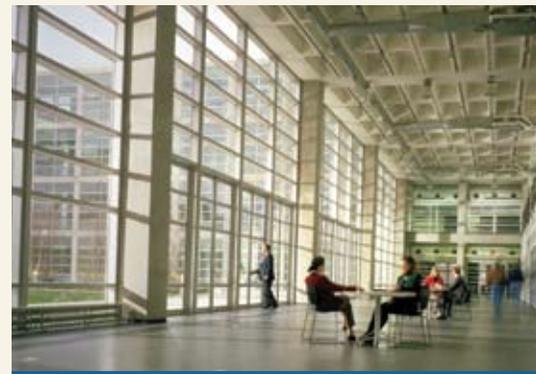
DESIGNING A FINANCIAL PATHWAY

Investing time and resources in design of a financial pathway is critical to successful implementation of climate actions for the built environment. Without a quality financing strategy, these actions are unlikely to deliver change. One possible starting point in designing a financial pathway for a country or a city is to define the objective of the financing at different phases. What exactly is being financed at each phase? The figure below proposes a framework for addressing this question:



1. An initial and essential phase tries to mobilize **financing for policy development**. Because a market might take years to create, it becomes decisive to invest resources in setting the right conditions during the early stages of policy design (e.g. a sectoral approach for the built environment rather than isolated projects).
2. The next phase happens in the early stage of implementation and focuses on **financing catalytic projects** – a mix of priority policy options (e.g. standards) and financing mechanisms to enable the most promising projects to catalyze public and private capital. The goal is to create local precedents, build confidence, and demonstrate that building efficiency is **financeable**.
3. In a more mature phase, the focus is on further **market development and scaling up**. Critical mass is gained by adjusting financial mechanisms and creating new ones, depending on local market dynamics.

International support from the United Nations Framework Convention on Climate Change (UNFCCC) and other international aid programs may be structured to provide support at any of these phases. Because all three phases are crucial to driving a transformation to energy efficient building, support should be provided for each phase with an understanding of the priorities and needs of the other phases.



There are three critical phases in developing **financeable** energy efficiency programs

Readiness – defining the policy pathway and capacity building needed to support conditions that will enable the market to scale up over time.

Prototyping – support for financing initial projects and actions

Critical mass (going to scale) – because there are financial barriers, even developed economies need to continue to focus on the financing mechanisms to scale up the market. The 2011 Global Energy Efficiency Indicator survey shows that rebates and incentives continue to be important at each phase.

To start policymakers can **define the objective** of each critical phase (readiness, prototyping, and critical mass).

Securing financial support for policy development is critical; policymakers need to design actions that are **financeable** in the short, medium, and long run.

Efforts to finance building efficiency programs are on the rise. The challenge ahead is to ensure that these financing efforts are scalable and reproducible.

The building market has many sectors that need to be transformed, including single-family homes, multi-family residences, commercial office space, hotels, schools, malls, government buildings, and hospitals. Investing in a sector-specific strategy that moves the sector through these three phases can be a valuable way to focus attention and to support that sector's transition.

1. READINESS: FINANCE FOR POLICY DEVELOPMENT

The first area for financial support is in the readiness phase, which includes policy development and design as well as human capacity development. The goal in this phase is to develop policies and capacities to support conditions that will enable the market to scale up over time.

Support from international development institutions can be helpful in formulating policy, designing efficiency programs and actions, establishing an energy efficiency agency with

Box 1.

Building Efficiency Measures in Jakarta

Indonesia's new building codes were developed with direct technical assistance from the International Finance Corporation (IFC) by analyzing cost-effective ways to get an average 30 percent energy savings in new buildings.

Sensitivity analysis of energy efficiency options for Jakarta shows that energy savings of more than 30-40% can be achieved from simple measures.

High Impact Measures	Office	Retail	Hotel	Hospital	Apt.	School
 Photoelectric controls (inclusion of controls to maximize daylighting)	18%	11%	NA	17%	NA	10%
 Solar shading (addition of horizontal and vertical devices)	17%	11%	18%	18%	8%	2%
 Glass performance (higher solar and thermal properties)	15%	6%	16%	14%	11%	5%
 Efficient Chillers (higher chiller COP)	11.4%	8%	6%	7%	9%	12%
 Variable-speed drives (inclusion of variable drives on pumps)	9%	3%	3%	5%	0.0%	0.0%
 Percentage glazing (limiting window-to-wall ration of the facade)	8%	4%	9%	7%	2%	0.0%
 Low-energy lights (limiting the power density for artificial lighting)	7%	8%	7%	16%	6%	5%
 Thermostat Management (limiting the minimum temperature)	2%	3%	3%	7%	6%	11%
 Heat Recovery (adding heat recovery unit to fresh air inlet)	2%	5%	3%	8%	0.0%	0.0%

Source: Prashant Kapoor, IFC Green Building Strategy, World Bank Group, Washington D.C. (2011)¹

the expertise to develop and implement new energy efficiency policies and programs, and facilitating stakeholder involvement. Greater human capacity and technical expertise can be built in areas such as data collection and analysis, policy and program development and implementation, and policy and program evaluation.

One task that requires attention among policymakers is the design of a sectoral strategy for the built environment that is *financeable*. Without considering the financing element explicitly, the risk is that many actions may never be implemented. The design of a specific finance strategy will benefit both the government and the private sector, to the extent that it delivers a clear long-term plan with clear signals for the many stakeholders involved in the building cycle.

Policy design needs to consider how public policy can *attract private- and public- sector* capital into building efficiency. The creation of these linkages will vary geographically, but one feature is common: the need for a mix of *requirements* to use energy efficiently. These include building codes or energy efficiency targets for the country, and *incentives* for good performance. Legal requirements or voluntary actions alone are unlikely to create a market at scale; the challenge for policy design is to find a balance between the two.

2. PROTOTYPING: FINANCE FOR CATALYTIC PROJECTS

The second area for financial support lies in the financing of projects and programs in the market itself. For a policy or program to enable the building efficiency market to scale up, it should focus on investments in policies and programs that structure the market in a way that allows for more rapid market development.

In order to transform a sector, a scalable financing model is necessary. Buildings tend to have high up-front costs and low operating costs because of efficiency gains that lower the total cost throughout the building's life cycle. For this reason, much of the public debate on energy efficiency finance deals with the question of *cost optimality* – how best to address the cost curve of projects over the life of the building.²

Lessons from experiences in energy efficiency finance in developing countries point to the importance of adopting an *investment-grade* approach to low-carbon energy policy to ensure that the country or city offers enabling conditions for investors, both local and international.³ Without the right investment conditions, international capital may never be deployed, even if the policy package is technically sound.

The financing of energy efficiency projects can use a variety of mechanisms, such as grants, tax measures, and special-needs funds. The question for many governments in developing countries is how to achieve the best mix of mechanisms, and of *domestic* and *external* sources of financing. Thus far, the examples of energy efficiency finance in the built environment rely on international support at least in the initial phase. As middle-income economies increase their appetite for investing in energy efficiency, many of them are requesting credits from multilateral development banks. As a result, experimentation with financing mechanisms is ongoing.

In practice, many developing countries, for example China, are using energy service companies (ESCOs) as a mechanism for financing energy efficiency in the built environment. It is still early to draw definitive lessons, but the performance of these mechanisms might offer valuable insights into what works and what does not in practice. The case of Mexico (Box 2) illustrates a programmatic approach to financing energy efficiency measures in housing.

A core challenge for policymakers in developing countries is to build a financial strategy that attains critical mass, going beyond the financing of isolated projects. The focus of banks and cooperation programs tends to be on the financing of pilot projects. As a result, the challenge for policymakers who want to transform a sector is to create credible signals through mechanisms that boost investment in the sector by *several orders of magnitude*.

Box 2.

Example of Mexico's Financing Plan for Energy Efficiency Measures (2009-2013)

- Mexico was the first country to submit a national low-carbon investment plan to the World Bank's Climate Investment Funds (CIF).
- The investment plan has a strong energy efficiency component in various sectors of the Mexican economy. The energy savings potential within the productive sector is between 15 and 40 percent of sector consumption, and the estimated investments are \$5.6 billion.
- The government plans to increase the efficiency of 30,000 existing and new houses in hot climates by replacing inefficient equipment and upgrading the house envelope. The intermediate target for 2011 was 12,000 units. This included the installation of thermal-insulated roofs and walls and double-glass-pane windows by specialized companies, and the replacement of air conditioners and refrigerators.
- Part of a loan from the CIF will be used to remove barriers to energy efficiency: The funds will help reduce the cost to consumers of buying efficient equipment and devices for their houses. Financing will be available for low-income populations through local loans and guaranteed commercial bank loans.
- Companies that will buy new and efficient equipment will have access to a line of soft financing. The financing of energy efficiency in Mexico, until 2013, is mostly international, combining grants, loans, carbon markets, and private-sector funds reaching a sum of approximately \$415 million.

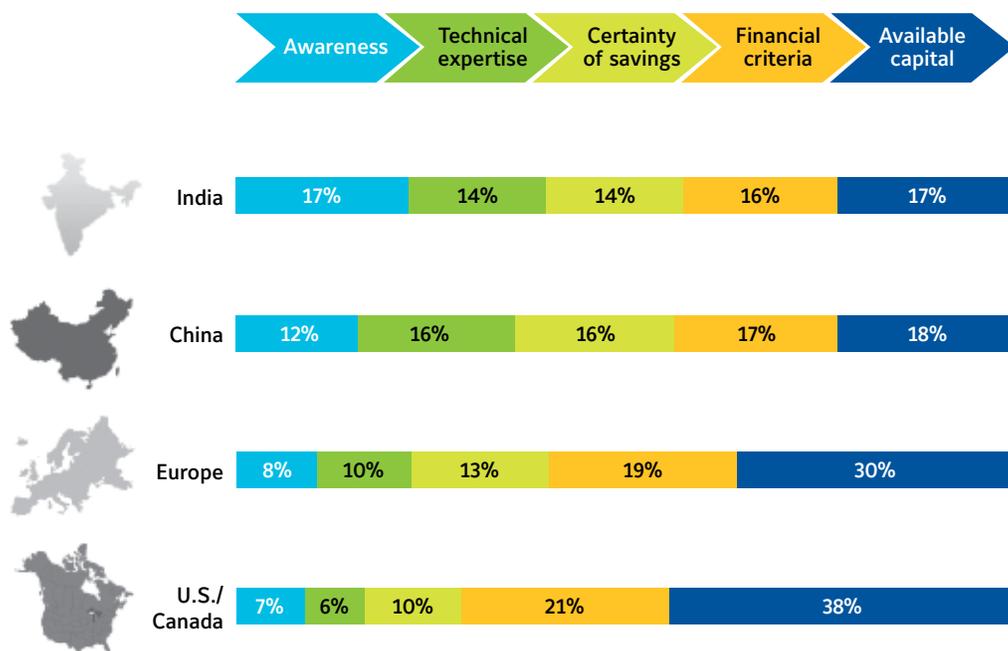
Source: Mexico's Low Carbon Investment Plan submitted to the World Bank's Clean Technology Fund⁴

3. CRITICAL MASS: MARKET DEVELOPMENT AND SCALE-UP

Economies around the world are struggling with similar barriers and challenges as they try to scale up markets for energy efficiency. Financing building efficiency projects remains one of the most persistent barriers to energy efficiency, even in developed countries with substantial markets for energy efficient buildings. As shown by the 2011 Global Energy Efficiency Indicator

Survey, conducted annually by the Johnson Controls Institute for Building Efficiency, the *lack of available capital* to pay for improvements is named as the top barrier to pursuing energy efficiency. It is named more frequently in more developed markets for building efficiency, such as Europe and the U.S., than in developing markets for building efficiency, such as India and China.

Figure 1.
Top Barrier to Building Efficiency from Building Energy Management Decision-Makers



Source: Institute for Building Efficiency, Johnson Controls, Inc. Global EEI Survey (2011)⁵

The United Nations Environmental Program Finance Initiative (UNEP FI) has pointed out that challenges to energy efficiency finance at scale include:

- The so-called *aggregation challenge*: large corporate banks will not conduct due diligence for investments lower than \$100 million because the opportunity cost is too high.
- *Split incentives*: the entity paying for the energy efficiency investments is not the same as the entity benefiting, especially in buildings when many parties are involved.
- *Lack of guarantees*: insufficient mechanisms for energy efficiency lending to smaller companies.⁶

Initiatives tackling building energy finance in developing countries are on the rise, including efforts at the city level. One example is the Clinton Climate Initiative (CCI), which works with financial institutions and providers of capital to adapt existing and create new financial products that are specifically tailored to building energy efficiency projects.⁷

A recent example from the U.K. shows how policymakers are attempting to achieve critical mass and market scale-up through a combination of regulations and finance initiatives (Box 3).

Box 3.

Financing the retrofits of old buildings: Market creation through regulation in the U.K.

- As part of the Green Deal in the U.K., the government aims to stimulate a 'step change' in the energy efficiency of British properties while putting in place mechanisms to attract the financial community to the energy efficient economy.¹
- The basis for action is the U.K. Energy Bill of 2010, which aims to **regulate** greenhouse emissions and energy. As a result, the government is establishing a framework to enable private firms to offer consumers energy efficiency improvements to their homes, community spaces and businesses at **no up-front cost**, and to recoup payments through a charge in installments on the energy bill. From 2012, households will be able to access up to £10,000 (US\$16,500) up front to pay for energy efficiency work. Similar support will be available to businesses and vulnerable people, or those living in homes that need extra work.
- The Green Deal is expected to create a retrofit market worth **£7 billion to £11 billion** (US \$11 billion to \$17 billion) per year over the next 15 years, a major ramp-up from existing investment of £1 billion to £2 billion (US \$1.5 billion to \$3.0 billion) per year.² This is an example of a policy-driven market that could not be created without mandatory requirements for building efficiency. It therefore highlights the linkages between policy making and long-term financing.

Source: UK Department for Energy and Climate Change (DECC)⁸

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PRIVATE SECTOR ROLE AND PERSPECTIVE

Building efficiency investments can improve energy productivity, foster economic growth, improve energy access, energy security and the environment. Each additional \$1 spent on energy efficiency in electrical equipment, appliances and buildings avoids more than \$2 in energy supply investments, on average, according to the International Energy Agency.¹ Improving building efficiency makes it more cost effective to achieve sustainable urbanization, meet growing energy demand and increase energy access for the poor. Buildings that cost less to illuminate, heat and cool free up resources for other investments.

Market conditions affect private-sector investment decisions and business viability. Creating the right conditions requires aligning the interests of architects, construction companies, building trades such as electricians and plumbers, equipment manufacturers, and government offices and officials. To achieve greater energy efficiency, there must be a compelling view to why changing current business practice benefits everyone.

Private-sector investment will follow demand. Demand for energy efficient buildings does not always exist today. Policies can help drive that demand: Government incentives, rebates and other policies rank among the top drivers for commercial building owners to invest in energy efficiency technologies and practices.²

Once there is demand for energy efficient buildings, there also need to be suppliers in the market to provide the energy efficient materials, equipment and services, and banks that want to finance any additional up-front costs of efficiency projects. Building materials, equipment and service providers may view energy efficient buildings as either an opportunity or a threat to business as usual, depending on their ability to supply such buildings. Companies with efficient materials, equipment and services will likely view increased building efficiency as an opportunity, whereas those with inefficient materials, equipment or services may see the shift to efficient buildings as a threat. Policies can be designed to help ensure an adequate supply of cost-effective building efficiency products and services, available financial services to cover the up-front investments, and proper valuation of buildings based upon their energy attributes.

The Institute for Building Efficiency at Johnson Controls explored the general market conditions and building efficiency public policies that can drive increased investment in building efficiency in developing



Creating the right supporting market conditions for investment in energy efficient buildings can leverage private-sector capital, technology and services to scale up the market.

Policies should be designed to target one segment of the market at a time. The four major segments in the buildings market are: commercial new construction, residential new construction, commercial retrofits, and residential retrofits.

The private sector can play a role in setting policy priorities and designing policy options. The private sector can also have a role in implementing some policy priorities through public-private partnerships.

countries. We investigated these questions with U.S. and European-based building efficiency companies who are investing in developing countries, including, energy service companies (ESCOs), building equipment manufacturers, building material manufacturers, architecture and engineering firms and financial institutions. Through an online questionnaire and a roundtable discussion with a group of industry leaders and industry associations, we reviewed options and discussed policy priorities that would support a robust efficiency market. A list of round-table participants is included at the end of this section. The analysis and interpretation of these materials are the authors' alone and are not necessarily shared by the roundtable participants. We hope our findings might serve as a starting point for similar discussions with the private sector at the country and city level, as priorities will vary by geography and local conditions.

GENERAL MARKET CONDITIONS

Companies from the building efficiency sector indicated that specific building efficiency policies are important when making decisions to invest in emerging economies, but that policies exist within a set of general market conditions that are also important to investment decisions. The roundtable discussed both positive factors that drive investment and negative obstacles (barriers), that make investment less appealing.

Investment Factors

Three factors emerged as having the greatest influence on decisions by companies to invest in building efficiency in emerging economies: the size of the market, the regulatory regime, and a stable investment framework. Companies at the roundtable reflected on the importance of these market fundamentals. For example, if it takes two years to sort out the property rights to site a manufacturing facility in a given country, then that is a significant deterrent to investment.

Obstacles to Investment

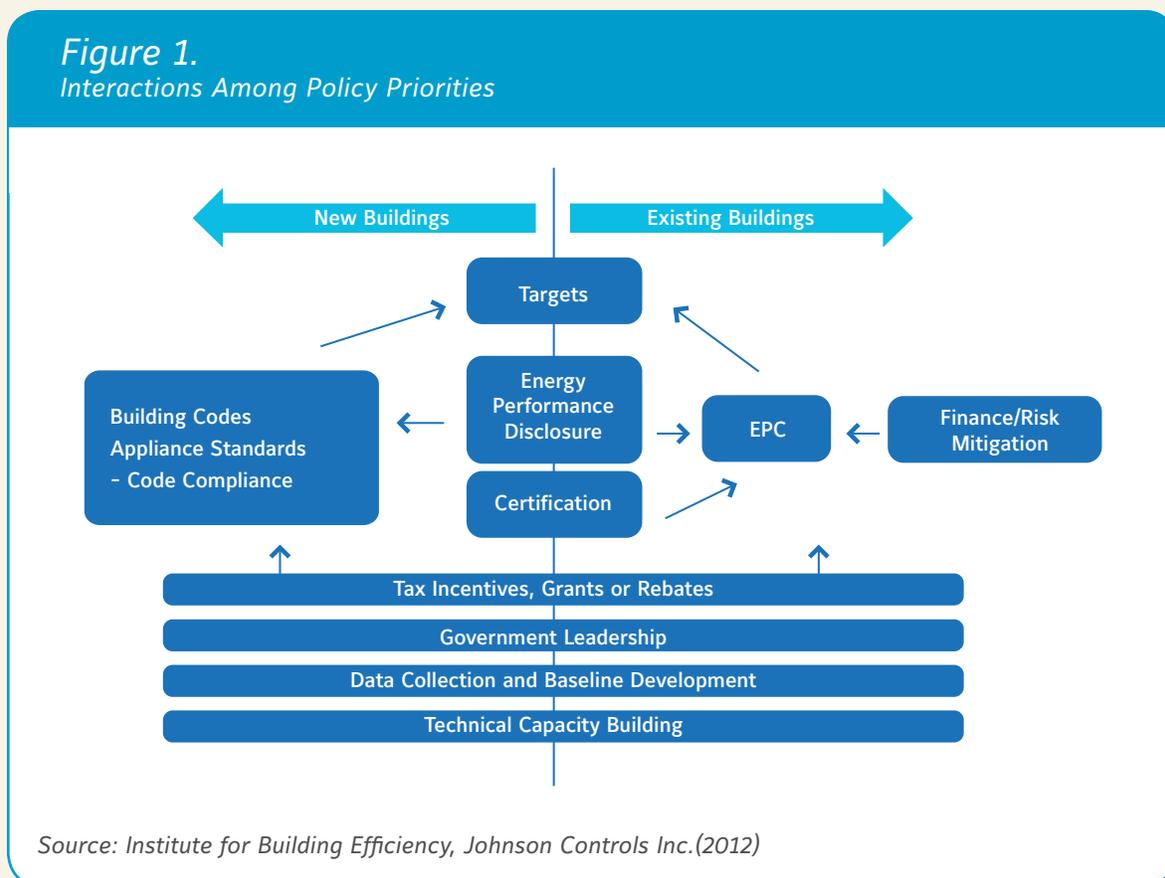
Risk is the greatest obstacle to investment by building efficiency companies. Risk can come from many sources, but participants specifically noted that the investment horizon is very important where there is significant political risk, such as regime change. In high political risk situations, companies will only make investments with quick paybacks, so as to avoid the potential for stranded investments. The relatively short payback times for some building efficiency projects can be attractive for service providers; longer-term projects with deeper efficiency gains may be harder to support.

The second greatest obstacle to investment cited at the roundtable was government corruption. Companies noted that they expect to operate globally with strict business integrity, making it unattractive and difficult to operate in markets where bribes and other forms of government corruption are the norm. Other obstacles to investment in emerging economies include lack of available data and under-developed legal systems. Lack of a strong legal intellectual property rights structure was also noted as a barrier to investment.

POLICY PRIORITIES

The roundtable dialogue held with U.S. building efficiency companies identified 10 private-sector policy priorities. In discussing these priorities, participants highlighted the importance of each and the ways in which the policies interact to support investment and energy efficiency action. This dialogue, coupled with the short questionnaire, offers insights that may be helpful to policymakers regarding the opportunities to support investment and market development. We share these findings from our small sample group, not because they are conclusive or broadly representative of voices in the participants' communities, but because we hope they will provide interesting fodder for stakeholder discussions about policy priorities in other countries and cities around the world.

As an overview, each of the 10 policies and some of the ways they interact with and support each other are shown in the following diagram.



In looking closely at Figure 1 in the new buildings category, building codes are the key policy for meeting building efficiency targets. For existing buildings, energy performance contracting policy can facilitate renovation. Energy performance disclosure requirements are a key driver for both of those policies, and voluntary certification can also help. Building retrofits using energy performance contracts need to be financed, so policies that help make financing

available for those projects can provide key support. In addition, supporting policies for greater efficiency in new or existing buildings can include:

- Tax incentives, grants or rebates
- Government leadership through efficient public buildings
- Data collection and baseline development to inform building management, efficiency investment and policy decisions
- Technical capacity building

The following sections provide a short review of each policy category (some are combinations of a few categories given in the full report), the role of the private sector in developing and implementing each policy, and examples of best practices for each policy from around the world. Policies are listed in approximate order of priority based on our private-sector questionnaire and discussion. For example, public awareness and education campaigns were not a high priority from a private-sector investment perspective, so we have excluded them from this list. However, in any given market or effort, this may be a higher priority among other stakeholders.

In evaluating policy options, it is critical for policymakers to recognize that different policies can target different segments of the buildings market. The four major market segments in the buildings market are commercial new construction, residential new construction, commercial retrofits, and residential retrofits. In addition, institutional buildings such as hospitals, schools and government buildings may also be considered as unique vertical markets. Policies may be designed to target one segment of the market at a time. Examples of best policy practices will be pulled from among these market segments.

1. Building Efficiency Targets

Building efficiency targets are overarching efficiency targets for the commercial or residential building sector at the local, regional or national level. Energy efficiency improvement goals, energy efficiency resource standards (EERS), and energy efficiency trading schemes (white certificates) are all examples of building efficiency targets.

Building efficiency targets came out as a top priority because they can catalyze many other actions in both the public and private sectors by focusing all stakeholders around a clear goal. The enforceability of targets and degree to which targets are compulsory was noted as a key determining factor in their effectiveness.

2. Building Energy Codes

Building energy codes require minimum thresholds for energy efficiency in commercial or residential buildings. This category includes whole-building design and construction requirements, performance requirements, and appliance, equipment and lighting efficiency requirements. Such codes and requirements are particularly key to transforming new buildings to be more energy efficient. Codes and requirements also can be put in place for energy efficiency when a building undergoes a major renovation. For example, insulation (R-value) requirements could be put in place for building envelope renovations. Energy performance standards for appliances, equipment and lighting efficiency reduce energy consumption in

buildings, and setting or revising appliance standards will have an impact on energy demand through the replacement of inefficient equipment with more efficient equipment over time.

Building energy codes face a significant challenge in many countries around compliance and enforcement. Roundtable participants noted two particular ways enforcement might be improved. The first was simply to have other supporting policies in place – such as incentives for demonstrated compliance, or mandatory disclosure of energy performance. The second was to use current technologies to track and monitor building energy usage remotely. Tracking performance may be another mechanism to help review whether a building was built to code, though it may not be a complete substitute for on-site inspections. Remote monitoring and testing before to the issuance of occupancy permits may be another tool that could complement the more costly on-site inspections. Developing countries may be able to leapfrog past the challenges developed countries have faced with building energy code enforcement by complementing traditional enforcement approaches with remote performance testing.

3. Building Energy Performance Disclosure

Building energy performance disclosure is a requirement to give building owners and users information on building energy consumption. Such information may be required at the time of sale or rental of the building, or may be required to be publicly available at all times. Today, when a building is bought or rented, little information is known about that building's efficiency, or the energy costs required to operate it. In contrast, many countries require disclosure of an automobile's fuel economy (miles per gallon) to consumers when they purchase or lease a car. Building energy performance disclosure would require this same type of energy performance information to be available when a tenant or prospective buyer considers renting or building a building. For example, in New York City, building energy performance must be measured and disclosed once every five years.

Energy costs are a significant monthly expense in the operation of a building. According to the U.S. Department of Energy, energy use is the single largest operating expense in commercial office buildings, representing approximately one-third of typical operating budgets.³ The Institute for Market Transformation points out that the typical U.S. household spends more on energy each year than on property taxes or homeowners' insurance, yet unlike those two expenses, energy costs are not routinely underwritten in a mortgage loan.⁴ The disclosure of building energy performance would provide transparency about the energy costs and energy efficiency of different buildings so that the value and cost savings from energy efficiency could be easily passed between actors during transactions in the buildings market. The value of energy efficiency can be shared across the building's value chain. Efficiency benefits the building occupant who pays the energy bills and sees direct savings from being in an energy efficient building. It also increases the value of the building to the owner (in higher resale value and increased occupancy and rent), and increases the value to the developer, thereby overcoming the challenge of split incentives.

The disclosure of estimated energy costs can also be required for appliances, equipment, and lighting. Total estimated cost of ownership labels could be required in addition to efficiency labels on those items.

Building performance disclosure is a private-sector priority because it facilitates proper valuation of buildings based upon their energy performance, enabling the value of energy

efficiency to be passed easily along a building's value chain and shared among all stakeholders. When all stakeholders share in the cost-saving benefits of greater energy efficiency, the building efficiency market should grow.

4. Building Rating and Certification Programs

Building rating and certification programs are systems for labeling buildings with a rating or certification that indicates its level of efficiency and sustainability. Rating systems benchmark buildings against each other, creating the spirit of competition. Building rating and certification programs can come in many forms. The simplest ratings often consist of the requirements of the energy performance disclosure policies listed above. Also common are voluntary rating and certification systems that provide more detailed insights into a building's energy systems or measure building sustainability features beyond only energy. Such voluntary rating and certification programs can have a powerful transformative effect on the buildings market. For example, the roundtable discussion noted that when one building in an area achieves a LEED certification from the U.S. Green Building Council, owners of neighboring buildings who compete for the same tenants seeking high-quality, sustainable space can be inspired to pursue certification as well.

5. Tax Incentives, Grants or Rebate Programs

Tax incentives, grants or rebate programs can be used to incentivize a range of measures, from purchasing energy efficiency equipment and products to completing whole-building upgrades. Such incentives can be key to invigorating a new market for building efficiency. In the global 2012 Energy Efficiency Indicator survey⁵ of nearly 4,000 facility managers and executives, conducted annually by the Institute for Building Efficiency, 31 percent of respondents selected tax incentives or rebates as the policy that would have the greatest impact on improving energy efficiency in buildings.

6. Government Leadership

When governments lead by example, by making their own buildings more energy efficient, they create demand for efficient buildings and help jump-start the building efficiency market. A focus on improving *public buildings* owned or operated by local or national governments is often a good starting point in a comprehensive policy pathway and provides three major benefits at once:

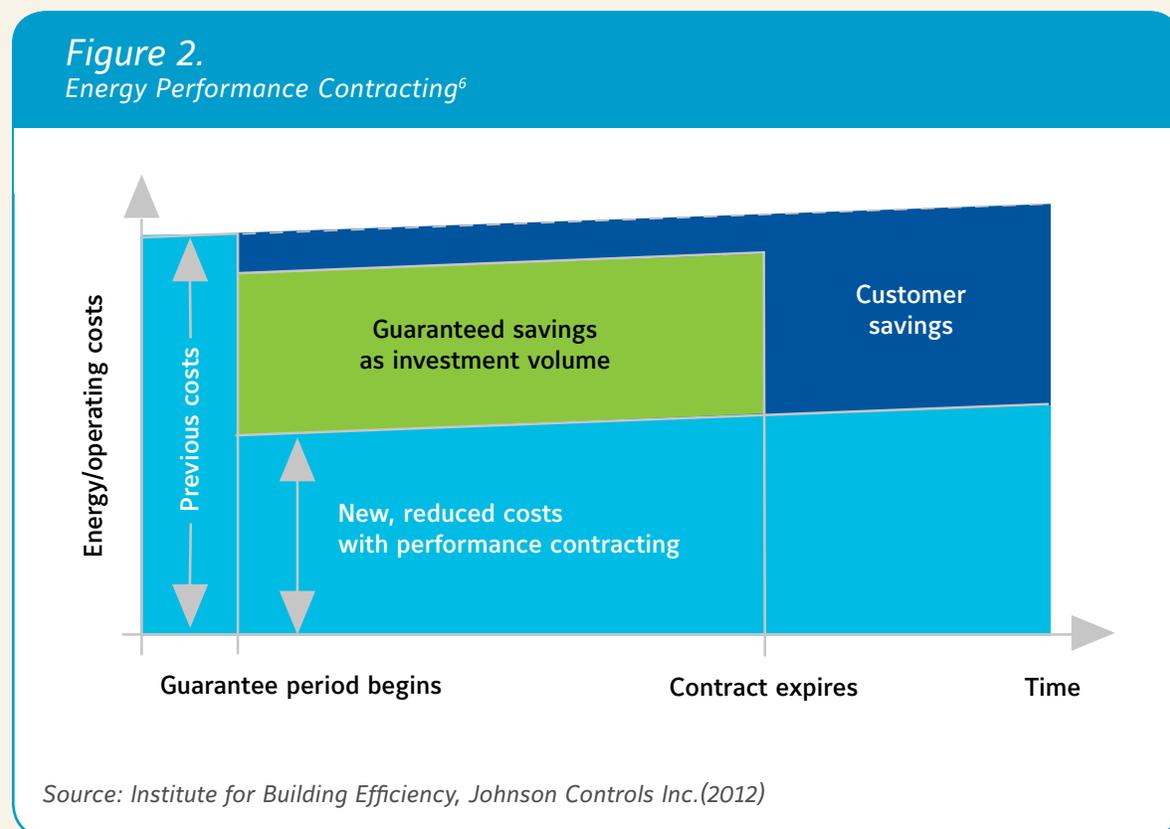
- Improving the efficiency of government buildings saves money for public agencies, freeing up capital for other public programs.
- Efficiency measures in public buildings support the market growth of energy efficient building products and services and create jobs.
- A comprehensive policy to address all government-owned or financed buildings has far-reaching impacts on society, and particularly on vulnerable populations that depend on government services. Policies can be structured to apply efficiency criteria to improve social housing, hospitals, and public schools.
- Governments can require that their new buildings be energy efficient, that they retrofit their existing building stock to be more efficient, that they lease space only in efficient

buildings, and that only efficient appliances, equipment and lighting be used in the buildings. To meet this demand, designers and construction companies will have to learn how to build efficiently, energy service companies will grow in the market to retrofit existing buildings, banks and financial institutions will learn how to finance these projects, and appliance, equipment and lighting manufacturers will have to supply efficient products to the market.

7. Energy Performance Contracting Enablers

Policies that enable energy performance contracting (EPC) can help create standardized, streamlined, and transparent project development and vendor selection processes that lower the transaction costs for the use of EPCs to retrofit existing buildings. These include policies that establish standard contracts; pre-approved lists of providers, project facilitators or consultants; and standardized measurement and verification (M&V) protocols. EPCs address barriers to building efficiency such as up-front costs, lack of technical capacity on the ownership team, perceived project risk, and uncertainty of savings.

In energy performance contracting, an ESCO plans and executes a retrofit to make a building more energy efficient. The ESCO then guarantees the energy savings for the customer through an EPC. Figure 2 illustrates how this tool works in practice.



Box 1.

Energy Performance Contracting: The European Bank For Reconstruction And Development (EBRD) In Romania And Ukraine

The EBRD launched its Sustainable Energy Initiative (SEI) in 2006 to address the dual challenges of improving energy efficiency and combating climate change in the regions of central Asia, Eastern and Central Europe, and Russia. Recognizing the necessity to stretch limited public funds, SEI has successfully leveraged enough private-sector finance with its strategic investments so that external funds now occupy the largest share of SEI's total project value, maximizing the positive impacts on local economies and the environment.⁷

Technical assistance, regulatory preparation, and financing for energy performance contracts (EPC) in the region have been a major EBRD focus for helping national and municipal governments reach their energy-saving goals and for driving the market for energy efficiency practices and lending.

- In 2011, to help Romania's national government achieve its goal of 20 percent energy savings by 2020, EBRD granted a €10 million corporate loan to EnergoBit ESCO to finance energy-saving initiatives for Romanian municipalities through EPC. This loan builds on EBRD's ongoing, extensive technical assistance program for local authorities to prepare and manage energy efficiency improvements based on EPC services.⁸
- Facilitated by a grant from the Czech Republic, EBRD has launched a technical assistance project in the Ukraine to identify and develop mechanisms for private-sector financing for energy efficiency improvements in public buildings such as schools and hospitals.⁹
- The project assessed the legal and commercial framework for EPC services in Ukraine, conducted market analyses for ESCO services, and identified and facilitated the regulatory reforms needed to fully enable the uptake of EPCs in Ukraine, while minimizing risk for the private lenders.
- **Results:** In Romania, technical assistance combined with the €10 million EBRD loan has helped to catalyze a pipeline of €45 million in projects to be implemented over the next 10 years, ranging from energy efficient street lighting to cogeneration projects in municipal hospitals. The EPC project in the Ukraine is being piloted for public buildings in the Ukrainian cities of Dnipropetrovsk, Odessa and Zaporozhia with the goal to expand nationally.

8. Risk Mitigation

Risk mitigation programs can encourage the finance sector to lend money to building efficiency projects by transferring risk from financial institutions to either a government entity or multilateral development banks. Risk mitigation can take many forms. The greatest sources

of risk should be identified through discussions with financial institutions, and policies should be designed to mitigate those specific risks. Roundtable participants noted that if risk mitigation mechanisms are not well designed or are too cumbersome and complicated to use, then the private sector may not use them, or may underutilize them.

Figure 3.
Type of Investment Risk

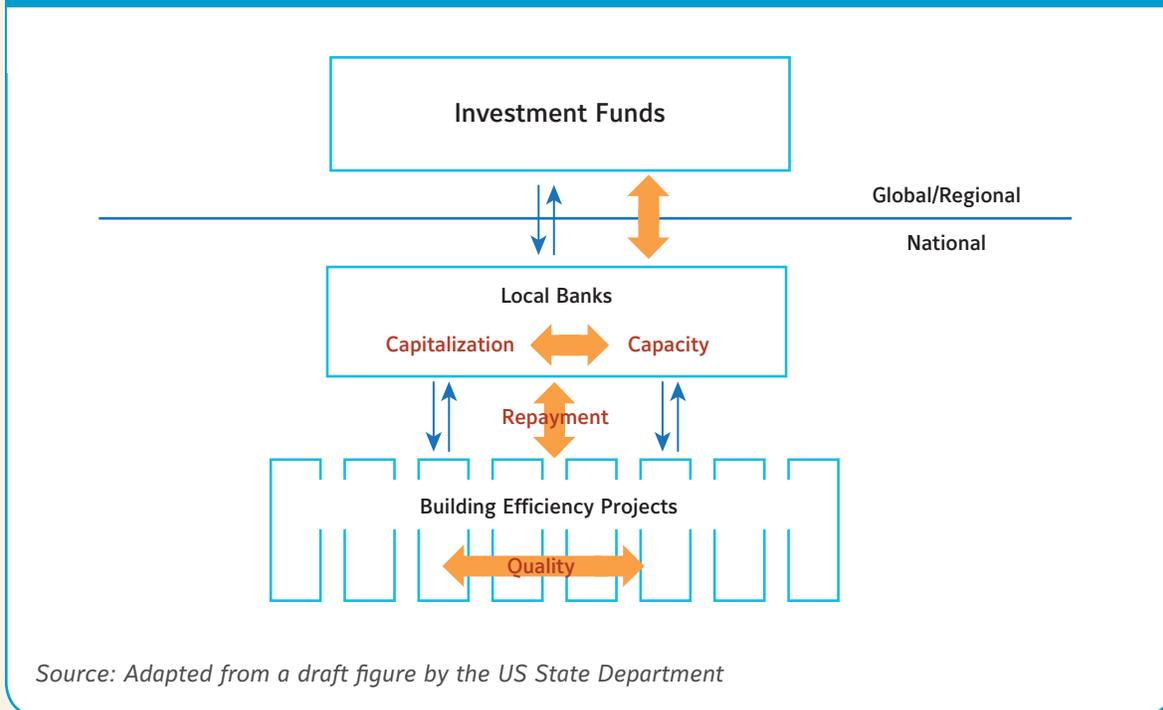


Figure 3 shows five kinds of risk that the government may want to mitigate in order to make financing available for building efficiency projects. The design of finance policies will be different for the residential and commercial markets, and potentially sub-sectors of those markets, but the same basic categories of risk exist in each.

Currency risk may be of concern if international investment funds are to invest in local markets. Local financial institutions may need help tackling some of the risks that come with initial entry to the building efficiency market.

Capacity risks may surround the development of new financing instruments for building efficiency projects. Without a large pipeline of projects, financial institutions may hesitate to dedicate the capacity to develop new financing instruments, and without financing instruments the pipeline of building efficiency projects may never materialize. In this case, government may be able to support the development of building efficiency financing instruments, thereby helping financial institutions overcome the capacity risk.

Capitalization risks come with dedicating capital to those new financing instruments.

Repayment risks come with new financing instruments that have little track record to demonstrate repayment. Repayment risk is present in every market – in developed and

developing countries. The roundtable discussion noted that repayment risk is particularly key because the best-engineered and best-executed building efficiency project still will not generate repayment if the underlying host is not viable, or goes out of business.

Quality risks exist in whether the expected energy and cost savings from a building efficiency project actually materialize. Quality risk depends on the way building efficiency projects are engineered and executed.

Some of these risks may not need government mitigation: For example, an EPC could mitigate the risk of project quality. The five risks discussed here do not constitute an exhaustive list but simply a starting point for discussing the design of risk mitigation with the finance sector.

Box 2.

Public Finance Credit Lines for Energy Efficiency: Thailand's Energy Efficiency Revolving Fund for Local Financial Institutions

Building off public funds initially dedicated in 1992 by the country's nationwide energy conservation legislation,¹⁰ the Royal Thai Government established its Energy Efficiency Revolving Fund (EERF) in 2003 with the goal of catalyzing commercial lending for energy efficiency in buildings and industry. Today, the EERF represents one of the most successful examples of a public-private partnership between the national government and local financial institutions dedicated to energy efficient buildings in the developing world.

- The Royal Thai Government conducted an initial market assessment to estimate the economic potential for improving energy efficiency in buildings and industrial facilities. The results recommended an initial USD\$55 million for the EERF pilot program.
- The EERF was designed as a three-year pilot program to provide zero-interest sub-loans to participating Thai banks to encourage them to finance qualifying energy efficiency projects, stipulated by contracts between the government and each participating bank. Banks provide low-interest loans to projects with an average seven-year repayment term.
- **Results:** The EERF has been renewed twice since 2003 and, as of 2010, 11 partnering banks had financed 335 energy efficiency projects for an estimated energy cost savings of USD\$154 million.¹¹

Box 3.

Risk Mitigation: China's Utility-Based Energy Efficiency Finance Program (CHUEE) and Loan Guarantee Scheme

Two distinct risk-mitigation programs in China are working to unlock private-sector finance for energy efficient buildings through innovative multi-donor partnerships between the Global Environment Facility (GEF), the International Finance Corporation (IFC), the World Bank, and donor countries. The China Utility-Based Energy Efficiency Finance Program (CHUEE) operates as a risk-sharing facility, while the China Energy Conservation Project (CECP) is helping China strengthen its ESCO market through loan guarantees.¹²

- CHUEE was created in 2006 to serve as the intermediary between local financial institutions (LFIs), utilities, and suppliers of energy efficient products and services, and to provide technical support.
- Under CHUEE, a Loss-Sharing Agreement with Chinese banks provides that IFC and the GEF will share a portion of the loss for all loans within a greenhouse gas emission reduction portfolio, with differing ratios on first and second losses.
- Under the CECP, the World Bank and the GEF provided USD\$16.5 million to the Chinese Ministry of Finance to establish loan guarantee reserves for ESCO projects. Through a state-owned guarantee company that handled the contracts and claims, the Chinese government was able to issue a 90 percent guarantee on loans made by LFIs to ESCOs for qualifying energy efficiency projects.
- **Results:** CHUEE has helped facilitate a total investment of USD\$512 million in energy efficiency projects for an estimated reduction of 14 million tons of CO₂ per year. Over four years, the CECP leveraged USD\$52 million of public finance in the form of loan guarantees for a total of USD\$90million in energy performance contracting investments by Chinese ESCOs.¹³

9. Data Collection and Baseline Development

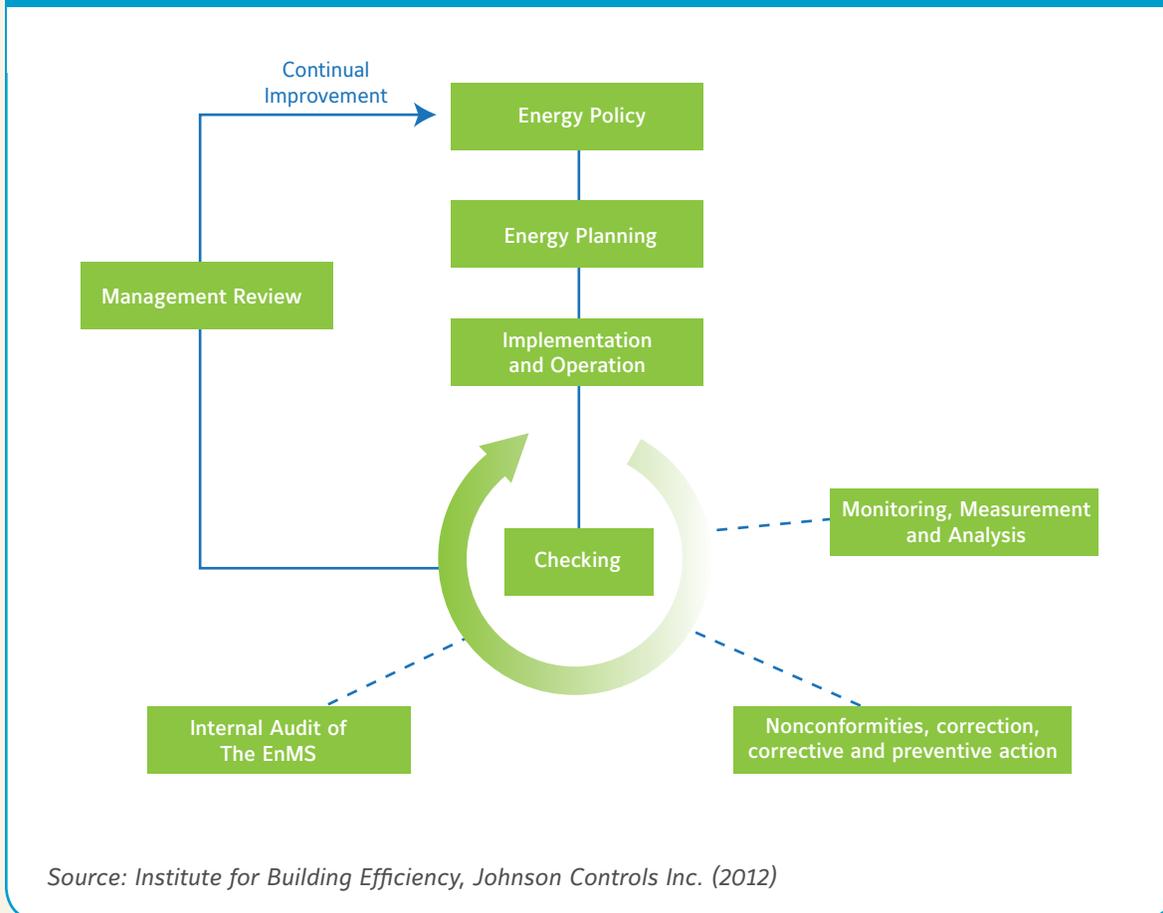
Reliable and transparent data on building energy use is important for good day-to-day energy management decisions, as well as for the design of building efficiency policy measures. In addition, good data and information on building energy usage is crucial for the measurement and verification of building efficiency gains from the project through to the policy level.

Good building energy usage data is an essential component of smart energy management in buildings, as well as in the development of building policies and strategies for countries and cities. Energy usage data can enable the use of building management practices such as ISO 50001, the international energy management standard (Figure 4).

ISO 50001 provides a process for managing and continuously improving energy performance – in a building, on a campus, or across an entire building portfolio. One key element of the

ISO 50001 process is to monitor and measure building energy performance to ensure that the benefits of energy management do not wane with time. Measurement and verification of energy efficiency can help secure financing of building efficiency projects. At the city or country level, a similar need exists to monitor and measure the impacts of building efficiency policies over time, and to improve upon and adapt those policies when needed.

Figure 4.
ISO 50001 Framework for Energy Management



While continuous improvement in energy management, such as that achieved using ISO 50001, is ideal, much also can be done to improve energy efficiency by using data and baselines to implement simpler energy management processes.

10. Technical Capacity Building/Workforce Training

Successful implementation of policies, and growth of the building efficiency market, often require an increase in capacity in both the government and private sectors. The roundtable discussion noted that capacity building and workforce training programs are often key enablers of the private-sector entry into the building efficiency market in emerging economies.

PRIVATE SECTOR ROLE AND IMPACT

The role of the private sector in designing and implementing policies, as well as the direct or indirect nature of the impact of those policies on growth of the building efficiency industry, will be discussed in this section. The private sector can play a role in the development and design of policies, and also at times in the implementation of policies through public-private partnerships (PPPs).

Role of the Private Sector

Buildings are generally designed, constructed, built, financed, retrofitted, and managed by private-sector actors. Transforming buildings to be more energy efficient requires these actors to benefit when making energy efficiency investments. Aligning the interests of all these stakeholders to deploy building efficiency at scale will require dialogue and engagement with the building construction industries and the, private sector can provide input on policy strategy and design.

PPP's offer some of the greatest opportunities for directing private-sector capital toward sustainable development.¹⁴ There are two types of PPPs – those that have legal structure and those that are efforts to work together simultaneously to achieve a common goal.

The more formal PPPs for energy efficiency, according to the International Energy Agency (IEA), commonly have the following features:

- A contractual relationship or agreement between a public entity and a private organization
- Risk sharing between the public and private partners
- Mobilization of private-sector financing
- Payments to the private sector for delivering services to the public sector¹⁵

Governments increasingly looking to these types of PPPs to help overcome barriers to improving efficiency and to achieving energy savings targets. In the building sector, PPPs with ESCOs and local financial institutions can be helpful in targeting specific market barriers, without the need for direct government subsidies.¹⁶ They also allow governments to achieve targets and save on long-term costs with only a fraction of the public funding that would otherwise be required, a crucial consideration for governments facing debt crises.

Other forms of PPPs include looser collaborations, such as the collection of private-sector input on selection of building efficiency targets or in developing building codes.

Impact on the Private Sector

Some policies have a very direct impact on driving growth in the private-sector market for energy efficient buildings, while other policies have an indirect impact. The direct or indirect impact in the building efficiency market varies by segment of the buildings market and by private-sector stakeholder, but thinking through the kinds of impacts each policy will have is important to good policy design.

Figure 5 analyzes the role of the private sector and the impact on the private sector of each of the 10 policy options discussed as policy priorities in this paper.

Figure 5.
Private Sector Role and Impact

Private Sector Role and Impact	Informs Policy Design	Assist in Policy Implementation (Public Private Partnership)	Direct Impact on Growth in Building Efficiency Industry	Indirect Impact on Growth in Building Efficiency Industry
Building Efficiency Targets				
Building Energy Codes				
Building Energy Performance Disclosure				
Building Rating Systems or Building Certification Programs				
Tax Incentives, Grants or Rebate Programs				
Government Leadership Programs				
Energy Performance Contracting Enablers				
Risk Mitigation				
Data Collection And Baseline Development				
Technical Capacity Building Programs/Performance Training and Education				

Source: Institute for Building Efficiency, Johnson Controls Inc. (2012)

Box 4.
Melbourne, Australia's Set of Building Efficiency Policies

The city of Melbourne has combined some best-practice policies for transforming existing commercial buildings to be more energy efficient.

1. The city set a net zero emissions goal to achieve by 2020. This goal will require a 50 to 60 percent improvement in building efficiency.
2. The Federal Government of Australia has introduced building energy codes that require a certain efficiency standard to be met when a building undergoes reconstruction, major renovation, refurbishment or retrofit
3. The federal government is also developing a requirement that building energy performance be disclosed at the time of sale or rental of a commercial office building.
4. Melbourne's Environmental Upgrade Agreement Program enables the city council to enter into Environmental Upgrade Agreements (EUAs) with commercial property owners seeking upfront financing for projects that improve energy, water and environmental efficiency, and with financial institutions willing to fund those retrofits. The owner or occupier pays an ongoing Environmental Upgrade Charge (EUC), levied by the council, that essentially matches the principal and interest. The payments are then passed on to the lender. The EUA structure makes the loan

Box 4. (con't.)

Melbourne, Australia's Set of Building Efficiency Policies

transferable to subsequent owners and enables owners to legally pass the repayment costs along to occupants, who see the energy savings on their energy bills.

The suite of policies implemented by Melbourne demonstrates the type policy combination that has potential to transform existing commercial buildings to be far more energy efficient.

CONCLUSION

The right general market conditions and an effective combination of building efficiency policies can help create a robust market, enabling private-sector capabilities and capital capabilities to scale up the market for energy efficient new and existing buildings. The private sector can play a role in both developing and implementing some building efficiency policies. The Policy Assessment Tool, introduced earlier in this report, can help policymakers determine what building efficiency policies should take priority in their own markets.

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