

G20 Energy Efficiency Investment Toolkit

Case Studies

G20 Energy Efficiency Finance Task Group (EEFTG)

Established in 2014 under the G20 Energy Efficiency Action Plan
Coordinated by the International Partnership for Energy Efficiency Collaboration (IPEEC)
and with 15 participating G20 countries



The G20 Energy Efficiency Investment Toolkit is the product of the collaborative work of 15 participating country members of the G20's Energy Efficiency Finance Task Group, co-chaired and coordinated by France and Mexico. This toolkit is published under the content direction of the International Energy Agency (IEA); the International Partnership for Energy Efficiency Collaboration (IPEEC); and the UN Environment Finance Initiative (UNEP FI). It provides a voluntary framework and tools for G20 countries to enhance capital flows for energy efficiency investments in their economies. This toolkit is the culmination of three years of detailed technical work of the G20's Energy Efficiency Finance Task Group, with its participating countries, as constituted under the G20's Energy Efficiency Action Plan in 2014 and reinforced through the 2016 Energy Efficiency Leading Programme.

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Executive Summary

The G20 represents 84% of the world's total economic output, more than 80% of primary energy consumption and 80% of greenhouse gas (GHG) emissions. G20 countries recognise that both energy efficiency and increased energy productivity are critical to boost sustainable economic growth in an increasingly resource constrained planet. Energy efficiency investments deliver multiple private and public benefits and can be scaled-up significantly to decarbonise economies and deliver these multiple national economic benefits and the goals of the Paris Agreement in the most cost-effective way.

This G20 Energy Efficiency Investment Toolkit (the "Toolkit") represents the culmination of three years of collaborative work, by participating countries, international organisations (IOs), financial institutions and country experts, to enhance capital flows for energy efficiency investments as compiled and supported by the G20 Energy Efficiency Finance Task Group ("EEFTG"). Launched by the G20 Energy Efficiency Action Plan in 2014, the EEFTG delivered the core policy component of this Toolkit (the *Voluntary Energy Efficiency Investment Principles*) as welcomed by G20 Energy Ministers in 2015. Since then EEFTG and its collaborators have rallied 122 banks, more than USD 4 trillion of institutional investors, leading public financial institutions and insurance companies in support of G20 countries' ambitions to redouble their efforts and scale-up energy efficiency investments as articulated in the G20's Energy Efficiency Leading Programme endorsed by G20 Leaders in 2016 and creating the platform for this Toolkit.

Greater collaboration is essential to addressing the G20 energy efficiency investment challenge, which transcends individual domains and sectors - be they policy, regulatory, public or private. It requires unprecedented levels of coordination and collaboration to identify and unlock the benefits resulting from a significant scale up of energy efficiency investment. Financing flows are global, and the multiple benefits through increasing and prioritising energy efficiency investment will accrue nationally and locally, making countries stronger, more resilient and more energy-secure. Financial and technology innovation and up-take will also accelerate through the greater awareness and promotion of "best in class" instruments and approaches. This is because leadership and successful business models that flourish in one jurisdiction can, through the global nature of finance, be shared and copied in other countries, despite the specificity of national contexts.

Throughout its chapters, this Toolkit offers a new perspective on the challenge of scaling-up energy efficiency investments by defining and separating "core" energy efficiency investments (those stand-alone projects where the delivery of energy savings is the lead driver) and "integral" energy efficiency investments (where overall asset performance is the lead driver, yet multiple benefits -including improved energy performance- are delivered by an incremental "embedded" investment). The Toolkit also provides insights into national policy developments, showcasing good practices, as well as insights into policy tracking databases, using the *Voluntary Energy Efficiency Investment Principles* as a frame for their comparison. Finally, the Toolkit reveals how public and private sector financial institutions are tackling the energy efficiency investment challenge, through their commitments, approaches, tools and by sharing the areas that they identify for further joint development.

No single stakeholder group can deliver the scale up of G20 energy efficiency investment required on its own. This Toolkit therefore provides a collaborative architecture through which G20 policy makers can engage in a structured dialogue with investment providers and jointly develop and deliver the targeted economic, social and environmental benefits that G20 Leaders seek together, in their national interests and for the benefits of the global community. The value to G20 policymakers of this Toolkit, and its collaborative architecture, is greater than the sum of its parts - precisely because of the network effect created by convening and connecting the multiple stakeholders responsible for its components, and uniting them in the pursuit of a shared objective with benefits for all.

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The daily operation of EEFTG and its technical activities are managed, on behalf of the Co-chairs and the Steering Group, by a small secretariat formed of key individuals selected for their specific technical input and relevant networks that they brought to EEFTG. The members of the EEFTG Secretariat are: Mr Santiago Creuheras Díaz (Ministry of Energy, Mexico), Ms Rocio Palacios Espinosa (Ministry of Energy, Mexico); Ms Clementine Renevier (Ministry of Ecology, Sustainable Development and Energy, France); Ms Ailin Huang (IPEEC); Ms. Annie Degen-Neuville (UNEP FI); and - in the role of EEFTG rapporteur and content lead - Mr Peter Sweatman (Climate Strategy & Partners). Special mention is reserved for Tyler Bryant and Sam Thomas (IEA), Sarah Challe and Martin Schoenberg (UNEP FI), Tatiana Bosteels (for IIGCC) and Mauricio Yrivarren (Climate Strategy), in addition to the EEFTG Secretariat, for their diligent support of various aspects of the co-ordination, organisation and drafting of this Toolkit.

The structure of this Toolkit was presented for comments to the G20 Energy Sustainability Working Group (ESWG) in Berlin and G20 countries were offered an opportunity to review and comment on its contents. Drafting was coordinated by the EEFTG Secretariat and co-delivered by the IEA, UNEP FI and the IPEEC with crucial support, direct inputs and comments from very many International Organizations and collaborators. These entities performed a variety of roles including content provision and review, expert support, convening and hosting EEFTG meetings, workshop coordination, identifying experts, resourcing and networking on EEFTG's behalf. In 2017, EEFTG particularly thanks:

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Principles for Responsible Investment (PRI), Sustainable Energy For All (SE4All), UN Environment, United Nations Environment Finance Initiative (UNEP FI), UNEP FI Principles for Sustainable Insurance (PSI), UN Environment Inquiry into the Design of a Sustainable Financial System (UN Inquiry), and the World Bank Group.

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G20 Energy Efficiency Investment Toolkit

Energy efficiency is a long-term priority for the G20 Leadership from the world's 20 leading economies is critical to double the global rate of improvement in energy efficiency¹ and to better understand and help fill the annual energy efficiency investment gap. Increased G20 collaboration on energy efficiency can drive economic activity, growth and productivity gains, strengthen energy security and improve environmental outcomes. Moreover, since its founding the G20 has offered a strong platform for members to share their accumulated experiences and good practices to accelerate energy efficiency improvements globally.

In July 2016 in Beijing, China, G20 Energy Ministers welcomed the G20 Energy Efficiency Leading Programme (EELP), the G20's first long-term framework for energy efficiency. The EELP builds on the success of the G20 Energy Efficiency Action Plan endorsed by G20 Leaders in November 2014.

G20 EELP calls for enhanced capital flows into energy efficiency investments

- As the world's major economies, the economically attractive opportunity to invest in energy efficiency creates market demand for finance in G20 members that requires enhanced capital flows into energy efficiency investments.
- Like all programmes, energy efficiency needs to be adequately resourced by dedicated human, institutional and financial resources, to allow its deployment at all levels of national and local economies. Support is needed to: i) create an enabling national policy environment; and ii) generate direct investments by public and/or private stakeholders into energy efficiency solutions, systems and technologies.
- G20 members will work to significantly improve energy-efficient technologies and equipment coverage, as well as effectively work to enhance capacity building and the policy and regulatory environment for energy efficiency investments, taking into account different national realities, capabilities and levels of development within countries, and respecting national policies and priorities.

In September 2016, G20 Leaders encouraged members to significantly improve energy efficiency, based on their specific needs and national circumstances, and G20 Energy Ministers recognised the particular opportunity provided by voluntary collaboration to scale-up energy efficiency investment, since financing institutions within the G20 represent the majority of the global financial system. This heightened interest in increasing the rate of deployment of energy efficiency can enhance productivity, improve energy security and enable low carbon growth. While this will require new core energy efficiency policies, it also requires a review of existing energy architecture to better integrate energy efficiency considerations and a market transformation that supports and facilitates energy efficiency investments and expands financing toward energy efficiency-backed products.

The structure of this Toolkit was presented for comments to the G20 Energy Sustainability Working Group (ESWG) in Berlin and G20 countries were subsequently offered an opportunity to review and comment on its contents. Drafting was coordinated by the EEFTG and co-delivered by the International Energy Agency (IEA), United Nations Environment Programme - Finance Initiative (UNEP FI) and IPEEC with direct inputs and comments from other IOs and other G20 work streams, where relevant. The voluntary options presented in this Toolkit comprise tools, actions and case studies, that together present an integrated and sustainable approach towards enhancing capital flows to energy efficiency, and can be taken up by G20 countries voluntarily and in accordance with their national circumstances and priorities and is divided to four sections:

1 One of the three pillars defined by SEforAll to deliver UN SDG #7, SEforALL. (2015). SEforALL provides "strong global framework" for energy SDG – Ban Ki-moon. Retrieved from http://www.se4all.org/2015_09_17_se4all-provides-strong-global-framework-for-energy-sdg-ban-ki-moon
SEforALL. (2015). Our Value Added. Retrieved from http://www.se4all.org/our-vision_our-value-added

1 An assessment of current energy efficiency investment by sector and region

- Global investment in energy efficiency was estimated to be USD 221 billion in 2015, an annual increase of 6%, with over half of this investment occurring in the buildings sector.
- Section 1 of the Toolkit considers energy intensity improvement trends and geographical contexts to frame incremental energy efficiency investment needs and make the case for additional attention from G20 policy makers and markets.

2 Showcase of good practice exchanges on (i) enabling national policy framework design and (ii) implementation of the voluntary Energy Efficiency Investment Principles for G20 participating countries

- An enabling national policy framework is critical to mobilise and effectively channel finance to energy efficiency investments. The *Voluntary Energy Efficiency Investment Principles* (VEEIP) for G20 participating countries offer a guiding framework for designing and implementing policies that stimulate both the demand for and supply of energy efficiency investments and finance.
- Section 2 of the Toolkit identifies gaps and bottlenecks for energy efficiency investment growth, and provides relevant experiences and case studies to address these through an extensive review of existing policies and policy databases through the lens of the VEEIP.

3 Report on “best in class” instruments and approaches to encourage and increase energy efficiency investments among different types of private sector financial institutions (banks, long-term investors and insurance companies)

- Private sector banks, long-term investors and insurance companies are gradually making energy efficiency investments a focus area. This is demonstrated by the energy efficiency declarations and commitments made by 122 banks from 42 countries and the managers of more than USD 4 trillion of long-term investment funds, and the collaboration under the Principles for Sustainable Insurance (PSI). Insurance companies also have a unique facilitating role through targeted energy efficiency insurance products and services improving the risk profiles of investments.
- Section 3 of the Toolkit presents existing financial instruments and approaches that can be applied by different types of private financial institutions to scale up affordable energy efficiency financing across different sectors and regions. The financial instruments and approaches selected have been identified as “best in class” based on results from a survey of banks and the work of UNEP FI, Principles for Responsible Investment (PRI), the Global Investor Coalition (GIC) and PSI.

4 Facilitate consensus building among public banks and development institutions around “best in class” instruments and approaches to scaling-up their energy efficiency activities

- International financial institutions, public banks and multilateral development banks are principals in the promotion of energy efficiency finance best practices, energy efficiency investments and new instruments that can crowd-in other sources and help fill the energy efficiency investment gap.
- Section 4 of the Toolkit presents a joint G20 statement endorsed by leading public financial institutions identifying key areas and collaborative activities that they will undertake to scale up energy efficiency. These include the deployment of technical and project development assistance, alongside targeted energy efficiency credit lines, as well as opportunities to lever retail distribution channels and build capacity and investment activities among local partner financial institutions, taking into consideration countries’ national circumstances and priorities.

Summary for Policy Makers

The G20 Energy Efficiency Investment Toolkit frames the critical challenge of scaling-up energy efficiency investments in a way that is helpful to policy makers by sorting and simplifying these otherwise complex issues into insights and actionable voluntary options for policy makers drawing on the experiences of private and public financial institutions. This G20 Toolkit recognises that joint actions are required from multiple stakeholders (policy makers, regulators, banks, long-term investors, insurance companies and public financial institutions). The Toolkit also recognises that to deliver multiple benefits of energy efficiency to G20 economies, energy efficiency investment needs to increase (independent of source), and energy efficiency financing is a mechanism (means to an end) that, if adequately deployed, can rapidly accelerate the growth of energy efficient business models and therefore enable the scaling-up of energy efficiency investments in buildings, transport and industry where hosts do not have easy access to the necessary investment capital.

A pattern that emerges independently in each section of this Toolkit is the division of investments and policies into three clusters: “core”, “integrated” and “inefficient” (or hidden). Energy efficiency is “core” to certain pure energy efficiency investors, ESCOs, specific energy efficiency standards, programmes or policies, targeted bank lending facilities and energy savings insurance products. Yet energy efficiency is also “integrated” and embedded in green real estate, sustainable investments, green and climate policies, investor ESG or SRI commitments and bank safeguard procedures. However, there are large clusters of on-going incremental investments and policy arenas where energy efficiency is not a primary consideration, but which have implications for energy efficiency outcomes: For example the lock-in of “inefficiency” through non-compliant buildings, plant and vehicles, energy price subsidies, finance instruments and asset designs which do not consider energy performance.

While there is no precise indicator of current trends across multiple sectors in multiple countries, “core” energy efficiency investments appear to represent “single digit” percentages of total investments (e.g. ESCO markets are just 10% of total energy efficiency investments, nearly zero-energy buildings a small % of total global building investment), whereas incremental energy efficiency investment is integrated or embedded in around 30% of assets (depending on region and sector). However, by far the largest proportion of assets (60%) are either inefficient or do not visibly consider energy efficiency. This provides a strong potential to deliver improved economic, social and environmental outcomes.

This Toolkit uniquely draws together learnings from multiple stakeholders engaged in energy efficiency investment, financing and policy-making to provide a single framework of reference for G20 policy makers and market participants to help deliver the multiple benefits available through the scaling-up of energy efficiency investments. In broad terms, the results from “core” energy efficiency policies and investments provide the necessary evidence and tools for countries to strengthen their energy efficiency policy framework and to mainstream “integrated” and “inefficient” segments, and for financial institutions to accelerate the mainstream integration of explicit energy efficiency criteria through a combination of standards, regulations, tools and requirements. The evidence from “core” energy efficiency policies and investments also offers a strong economic rationale to extend policy compliance and implementation resources to ensure that the majority of global infrastructure and asset investments are energy efficient.

Each section of this Toolkit provides insights and analysis from the best available data on energy efficiency investments and policies. Through this analysis, the Toolkit identifies common threads, best practices and delivery tools for G20 policy makers and financial institutions. A selection of over 30 best-practice case studies is provided in a separate annex to this Toolkit.

Conclusion: The collaborative framework provided by this G20 Energy Efficiency Investment Toolkit offers the right flexible and voluntary architecture to continue the joint development and sharing of G20 energy efficiency policy, investment and financing tools and best practices to enhance capital flows to and scale-up energy efficiency investments. Work in the framework of this Toolkit will strengthen G20 collaboration and provide periodic updates for country input and review.

G20 Energy Efficiency Investment Trends

The USD 221 billion global market of identifiable energy efficiency investments are focused in large G20 economies which have a combination of the necessary policies, income levels, institutional support and market sizes to stimulate and foster them. The U.S., E.U. and China represented nearly 70% of global (core and integrated) incremental investments in energy efficiency in 2015.

In the EU, the buildings sector accounted for over 80% of total efficiency investments (with over 90% in Germany, UK and France). In the U.S., buildings represented over two-thirds of energy efficiency investments and in Japan energy efficiency investments in buildings was over half of the total; yet in India, buildings represented just 19% of total investment, with 34% in China, and 15% in the rest of the world. Emerging economies had a larger share of efficiency investment in industry and transport sectors, with China, for instance, accounting for over 40% of global energy efficiency investment in light-duty vehicles (LDVs).

The largest source of “core” energy efficiency investments is the market for energy performance contracts (EPCs) which totalled USD 24 billion in 2015². EPCs, however, accounted for just 10% of the larger “integrated” energy efficiency investment market which, depending on the sector and region, is ca. 30% or less of total identifiable asset investments.

While the global energy intensity improvement of 1.8% in 2015 was three times greater than the decadal annual average of 0.6%, between 2003 and 2013, G20 energy intensity improvement must accelerate significantly. The IEA notes the need for it to further increase to 2.6% immediately and continue improvement at this rate until 2030, which is broadly in line with SEforAll’s call to double the rate of global energy efficiency improvement. This implies a considerable increase in energy efficiency investments which, at a time of limited public investment capacity, requires a historic mobilisation of capital from public and private sector financial institutions. An enabling policy framework, which seeks to embed energy efficiency across multiple investment segments, is crucial to achieving this.

However, absolute incremental investment levels can follow a similar path as total investments in renewables, where steep declines in the cost of renewables technologies have led to decreasing investment levels per MWh but greater deployment

of total renewables capacity. As energy efficiency supply chains adjust, technological improvement will accelerate and economies of scale will reduce costs, lowering the cost of delivery of energy savings and incremental investment needs. This is an effect that is already being observed in some key product categories, such as LEDs, and was driven by enabling policies which integrate support for energy efficiency investments across target sectors.

Most investments in energy efficiency occur without using specialised energy efficiency financing mechanisms, such as the self-financing of efficient air conditioners, energy renovations, industrial retrofits or electric vehicles, and cannot be measured by observing energy efficiency finance flows. This also means that current energy efficiency investment is supported by the existing sources of finance available to investors. Yet, where energy efficiency alternatives are only attractive when observed over the asset’s lifetime, new tailored low-cost finance mechanisms, supportive policies and business models which make them visible and accessible to asset owners, are critical to enable these owners to make the energy efficient choice over the “cheap” one.

Split incentives, poorly understood performance risks and the disaggregated scale of most energy efficiency investments hamper demand for these investments within the limits of conventional financing mechanisms. New technologies mechanisms that reduce transaction costs, like smart metering, on-bill finance, energy savings insurance and cost reductions in the underlying energy efficient technologies can help overcome these barriers.

The fast growing debt market for green bonds provides a useful example: While in 2015, green bonds financed just USD 8.2 billion of energy efficiency investments (less than 5% of the total energy efficiency market), banks were able to have significantly improved access to this new source of finance if they more aggressively identified and tagged the green characteristics of the assets on their balance sheets. Regulations which support the greater visibility of bank assets’ energy performance will help financial institutions to prioritise this internal identification and subsequently grow the market for green bonds in a virtuous circle, delivering greater energy efficiency investment to private and public investors.

Investment Trends Conclusions: G20 energy intensity improvement must accelerate significantly in coming years and an enabling policy framework, which embeds energy efficiency across multiple investment segments is crucial to achieving this. As energy efficiency supply chains adjust, technological improvement will accelerate and economies of scale will reduce costs and new data, smart meters and business models with tailored finance can reduce transaction costs and aggregation. Regulations which support the greater visibility of bank assets’ energy performance will help financial institutions to prioritise energy efficiency investments.

G20 Energy Efficiency Investment Policies

In 2015, the *Voluntary Energy Efficiency Investment Principles* (“Principles”) were developed based upon the experiences of G20 Participating Countries and welcomed by G20 Energy Ministers. These Principles provide a robust framework through which to assess G20 policy progress to scale-up energy efficiency investments, evidenced through the results of the 2016 EEFTG global expert survey. The degree of implementation of the Principles was assessed through this survey and through analysis of eight policy databases containing in aggregate 10,000 global policy records.

While the coverage of the policy types included in the Principles is reasonably high - between 40-80%- it is surprising to see that none of the eight global policy databases has 100% coverage of the Principles, nor is it straightforward to sort the 10,000 policies which are recorded into the five policy categories identified in the Principles as supporting energy efficiency investments. This suggests that energy efficiency investment and finance, as a cross-cutting category, was not considered in the design of the current database tools available to policy makers to track policy developments in this area.

In terms of relative policy intensity of energy policies that support energy efficiency investments, EEFTG was able to map just 55 (3%) of core policies against the Principles for G20 nations in the IEA’s Policies and Measures (PAMS) database². This number would be 280 (or 80% higher) if EEFTG could identify a policy for each of the sub-Principles and every G20 nation in the vEEIP in PAMS, indicating plenty of opportunity for progress on both implementation and PAMS. This analysis, while imperfect, is also supported by the findings of the expert survey which indicates that there are areas for policy improvement identified by the Principles.

EEFTG work identifies key G20 policy gaps that correspond to Principles 2 (systematic balance of demand-side with supply-side policies), 3d and 3f (aggregation, standardisation and bundling support, and investment pipeline development assistance, respectively), 4a and 4e (accounting and regulatory treatment for EEI and blending public finance to lever private sector finance for EEI, respectively) and Principle 5 (building awareness and the use of voluntary targets within financial institutions).

Conclusion for policy makers: Continued implementation work on the Voluntary Energy Efficiency Investment Principles is recommended, with a focus on the areas highlighted through the “gap analysis” in this Toolkit. Countries can consider jointly developing further tools by Principle in these areas in annual revisions of this Toolkit. At the same time, the proven engagement mechanisms and bilateral approaches, led by EEFTG and its IO partners, can be reinforced and focus on the areas and tools highlighted by the G20 energy efficiency investment policy analysis. Finally, global policy databases are important tools for countries to take stock of and track progress. Improving data quality and search functions on existing policy databases would enhance G20 nations’ abilities to track and report progress on the G20 Energy Efficiency Investment challenge.

2 PAMS is one of the oldest policy databases (launched in 1999) and covers c. 2,000 energy efficiency policies in 117 countries with extensive coverage of G20 countries.
IEA. (2017). Policies & Measures Databases. [Website]. Retrieved from <https://www.iea.org/policiesandmeasures/>

Private Sector Contributions: Role of Private Sector Banks

Energy efficiency is not a defined financial asset class but is present in all manner of assets and across all forms of investment that use, transform or have embedded energy. This fundamental, “integrated” nature of energy efficiency, as seen from a financial perspective, means that “core” energy efficiency investment remains a niche market (small percentage of portfolios and business). However, incremental energy efficiency investments are (or should be) integral to large proportions of corporate investments, retail banking loans, public and private real assets (e.g. infrastructure), real estate and industrial investments.

Private sector banks have a collective balance sheet sized at well over USD 110 trillion, with long-term institutional investors managing USD 70 trillion and insurance companies (as the largest subset of institutional investors) around USD 31 trillion. To engage with as many and diverse a set of private sector financial institutions as possible, EEFTG has levered its relationships with formal networks³ and has developed commitment tools that, to date, 122 private banks and more than USD 4 trillion of institutional investors are using to embed energy efficiency considerations more deeply in their activities, in support and implementation of Principle 5 of the Voluntary Energy Efficiency Investment Principles.

In 2016, 818 companies (35% of the 2,300 global companies reporting to CDP) reported having undertaken an average of 2.9 energy efficiency projects each. In addition, 89 major companies that spend USD 2.7 trillion with over 2,500 suppliers saved USD 12.4 billion, of which half resulted from energy efficiency actions.

Yet evidence suggests that most companies are still focused on energy efficiency investments with a payback period of 3 years or less. This conclusion is echoed across all G20 countries, including Europe, the U.S., China, India, South Africa and Mexico. Economic returns do not seem to be a barrier for energy efficiency investments, so the Toolkit explores how financial institutions can play a role to unlock and improve energy productivity and the visibility of their assets’ energy performance.

EEFTG surveyed the leading banks making commitments to scale up energy efficiency to better understand their approaches. These banks start with a specific policy, strategy or target for the financing of energy efficiency -either standalone or as part of a larger sustainability or climate strategy. Nearly all of these banks (84%) indicated that energy efficiency finance has strong business potential and they identified the key drivers of energy efficiency business growth as including: energy prices, an anticipation of carbon taxes, public incentives, awareness, and the greater availability of technologies and professionals. Most of the banks active in energy efficiency finance focus on real estate and consumer and corporate lending, with two-thirds having at least one dedicated energy efficiency finance line or service. However, just one third of these banks take into account energy savings in credit terms and a similar proportion, or less, track the energy performance of their assets by category (real estate, industry, etc.).

Bank Conclusions for policy makers: The lessons of the “core” 122 banks – which represent less than one percent of all banks- committed to scaling-up energy efficiency activities can be enhanced and promoted to encourage the wider integration of energy efficiency into mainstream bank financing activities. Visibility of asset energy performance is key theme among core banks, as is having a bank-wide energy efficiency policy. The real estate and consumer and corporate lending departments should find ways to integrate the multiple economic benefits of energy efficiency for their customers into their regular finance products, thereby stimulating demand and enhancing their customers’ creditworthiness and resilience to energy shocks. Finally, banks can increase their use of “green tagging” as a mechanism to better track and report on the energy and environmental performance of their assets, also giving them expanded access to new financing markets (like green bonds) and enabling greater levels of transparency and disclosure.

³ UN Environment Finance Initiative (UNEP FI), the Principles for Responsible Investment (PRI), CDP, Investor Network on Climate Risk (INCR), Institutional Investors Group on Climate Change (IIGCC), Investor Group on Climate Change (IGCC) and UNEP FI Principles for Sustainable Insurance Initiative (PSI Initiative)

Private Sector Contributions: Institutional Investor Insights

Institutional investors can help scale-up energy efficiency investments in buildings, industry and SMEs by allocating long-term capital to the most efficient listed and private assets, and by directly engaging with their corporate investees to improve their energy efficiency. Leading institutional investors, managing over USD 4 trillion, share a common understanding of the positive economic and social benefits of energy efficiency and recognise the need to fully embed energy efficiency into their investment processes. This “core” group of 40 investors (representing around 5% of the sector by assets) are integrating energy efficiency considerations across their investments in different asset classes.

One of the main obstacles in assessing the effectiveness of institutional investors in capturing energy efficiency opportunities is finding out how energy efficiency information is integrated into investment practices and investment vehicles implicitly or directly. 60% of the 1,061 PRI reporting investors in 2016 considered climate change to be a long-term risk to investments. Energy efficiency is only implicitly integrated into such activities. One third of the managers reporting “optional indicators” for environmental and social themes to PRI referenced “green buildings” and “clean energy”, while just 15% referred directly to energy efficiency.

To improve institutional investor transparency, the PRI announced that it will align the PRI Reporting Framework with the final FSB Task Force Recommendations.

The task force targets disclosure to allow users to understand better the links between energy externalities and financial performance, thereby enabling improvement in the efficiency of their capital allocation. The task force identifies energy efficiency as a key opportunity for investors and a key component of its resource efficiency category.

Institutional investors have also started to embed energy efficiency considerations into their company assessments and corporate engagements, the better to raise the profile and visibility of energy efficiency. This Toolkit highlights the energy productivity tools and analysis that help reveal “best in class” company performers and uncover missed opportunities for improved profitability around which they can engage as shareholders. Investor-led collaborative corporate engagement activities are effective tools that can scale up energy efficiency investments. As real estate investors have a particular role to play in driving energy efficient real estate, UN Environment Finance Initiative, ASBEC and other partners have developed specific tools offering simple frameworks for capturing energy efficiency opportunities into each stage of real estate investment processes, accompanied by detailed case studies of investors implementing each step.

Institutional Investor Conclusions for policy makers: There needs to be better explicit measurement and reporting of energy productivity as it remains embedded in broader themes. More work is therefore required to make energy efficiency explicit and visible within investor and company disclosures. The FSB Task Force Recommendations provide an opportunity to scale up the existing voluntary work developed by the investment industry. G20 policy makers can continue to highlight these voluntary best practices, support and strengthen the visibility of energy efficiency investments in investor disclosure work and support those investors making commitments to scale-up energy efficiency investments. A consistent and appropriate regulatory framework for real estate and industry, through building codes, standards and mandatory certification schemes, would broaden coverage to a wider range of smaller investors in the heterogeneous investment industry.

Private Sector Contributions: Role of Insurance in De-risking Energy Efficiency

Insurance companies have a unique perspective, both as institutional investors managing USD 31 trillion of assets and as insurers of the uncertainties and risks relating to extreme weather events and climate adaptation. Insurance products and services can help remove technical uncertainties that can allow banks and non-specialist investors to focus on credit, process and corporate risks. Insurers can help increase energy efficiency investments through improved risk profiles of the underlying projects, through products like energy savings insurance, and also improve the understanding of these risks, through the need for more robust data and greater trust in the market for energy efficiency solutions. The high data intensity requirements for insurance products creates a requirement to augment the evidence base showing that projected energy savings will materialise and to reduce transaction costs.

Energy efficiency investments are often hampered by the uncertainty associated with risks in terms of the assets installed, the revenues resulting from the project, and the energy savings generated. In scaling-up energy efficiency investments, all these risks need to be addressed and better understood. The transfer of risks to insurance companies can lower the cost of carrying this risk and – by improving the risk profile of the project – lower the cost of capital. Energy savings insurance of this nature can enable business models for SMEs with limited balance sheets and abilities to write guarantees, even though the quality of their project work may be high.

Insurance Conclusions for Policy makers: Through engagement in the production of this G20 Toolkit, PSI members were given the opportunity to better understand the opportunities for energy efficiency insurance and their potential role in scaling-up energy efficiency investments. The growing awareness and integration of climate-related risks and opportunities by insurance companies can be strengthened by conducive legislative incentives, such as equipment, vehicle and building standards. Subsequent iterations of this Toolkit can encourage insurance companies and platforms, PSI and SIF, to develop a joint G20 insurance commitment to bring visibility to sector leaders and best practices.

Role of Public Finance in supporting the scale up of G20 Energy Efficiency Investments

Public financial institutions have had a leading role in promoting and scaling up energy efficiency investments, with a focus on: showcasing and replicating energy efficiency investment models that lever the partner networks of private retail banks for on-lending to their clients; the identification and implementation of new financial instruments designed to facilitate the replication and scale up of energy efficiency investments; and the identification of internal policies and safeguards that help mainstream energy efficiency investment across all activities of the organisations.

From 2012-2014, six leading public financial institutions invested over USD 7 billion in “core” energy efficiency investments representing 14% of their energy portfolios and 3% of their total investment portfolios, an amount equal to around half their investments in renewable energy. Working with these six and convening another ten public financial providers and stakeholders, EEFTG facilitated a public finance working group designed to identify and build consensus around the role of public finance in scaling-up energy efficiency investments. Public financial institutions do not have the additional amounts of capital required to fill the G20 energy efficiency investment gap, but they do have the patience and human capital to help develop the instruments and approaches required to lever more private capital and support policy makers in creating the regulatory frameworks which deliver the scale-up of energy efficiency investments required.

The public finance working group identified the seven key pillars of a joint G20 energy efficiency statement endorsed by many of its members. This statement provides a basis for continued engagement and joint development for G20 members with public financial institutions working in their geographies or at their behest. Four of the key areas identified for joint development with G20 countries are developed in greater detail in the Toolkit:

1. Increasing direct financing support of policy frameworks which require and promote energy efficiency and drive a life-cycle cost optimal approach to the procurement of new public infrastructure and buildings;
2. Working with stakeholders to increase the amount, availability and simplicity of technical and project development assistance facilities to lever own and partners’ investments;
3. Increasing on-lending activities with retail distribution networks, through partner commercial banks and other retail facing channels, to support aggregation of individual energy efficiency investments and lever on-bill finance and new repayment channels where available; and
4. Ensuring energy efficiency’s central role in the future of mobility, smart cities, energy grids and infrastructure.

Public Finance Conclusions for policy makers: Public financial institutions are working together to build a common understanding of the multiple benefits of energy efficiency and to share best practices in a more structured manner through this Toolkit. G20 countries can work to increase the amount, availability and accessibility of Technical and Project Development Assistance facilities to lever their investments and embrace a life-cycle cost optimal approach to the procurement of new public infrastructure and buildings. Countries can lever the experience of public financial institutions to strengthen policy frameworks for energy efficiency and facilitate aggregation mechanisms and ensure energy efficiency’s central role in the future of mobility, smart cities, energy grids, industry and infrastructure.

		Integrated	Core	
Market	 USD trillions	USD 221 bn	ESCOs (USD 24 bn); “Self-financed”	
Policy	 2000+ policies	Energy subsidies; Inefficient markets; Supply-led planning.	Energy Transition; National Renovation Strategies; Vehicle Fleet Standards; Transparent Energy Planning.	“EE First”; Mandatory targets/ standards; NZEBs; EE Obligation schemes; National EE Action Plans.
				
Private Sector	Banks  \$110tr	Finance undertaken without explicit consideration of energy “externalities” or cost effective energy improvements.	Green tagging; Green buildings lending; green lending; climate lending; Equator principles.	EE mortgages; Building renovation loan; EE credits/loans; EE tagging.
	Investors  \$70tr	Finance undertaken without explicit consideration of energy “externalities” or cost effective energy improvements.	Green tagging and company disclosure; Collaborative shareholder activism; Green funds; Sustainable real estate funds.	EE funds; Energy Productivity Indexes; Own real estate EE renovation; EE tagging.
	Insurers  \$31tr	Product and services without explicit consideration of energy “externalities”.	Green buildings insurance; Climate mitigation insurance and investments; Add- on coverage; Technical assistance, advisory services.	Energy saving insurance; energy performance guarantee; EE advisory services.
Public Sector	Public finance  \$176 + bn	Finance undertaken without explicit consideration of energy “externalities” or cost effective energy improvements.	Resource Efficiency; Safeguards; ESG & Climate Commitments.	Direct EE Lending; EE Policy lending; EE targets; Technical assistance.
			\$33 bn	\$7 bn

G20 Energy Efficiency Investment Toolkit: Case Studies and Best Practice Examples

Principle 1

Case study | France

The Energy Transition in France

France adopted the Energy Transition for Green Growth Act in August 2015, a broad legislation to catalyse the transition to a sustainable energy model while stimulating growth and employment. This Energy Transition Act sets out strong objectives for the reduction of greenhouse gas reduction and the diversification of the energy mix by limiting nuclear energy and deploying renewables and energy efficiency. The ambition of this law sends a very positive signal on the commitment of France to the low-carbon economy which will enable increased investments in energy efficiency in the coming years.

Objectives and measures

The Energy Transition Act establishes six major, interrelated targets:

- Reduce GHG emissions by 40% by 2030 compared with 1990 levels
- Reduce final energy consumption by 50% in 2050 compared with 2012 levels
- Reduce fossil fuel consumption by 30% by 2030 compared with 2012 levels
- Increase the share of renewable energy sources to 32% of the final energy consumption in 2030 and 40% of electricity production
- Reduce the share of nuclear power in the energy mix to 50% by 2025



In addition to the overarching targets outlined in the above, the government is also operating a host of programmes and implementing policies targeted at specific sectors:

Energy efficiency in the building sector: For the building sector, which is the largest energy consumer in France, the government is encouraging large scale retrofits and requires that 500,000 dwellings are renovated by 2017, including 50% in the low-income segment. To facilitate energy renovations, the government has introduced a set of financial incentives such as tax credit, zero interest eco-loans, third-party financing options and an energy transition guarantee fund.

Green finance and responsible investment: Article 173 of the Energy Transition law introduces new disclosure obligations on the integration of environmental, social, governance and climate considerations by listed companies and financial institutions. In particular, it requires institutional investors to report on their exposure to climate related risks including the GHG emissions associated with their portfolios and on their contribution to the international goal of limiting global warming.

Lessons learnt

As highlighted in the first principle of the Voluntary Energy Efficiency Investment Principles for G20 participating countries, high-level signalling on the importance of energy efficiency and its increased consideration in long-term national policies for sustainable economic growth is crucial to mobilise private capital for energy efficiency investments. The overarching targets set by high-level national policy are also crucial in providing a guiding framework for sectoral, cross-sectoral and regional policies, such as on buildings and green finance, that support the scaling-up of energy efficiency investments.

Mexico's Energy Transition

Mexico's Energy Transition Law (Ley de Transición Energética - LTE) was approved in December 2015, with the purpose to ensure the sustainable use of energy while maintaining competitiveness of the Mexican economy. It focuses on modernization of the country's energy mix, by setting up clean energy obligations and clear emissions reduction targets, as well as targets to improve the efficiency of the power and transmission infrastructure.

Mexico's energy transition law provides a comprehensive regulatory and policy framework coordinated by the Ministry of Energy and with clear division of responsibilities across key agencies. The National Commission for the Efficient Use of Energy (CONUEE) plays a key role in advising and guiding different government bodies on policy design and compliance, including through the Energy Efficiency Roadmap, which provides detailed guidance on energy efficiency goals, prioritisation of policy actions and compliance mechanisms. The Roadmap is complemented by PRONASE, a programme which comprises of projects and activities that work towards the attainment of the energy efficiency goals set up.

In the framework set out by the Energy Transition Law, the Ministry of Finance (SHCP) follows suit with complementary mechanisms and fiscal or financial incentives to foster investments in energy efficiency.

Objectives and measures for energy efficiency

- Encourage use of more efficient technologies (by households, companies and municipalities);
- Enhance standardisation of energy conservation codes and Official Mexican Standards for energy efficiency (NOMs)
- Increase availability and access to financing as well as financing mechanisms to facilitate the implementation of EE projects;
- Broaden the reach of information campaigns pertaining to the benefits of EE and the sustainable use of energy;
- Support the financing of R&D for EE related projects

LEY DE TRANSICIÓN ENERGÉTICA
Nueva Ley DOF 24-12-2015



CÁMARA DE DIPUTADOS

Momentum, Fostering EE Financing in Mexico

Experts estimate that the energy efficiency opportunity in Mexico is large and could absorb investments of USD 8.8-12.3 billion over the next 15 years, a considerable increase over the USD 150 million spent in 2013-2014. To realise this opportunity, Mexico can draw on some existing instruments which can deliver replicable and bankable pipelines of projects at scale:

Fund for the Energy Transition and the Sustainable Use of Energy (FOTEASE): This fund promotes the use, development, and financing of renewables and energy efficiency. FOTEASE is responsible for financing programs regarding the implementation of EE measures in public lighting and the replacement of inefficient household appliances among others.

Trust Funds for Rural Development (FIRA): FIRA provides credit and guarantees as well as training, technical assistance and technology-transfer support related to EE to Mexico's agribusiness sectors.

Eco-Credit for Business (Eco-Crédito Empresarial): This program provides credit to SMEs for the replacement of obsolete equipment with efficient one. Its purpose is to increase the productivity of SMEs by reducing their operational costs through energy savings and the effective use of energy.

Lessons learnt

In consonance with the first principle of the Voluntary Energy Efficiency Investment Principles for G20 participating countries, the LTE recognizes the multiple cross-cutting benefits of energy efficiency and seeks to maximize its full potential across Mexico's public and private sectors as well as its citizenry.

1 IFC. (2012). Estudio de Mercado del Financiamiento de Energías Sostenibles en México: Reporte Final. Retrieved from: <http://www.ifc.org/wps/wcm/connect/d75f9c004cf49a3bafaceff81ee631cc/October+2012-Market+Study+of+SEF+in+Mexico-ES.pdf?MOD=AJPERES>

Australia's National Energy Productivity Plan

During 2011-12 Australia spent AUD 120 billion² on energy across its economy (equivalent to 8.2% of its GDP in that year). Experts agree that by improving energy efficiency by just 1% a year, Australia could significantly reduce its energy expenditures³ and grow its economy by AUD 26 billion by 2030⁴. Australia's National Energy Productivity Plan (NEPP), launched in December 2015, was developed to address this. NEPP builds on the energy efficiency work of the Council of Australian Governments' (COAG) Energy Council and provides a framework and economy-wide work plan to coordinate energy efficiency, energy market reform and climate related policies over a 15 year horizon. A report is released annually to monitor the progress of NEPP.

Objectives and measures

- Improving Australia's energy productivity by 40% between 2015 and 2030;
- Boost competitiveness creating investment & jobs;
- Encourage more productive choices to help consumers manage energy costs and bills;
- Promote more productive energy services through innovation support, competitive modern markets and consumer protections;
- Reduce carbon emissions by at least one quarter to meet Australia's 2030 international GHG reduction target.

NEPP Timeline

- NEPP commences December 2015 and continues through to 2030.
- Initial measures in the work plan will continue to be developed in consultation with stakeholders during 2016.
- The work plan and implementation of supporting measures will be continuously monitored by the COAG Energy Council, with measures updated over time to keep the NEPP on track.
- The COAG Energy Council will deliver a NEPP progress report and review by 2020.

Tailored financing mechanisms

A number of financing mechanisms, tailored to the specific characteristics of energy efficiency investments, have been launched by the Australian government, and are contributing to the NEPP's key objectives. In addition to the Clean Energy Finance Corporation's (CEFC) financing programme, which offers a number of mechanisms to finance clean energy projects, there are also financing programmes focused exclusively on energy efficiency.

Westpack Energy Efficient Financing Program: Offers financing for energy efficiency related works for projects starting at AUD 15,000 for up to 10 years⁶. This program encompasses finance leases, commercial loans and hire purchase finance, with a 0.7% discount on finance for eligible projects, and is available for a broad range of industries (health and age care, agribusiness, and education) and state and local governments.

Lessons learnt

In line with the first principle of the Voluntary Energy Efficiency Investment Principles for G20 participating countries, the NEPP underlines the importance of energy efficiency as a horizontal, cross-cutting economic and developmental priority. The plan's long-term perspective sends a strong political signal to and provides policy stability for investors. Together with tailored financing mechanisms, such as the CEFC's government finance program and many other initiatives at the state and local level, high-level policy frameworks such as NEPP are crucial ingredients to stimulate demand for energy efficiency finance.

2 ClimateWorks Australia. (2015). Australia's National Energy Productivity Plan is an Important Step Forward. [Website]. Retrieved from <http://www.climateworksaustralia.org/story/insights/australias-national-energy-productivity-plan-important-step-forward>

3 Ibid

4 Climate Institute. (2013). Boosting Australia's Energy Productivity. Retrieved from http://www.climateinstitute.org.au/verve/_resources/TCI_BoostingAustraliasEnergyProductivity_July2013.pdf

5 Energy productivity refers to the value obtained from investments in energy. In technical terms, it is a measure of the amount of economic output derived from each unit of energy consumed.

6 CEFC. (2016). Helping Business take control of Energy Costs and Emissions. [Fact Sheet]. Retrieved from http://www.cleanenergyfinancecorp.com.au/media/178179/cefcfactsheet_westpac-energy-efficient-financing-program.pdf

7 Ibid

Driving energy productivity and value creation in the Kingdom of Saudi Arabia

The Kingdom of Saudi Arabia's launched its Vision 2030 in 2016, presenting an ambitious plan to shift from the Kingdom's dependence on oil towards a diversified energy sector and economy with extensive development of service sectors¹². Re-orienting the allocation of capital has been a core component of Vision 2030, and the Saudi Public Investment Fund, with total assets valued at USD 2.5 trillion, will be a key vehicle in this endeavour and will align its investment strategy with the goals of Vision 2030.

Improvements in energy productivity will be crucial to support the transition to a more diversified energy sector that is 'free from oil'. In addition to the reduced exposure of the economy to volatilities of oil price, energy productivity can also deliver many other benefits in terms of extra energy available to export and avoided capital expenditure on new electricity generation capacity.

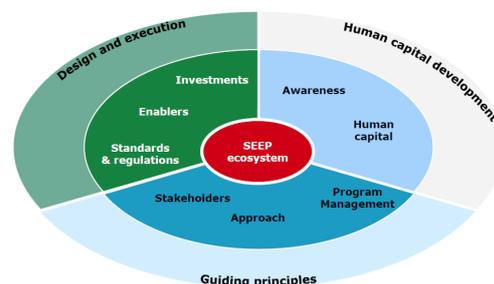
Measures

Already in 2010, the Kingdom established the Saudi Energy Efficiency Center (SEEC), which oversees a comprehensive Saudi Energy Efficiency Program (SEEP) that covers measures in building, transport and industry sectors, representing over 90 per cent of energy consumption in the Kingdom¹³. The SEEP will play a critical and growing role in implementing measures and delivering on the goals of Vision 2030.

To deliver on its comprehensive mandate, the SEEP cuts across multiple ministries and works with over 30 governmental entities and enterprises, including the Ministry of Petroleum and Mineral Resources, Ministry of Finance, Ministry of Commerce & Industry, SEEC, Saudi Aramco, Saudi Standards, Metrology and Quality Organisation amongst others.

The program has been designed to develop and nurture a strong ecosystem for energy efficiency and corresponding investments – which will not occur naturally without adequate incentives, especially in a low-energy price environment. As such the program is structured around three pillars:

- Design and execution of standards and regulations, incentives, and investments.
- Capacity development, including awareness raising and training.
- Guiding principles based on inclusiveness and ownership through extensive stakeholder consultation.



Since its launch in 2013, over 70 energy efficiency initiatives have been launched and implemented, including on the development of new standards and labels for buildings, industrial processes, transport systems and energy systems.

Complementary to these programmatic efforts, the government has also launched a number of public-private partnerships to co-finance energy efficiency improvements and is in the process of developing more financing mechanisms to support the transition to higher energy productivity.

These include incorporating energy productivity criteria into existing public capital spending; establishing a new public financing vehicle specifically for energy productivity investment; and issuing energy productivity 'green' bonds, including Green Sukuk¹⁴. To this end, the King Abdullah Petroleum Studies and Research Center (KAPSARC) is providing extensive analysis and developing business models for the scale up of energy productivity investments.

Lessons learnt

As in many other G20 countries, a broader national development strategy provides an important vision and long-term framework that sets the path for energy efficiency improvements. Amongst the members of the Gulf Cooperation Council (GCC), the Kingdom of Saudi Arabia leads these developments with its Vision 2030, which provides an important framework for a transition in the energy sector and economy, thereby also providing the broader architecture.

12 Kingdom of Saudi Arabia (2016) Vision 2030. Retrieved from <http://vision2030.gov.sa/en>

13 Saudi Energy Efficiency Center (2016) [website]. Retrieved from <http://www.seec.gov.sa/en>

14 KAPSARC (2016) Energy Productivity as a New Growth Model for GCC Countries.

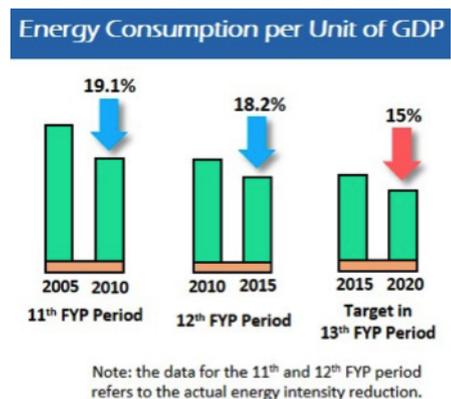
Government action to create a comprehensive policy framework for EE finance

In March 2016, China adopted its 13th Five Year Plan (FYP), setting the trajectory and key priorities for the country's economic and social development in the next five years. Building on the last two FYPs, the 13th FYP furthers its ambitions to drastically improve energy efficiency as a key pillar for sustainable energy policy and means to improve broader reaching environmental impacts as well as reducing emissions.

For this purpose, the Chinese government set “double control” targets to:

- Reduce energy intensity (energy consumption per unit of GDP) by 15%.
- Cap on total energy consumption at 5 billion tons of coal equivalent in 2020.

The focus of efficiency goals has been mainly on heavy industry and the power sector, while non-energy-intensive sectors like buildings and transport are increasingly targeted in the context of the country's fast urbanisation. Significant improvements will also come from cutting overcapacity in steel and coal.

**Greening the financial system from the ground up.**

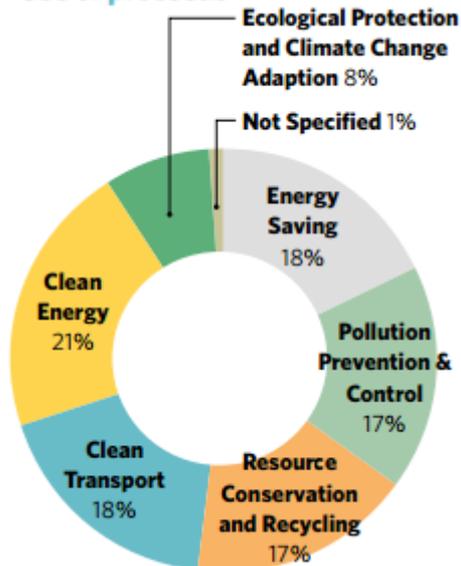
To facilitate these developments and other policies within 13thFYP, the government is also strengthening its reform efforts of greening the financial system. While the strengthening of these is embedded in the 13th FYP, efforts have already been launched as early as 2012, when the China Banking Regulatory Commission (CBRC) issued **Green Credit Guidelines** to encourage sustainable lending by Chinese banks. The guidelines are designed around three pillars encompassing green business opportunities, environmental risk management and environmental footprint. Banks are asked to consider the environmental performance of loan applicants when defining the interest rates and even to deny credit in case of serious environmental violations. This policy allowed for a significant expansion of green lending with the 21 major banks' joint green loan portfolio reaching one trillion dollars in 2014.

Further, CBRC and the National Development and Reform Commission (NDRC) formulated **Energy Efficiency Credit Guidelines** in 2015 to stimulate banks' financing of energy efficiency, especially in the industry and transport sectors. These new guidelines provide practical information to build the capacity of banks on risk management and product innovation for energy efficiency.

Building on these policies, China launched **Guidelines for Establishing the Green Financial System**⁸ in August 2016. They represent the most comprehensive policy package globally to support green finance development.

8 UN Environment. (2016). UN Environment News Centre: On eve of G20 Summit, China puts green finance centre stage. Retrieved from <http://www.unep.org/newscentre/Default.aspx?DocumentID=27084&ArticleID=36254&l=en>

Use of proceeds



Complementary to this policy portfolio, the People's Bank of China (PBoC) and NDRC released the Green Financial Bond Guidelines in December 2015, making China the first country in the world to have official rules on green bond issuance. The guidelines are accompanied by an endorsed project catalogue defining the type of projects eligible for green bonds along six key areas, energy conservation being the first one. These government-backed documents have allowed for a boom of the green bond market as China became the largest country of issuance in 2016 at USD36.2bn, representing 30% of total global issuance ahead of Europe (25%) and North America (15%). Largest issuers are the Shanghai Pudong Development Bank and Industrial Bank, which combined account for 43% of all issuance in China. Proceeds of 18% of the green bonds issued are going to refinancing energy saving projects. From almost no issuance in 2015, it is expected that that China's green bond issuance will grow to a total of USD 85-100 billion (45-50% of global issuance) by the end of 2017.

Lessons learnt

China has seen remarkable growth in visible energy efficiency investments in the last years, and has been effective in mobilising private finance. Key factors driving these developments are a strong policy framework that sends clear signals to investors and project developers as well as initiatives by the government to provide standardised guidelines and definitions that allow for the proliferation of targeted financial products for energy efficiency –actions that both drive the demand and supply of energy efficiency finance. The energy efficiency credit guidelines have also increased the size of banks' energy efficiency loans as a proportion of its overall loan portfolio, providing an expanding pool of assets for securitisation.

- 9 The Endorsed Project Catalogue can be found here:
Green Finance. (2015). China Green Bond Endorsed Project Catalogue (2015 Edition). Retrieved from <http://greenfinance.org.cn/displaynews.php?cid=79&id=468>
- 10 Quote by Laurent Morel, Head of Debt for Asia Pacific at Societe Generale. Found in: South China Morning Post. (2016). Global green bond market tipped to reach US\$100bn in 2017, with China seen maintaining its lead. Retrieved from <http://www.scmp.com/business/companies/article/2056904/global-green-bond-market-tipped-reach-us100bn-2017-china-seen>
- 11 Commercial banks and corporates accounted for 82% of issuance last year. This is the product in part of the PBOC announcement No. 39 [2015], which properly defined green bonds in financial terms, and established guidance as well as standards pertaining to bond duration period, disclosure and third party certification.

Principle 2

Case study | European Union

Energy Efficiency First

In February 2015, the European Commission adopted its “Framework Strategy for a Resilient Energy Union”¹⁵. Central to this strategy -and in line with the second principle of the vEEIP for G20 participating countries- is the “Energy Efficiency First” Principle. This calls for the consideration of energy efficiency across all EU decision-making, whether for the development of energy systems, buildings, industry and mobility. This principle was embedded in and reaffirmed through the Energy Package “Clean Energy for all Europeans” adopted by the EU in November 2016¹⁶.

Putting energy efficiency first highlights the importance of energy efficiency improvements for the security of Europe’s energy markets, cost effectiveness and other multiple benefits- prioritising efficiency investments ahead of investments targeted at supply infrastructure, such as new power stations, electricity grids or gas pipelines, and fuel supplies and related infrastructure.

EU’s Energy Union 5 Pillars	
1	Supply security
2	A fully-integrated internal energy market
3	Energy efficiency first
4	Climate action – emissions
5	Research and innovation (climate)

Actions and outcomes

With the European Commission having adopted “Energy Efficiency First” as a principle at the policy level, this principle now needs to be implemented – for which processes must be put in place that ensure energy efficiency measures are fully and systematically assessed when Member States consider supply-side investment alternatives.

Embedding the “Energy Efficiency First” principle across EU planning and strategic investing may require, amongst other actions:

- The alignment of existing energy efficiency targets, policies and directives with the EU 2030 climate and energy framework.
- The adoption of “Energy Efficiency First” as a guiding principle for the allocation of EU funds. These include the European Structural and Investment Fund (ESIF), European Fund for Strategic Investments (EFSI), but also dedicated EU financial instruments, which use public funds to leverage private capital through projects such as the PF4EE (Private Finance for Energy Efficiency)¹⁷. The principle should also be taking into account when planning technical assistance and allocating grants.
- The review of current accounting and regulatory treatment by a EUROSTAT working group to ensure their fair treatment of energy-efficiency investments¹⁸ to unlock more private finance.
- The integration of “Energy Efficiency First” as a fundamental principle of energy-market design proposals with clearly defined roles for different stakeholders, such as system operators and regulatory authorities to drive its implementation.

Lessons learnt

The European Commission has set a strong example by placing the “Energy Efficiency First” principle as a key pillar to its Energy Union strategy and shows how energy efficiency has been well integrated at a high-policy level. To ensure, that this principle is implemented, the Commission is now working to align its policies across its portfolio of relevant energy efficiency policies and needs to ensure the

15 European Commission. (2015). Energy Union Package (COM/2015/080 final).

16 European Commission (2016) Clean Energy for All Europeans – Press release. Retrieved from http://europa.eu/rapid/press-release_IP-16-4009_en.htm

17 European Commission. (2016) Good practice in energy efficiency – Working Document.

18 ECF. (2016). Efficiency First: A New Paradigm for the European Energy System.

Integrating 'Energy Conservation First' as an energy planning principle in Ontario¹⁹

Because of its climate and resource context, Canada has some of the highest per-capita energy consumption in the world. To ensure energy security and sustainable use of energy resources, the Canadian government has since long prioritised energy conservation. Given Canada's federal system of government, the majority of its energy regulation falls under provincial jurisdiction.

One of the leading provinces is Ontario. The province's Long-Term Energy Plan, presented in 2013, adopted the policy of Conservation First, which specifies that "regional plans will promote the principle of Conservation First while also considering other cost-effective solutions such as new supply, transmission and distribution investments". Accordingly, conservation is the first resource considered in planning, approval and procurement processes²⁰ (VEEIP Principle 2).

Integrating 'Energy Conservation First' into the planning framework

Ontario's Conservation First Framework for 2015 – 2020 sets out the goal to reduce the province's electricity consumption by 8.7 TWh by late 2020. Furthermore, this framework emphasises the need for stakeholders to work together - particularly local distribution companies (LDCs), which are assigned specific targets which they can pursue individually or by working with other LDCs.

The Ontario Power Authority (OPA) developed a clear breakdown of components for an Integrated Regional Resource Plan (IRRP), which includes assignment of roles to different agencies, and is further accompanied by relevant tools to help the different agencies:

Component	Stakeholders
Demand forecast excluding planned conservation programs	LDC
Planned conservation based on LDC CDM targets and information from LDC CDM plans	LDCs with OPA support
Existing and planned generation	OPA
Technical specifications related to the electricity system in the study area	LDC, transmitters, IESO ²¹
Evaluation of need: magnitude, location, timing	OPA
Development of options (additional conservation/DR, generation, transmission, distribution investments) to address need	LDC, IESO, transmitter, OPA
Recommendations and plan of action including approaches to meeting local needs	LDC, IESO, transmitter, OPA
Stakeholder engagement/communications plan	LDC, IESO, transmitter, OPA

Lessons learnt

Ontario provides a great example of how energy efficiency considerations are integrated into the energy planning process via the 'Energy Conservation First' Principle. The case study also shows that to successfully implement this approach requires collaboration between multiple stakeholders and clear division of roles and responsibilities in the process. To facilitate the planning process, the regulatory authorities and implementation agencies can also develop tools and standardised guidelines for specific components where relevant. This approach and implementation methodology provides an interesting example for other countries who are considering integrating energy efficiency into their broader energy planning processes.

19 Ministry of Energy, Ontario. (2013) Conservation First – A Renewed Vision for Energy Conservation in Ontario.

20 Ontario Power Authority. (2014) Conservation in Regional Planning Primer- LDC Toolkit [presentation]

21 IESO abbreviation for Independent Electricity System Operator

Principle 3

Case study | Australia

Australia's CEFC Energy Efficient Loans - helping business compete in a low-carbon economy

Born out of the 2012 “Clean Energy Finance Corporation Act” the Clean Energy Finance Corporation (CEFC) was established as a green bank to help facilitate enhanced capital flows into the clean energy sector. The CEFC has been established based on principles and offering financial products and financing facilities to address the financial barriers facing clean energy investment: availability, tenor and cost of finance. By doing so, it aims to help Australian businesses position themselves in a low carbon economy by assisting them to improve their energy efficiency, transforming energy use and reducing costs.

Mechanism

One financing mechanism that has been specifically designed to enhance the flow of finance to energy efficiency projects are the “Energy Efficient Loans”. For this, the CEFC has entered a co-financing agreement with the Commonwealth Bank to support businesses –mostly from the manufacturing sector- improving their energy efficiency. So far, the CEFC has committed AUD 50 million with matched financing from Commonwealth Bank for energy efficiency loans. “Energy Efficient Loans” on average range from AUD 500,000 to 5 million²² and can be used to finance up to 100% of purchase price of the equipment, allowing businesses to preserve working capital for other purposes. The equipment being financed acts as security for the loan. Loan terms can be aligned to the effective life of the equipment.

These loans have enabled many businesses to undertake efficiency upgrades of their equipment.

A good example is presented by Radevski Coolstores, a major supplier of apples and pears that faced increasing business operating costs due to increased costs of energy and refrigerants. It was able to install an innovative ammonia-based refrigeration system thanks to an AUD 1.15 million CEFC “Energy Efficient Loan”. These refrigeration update has resulted in:

- Cost reductions by over AUD 140,000 a year.
- CO2 emission reductions by about 25%.
- Competitive edge in the domestic produce market.



Lessons learnt

The CEFC shows that clean energy pays. The Corporation invests with a commercial approach (but taking into account public policy outcomes and positive externalities) to overcome market barriers to mobilise private sector investment – in 2013, the CEFC have crowded in AUD 2.9 of private sector investment for every AUD 1 of CEFC investment. This shows that governments play a leading role in mobilising private sector investments, by providing more patient capital that generates returns over longer periods, which is oftentimes the case for energy efficiency investments.

22 CEFC. (2015). Energy Efficiency. [Website]. Retrieved from <http://www.cleanenergyfinancecorp.com.au/energy-efficiency.aspx>

Mexico’s Eco-Credit Programme for Enterprises, Unlocking Energy Efficiency potential in SMEs

Started in 2012 by the Mexican Federal Government, the Eco-Credit programme (Programmea EcoCrédito Empresarial) is designed to support the industrial national sector, including SMEs through financing schemes with attractive rates. SMEs are responsible for 17% of total energy consumption (215 GWh), 47% of electricity (92 GWh) and 11% of fuel consumption (34,167 GWh). With over 4 million SMEs across the services, commerce and industry sectors, they present an impactful area of action, with proven energy saving potentials ranging from 10% to 20%. However, lack of awareness, technical know-how, and lack of access to credit (given that most business transactions are informal) have meant that much of this potential has been left untapped.

Mechanism

The Eco-Credit programme addresses this through two strands of support:

- Substitution of non-efficient electrical equipment with certified high-efficiency units (notably those identified in the PAEEEM (Enterprise’s Energy Efficiency Financing Programme) – the investment that the government makes through this subsidised equipment is ‘repaid’ through the energy savings generated.
- Implementation of energy audits, through a “case by case approach”, which helps SMEs to identify more opportunities to improve energy efficiency in their enterprise.

As of June 2015, the programme has rolled out a significant number of equipment (see table below).

Equipment Replaced and Amount Invested Under the Eco-Crédito Empresarial ²³		
Equipment Type	Number of Equipment Replaced	Amount Invested
Commercial Refrigeration	13,247	364,541,608.33 MXN (22.49 million USD)
Lighting	5,592	2,301,424.93 MXN (142k USD)
Air Conditioners	1,896	30,294,712.37 (1.8 million USD)
Electrical Substations	77	9,022,270.67 (557k USD)
Electric Motors	1	22,942.69 (1.4k USD)
Capacitor Banks	2	17,874.86 (1.1k USD)
TOTAL	20,815	406,200,833.91 (25 million USD)

Lessons learnt

Mexico’s Eco-Credit Programme, which is targeted at SMEs, provides a compelling example especially for those countries, that are currently ‘locked in’ a system, where subsidised electricity are a burden to the government’s fiscal resources, while cheap energy prices do not incentivise consumers to reduce their energy consumption. By subsidising the replacement of equipment, the government disrupts this cycle, stimulate energy efficiency improvements, and can directly reap the benefits of energy savings, which repay the initial cost of the subsidised equipment and lower the burden of electricity subsidies.

South Korea's Building Energy Information and Management System

In South Korea, the building sector accounts for over 20% of final energy consumption. Importing more than 90% of its energy and facing a continuously raising energy demand, the country has adopted ambitious targets and policies to increase energy efficiency in the building sector.

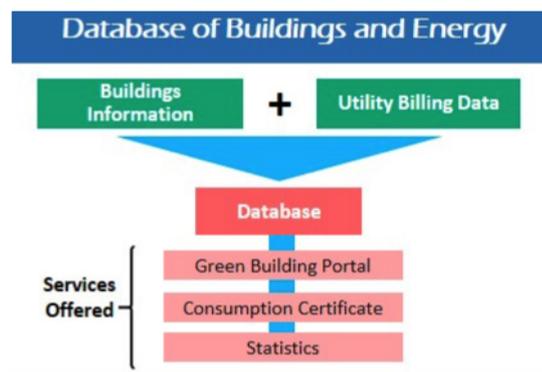
Lack of reliable information and knowledge on buildings' actual energy performance was identified as a barrier to scaling up of investments in energy efficient building construction and retrofits. More data on real energy consumption of buildings and energy savings realized through well-defined energy efficiency measures are necessary to convince banks and investors to allocate more capital to energy efficiency in real estate.

South Korea developed the world's first nationwide integrated database on all buildings energy use and greenhouse gas emissions. Entitled the National Building Energy Information and Management System (BEI&Ms), this data platform aims to support energy consumption reduction efforts in the building sector.

The National Building Energy Information and Management System (BEI&Ms)

BEI&Ms provides a system that manages and analyses different parameters of building property and building energy consumption data, such as electricity, gas, district heating as well as water and renewable energy consumption. It combines building information (location, building type, registration) and energy information updated monthly for all buildings which are assigned a unique identification number. Data collection is based on utility billing data through cooperation with 76 energy supply institutes.

The program started in 2010 with a pilot database of one district of Seoul and was progressively expanded to cover the whole country. Initiated by the Ministry of Land, Infrastructure and Transportation (MOLIT), the Building Energy Information and Management System is currently managed by the Korea Appraisal Board (KAB).



Key benefits and lessons learnt

- The energy information system allows for statistical analyses such as base lining, benchmarking and energy performance tracking for each building in the aim to improve their energy efficiency
- The system provides key information to promote green building policies and support decision-making on regulations and policies to building energy consumption levels
- The data is made available to households through a public web portal which allows to improve awareness and educate people on energy conservation in the aim to influence behaviours and stimulate demand for energy efficiency improvements
- It contributes to stimulate the green building market as a driving force of economic development.

South Korea's ESCO Programme

The Korean Energy Agency (KEA), previously KEMCO, is a public organisation working under Korea's Ministry of Trade Industry and Energy (MOTIE) responsible for drafting and executing energy related policies that address climate change²⁴. Among its services, KEA provides loans to projects that allow Energy Service Companies (ESCOs) to replace dated and inefficient facilities of energy consumers, who lack access to conventional sources of finance²⁵. Main focus areas include²⁶: high efficiency lighting, waste heat recovery, heating and cooling system, and manufacturing process improvement.

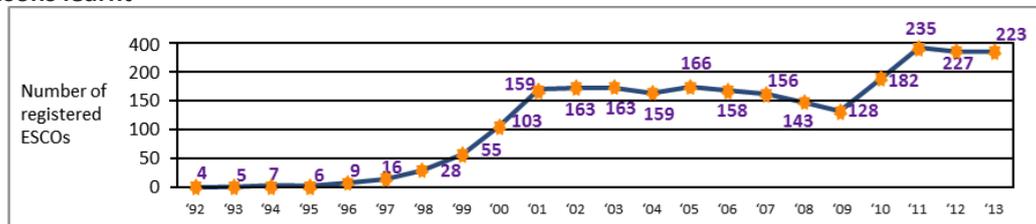
Loan Procedure Steps:

1. ESCO or energy-user files an application online.
2. KEA reviews the application and conducts an expert review of the proposed project.
3. If accepted, KEA issues loan recommendation.
4. ESCO or energy-user uses the loan recommendation to secure financing.
5. Agree on loan and repayment conditions with the financial institutions.
6. The financial institution can then apply for a low-interest loan from KEA.

Funding allocated through the program for ESCOs in 2012 was about USD 242 million, resulting into savings equivalent to 233,000 toe (roughly 2.7 TWh), which can be translated into 11 kWh saved per USD spent. Since the inception of the programme in the early 90s, the number of ESCOs registered with KEA has steadily grown. This has led to the development of standard contract models and guidelines, as well as the enhanced capacity amongst technical experts and job creation, which further enhanced the effectiveness of the programme²⁷. The programme also played a critical role in developing the ESCO market in Korea.

Graph Source: KEMCO, 2014

Lessons learnt



KEA's ESCO programme shows the catalysing role that governments play. By providing loans to ESCOs that had difficulties accessing finance, the programme kicked off a series of projects that demonstrated the benefits of services that ESCOs could bring. These successful experiences then created more demand for services, which further developed and expanded the ESCO market in Korea – growing from just four in 1992 to over 220 in 2013.

24 UNECE. (2015). Best Policy Practices for Promoting Energy Efficiency. Retrieved from http://www.unece.org/fileadmin/DAM/energy/se/pdfs/geee/pub/ECE_Best_Practices_in_EE_publication.pdf

25 Korea Energy Agency. (2015). Energy Efficiency: Investments in Energy Suppliers' Demand-side Management (DSM). [Website]. Retrieved from http://www.kemco.or.kr/renew_eng/energy/industry/dsm.aspx

26 Asia Pacific Energy Research Center. (2012). Compendium of Energy Efficiency Policies of APEC Economies. Retrieved from http://aperc.iecej.or.jp/file/2012/12/28/Compendium_2011.pdf

27 IEA. (2014). Energy Service Companies and Financing. [PDF Presentation]. Retrieved from https://www.iea.org/media/training/presentations/latinamerica2014/8A_Energy_Service_Companies_and_Financing.pdf

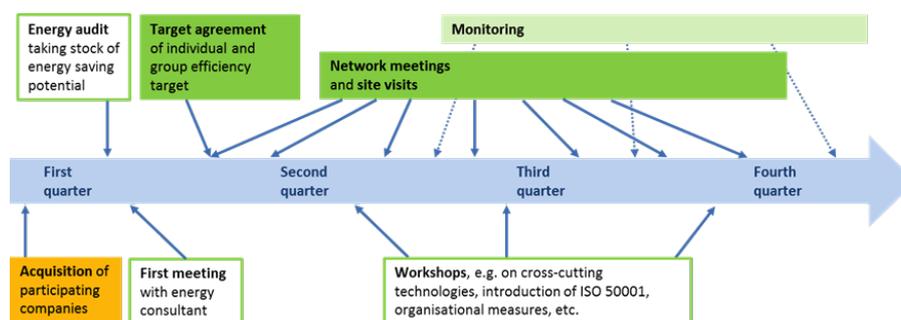
Energy Efficiency Networks as peer-to-peer platforms that enable energy efficiency improvements and investments

Much of the energy efficiency potential remains untapped – especially in industry, which represents 39% of global total energy demand²⁸. Despite the profitability of energy efficiency investments, the opportunities are often overlooked due to prioritisation of other more core business areas, lack of specific knowledge and market overview, high transaction costs, lack of experience and knowledge.

Energy efficiency networks (EENs), as peer-to-peer business-to-business networks have been designed to overcome these barriers and proven to be an effective mechanism for stimulating energy efficiency and corresponding investments in the industrial sector. A recent study of the 30 Pilot Networks Programme in Germany, a pilot programme of EENs, has shown that the funding provided through the network programme led to an investment of EUR 34.15 per Euro of funding. Following the success of the pilot, the German government and 21 business associations launched the Energy Efficiency Networks Initiative (IEEN) in late 2014, which aims to scale up EENs with the goal to set up 500 EENs and through them reduce primary energy consumption by 75PJ by 2020²⁹.

Mechanism

Originating from Switzerland, EENs are network platforms and mechanisms that bring between eight to fifteen companies together (from a region, sector, supply-chain, or within a corporate group) to exchange experiences and undertake steps together to improve energy efficiency. EENs work on a voluntary basis, but are often incentivised by existing regulatory and policy frameworks³⁰. EENs vary across different countries but broadly follow a process as shown in the figure below.



To date a total of 90 EENs operate in Germany and the networks have produced significant results. Through the 30 Pilot Networks Programme alone 1,980 energy efficiency measures have been realised, resulting in total energy savings of 870 GWh. Over the period of the network process, participating companies could reduce their energy consumption by 10 to 30%. Per Euro of funding provided, the network activities of pilot programme have led 878 kWh in energy saved³¹.

Lessons learnt

Promoting the creation and effective implementation of EENs is an effective way to catalyse and scale up energy efficiency improvements and building a pipeline of energy efficiency projects, while delivering multiple other benefits. A key driver of the success for EENs is the peer-to-peer learning experience enabled through the rigorous network process, which creates greater awareness, mutual learning, as well as providing motivational dynamic for action. Since their successful implementation in Switzerland and Germany, EENs have also been adopted in other countries, including emerging economies such as Mexico, Brazil and China.

28 IEA (2016) Energy Technology Perspectives
 29 IEA. (2016). Germany: National Action Plan on Energy Efficiency. [Database]. Extracted from <http://www.iea.org/policiesandmeasures/pams/germany/name-146641-en.php>
 30 IPEEC (2016) Energy Efficiency Networks – An effective policy to stimulate energy efficiency.
 31 IGEF (2015) Overview Study: Promotional Schemes for Demand-Side Energy Efficiency

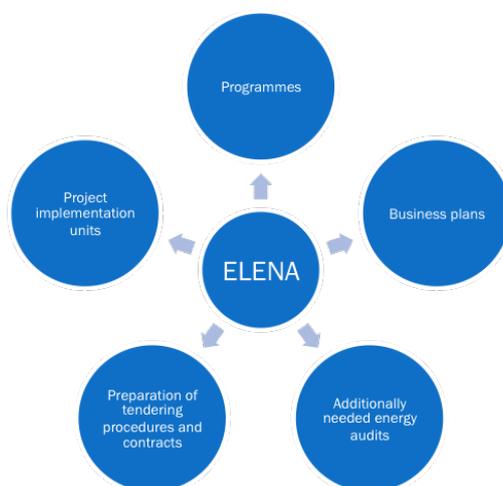
ELENA – a one stop shop for project development assistance

Cities consume 70% of energy in Europe, but the potential for improvements towards more sustainable energy consumption has not been tapped – not due to lack of availability of finance, rather a lack of know-how and capacity to implement large-scale projects. To address this issue, the European Investment Bank (EIB) and the European Commission set up a project development facility called European Local Energy Assistance (ELENA) to help local and regional authorities prepare energy efficiency and renewable energy projects³².

Qualifying investment programmes can include any that involve the improvement of energy efficiency – from buildings to transport programmes relating to enhanced energy efficiency. The aim is to generate bankable investment projects that attract outside finance, from private financial institutions such as local banks as well as public financial institutions such as the EIB.

Mechanism

Money from the ELENA funds is used to provide technical assistance to local and regional authorities that seek to implement their energy plans. The EU contribution can cover up to 90% of eligible costs for assistance in the five areas depicted in the figure:



The projects can also be implemented by energy service companies (ESCOs), which are service providers that guarantee future savings made on energy bills and can fund projects upfront that are refinanced through the savings achieved.

Lessons learnt

Total commitments made to ELENA so far amount to EUR 49m, and the facility is on track to mobilise more than EUR 1.6bn in investments over the next few years. These numbers show just how important project development assistance is in mobilising finance. The investments that are expected to be mobilised are a large multiple of the comparatively small amount of resources invested in project development assistance, providing a very effective way of using public funding to mobilise finance. Such an approach has already been adopted by a number of public financial institutions, such as the EBRD and World Bank, which provide project development assistance together with credit facilities. ELENA takes this one step further by solely focusing on the high-impact deliverable of project development assistance and provides an interesting example for other countries to follow.

Principle 4

Case study | Germany

Germany's ECP Insurance for Energy Savings, a Win-Win for Contractor and Customer

An often cited barrier hindering investments into energy efficiency measures is trust. Before entering energy performance service contracts, customers want to ensure that the energy efficiency measures to be installed will perform and deliver the energy savings projected.

Energy Efficiency Protect (Energie Einspar Protect – EEP) offered by Germany's KlimaProtect is an innovative product that has been developed to address this barrier³³.

Mechanism

KlimaProtect effectively acts as the certifying body that assesses each project proposal with a supplier. Once a project is certified, the predicted energy savings will be insured through EEP. The return is guaranteed - in the event that the energy efficiency works do not generate the predicted savings, the difference will be covered by the insurance³⁴. Moreover, the transaction costs to identify and select a suitable project are reduced significantly³⁵. This gives planning security to customers, who are able to know in advance when their investment will be amortised.

EEP offers two types of products:

- **Project related coverage:** which are individual coverage solutions better suited for large projects comprising multiple efficiency measures and corresponding volume of savings.
- **General agreement:** is a solution for providers who intend to apply a similar array of efficiency measures. Thus the insurer and provider can enter a general agreement for the insurance of future projects, if similar measures will be implemented, thereby avoiding the need for constant re-examination.

EEP is suitable for all enterprises active in the area of energy efficiency such as energy savings contractors, planning officers for energy related renovation, and general contractors and subcontractors who plan and implement building insulation, lighting solutions and CHP units.

Lessons learnt

EEP is a great mechanism to address the barrier of trust that faces many stakeholders interested in promoting and undertaking an energy efficiency investment. It is a win-win for both customers and contractors, offering customers assurance that they will not incur a loss through the energy efficiency works, while the assurance enables the contractor to expand its customer base more quickly and increase returns. Because the insurance covers the economic risk of his warranty, the contractor does not need to create a reserve for guarantees, giving him an edge over his competitors. EEP is thus an effective tool to upscale energy efficiency investments, especially in countries with expanding markets for energy service companies.

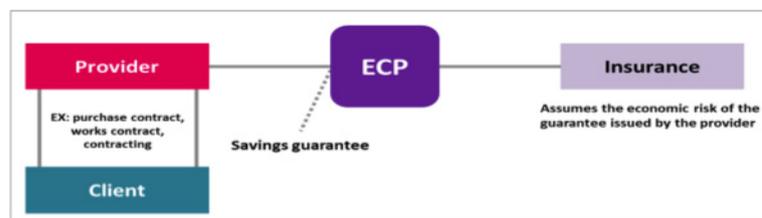


Figure 1: Energy Efficiency Protect³⁶

33 KlimaProtect. (2014). Energy Efficiency Protect EEP. Retrieved from http://www.klimaprotect.de/wp-content/uploads/2014/07/KlimaProtect_EEP_EN_v2_150dpi.pdf

34 Klimaprotect. (2015). "Energy efficiency – so it can work". [Video]. Retrieved from http://data.klimaprotect.de/Klimaprotect_EN_Master_1080p.mp4

35 Ritzek, J. (2015, April 26). Energy Savings Insurance - the next BIG thing? Energy Efficiency in Industrial Processes. Retrieved from <http://www.ee-ip.org/theme/post/finance/energy-savings-insurance-next-big-thing>

36 Klimaprotect, 2015

Argentinean Energy Efficiency Fund

The Argentinean Energy Efficiency Fund (Fondo Argentino de Eficiencia Energética or FAEE) is a program implemented by the Undersecretariat of Savings and Energy Efficiency (SSAyEE) of the Ministry of Energy and Mining. The FAEE was set up with the to financethe implementation Energy Efficiency measures in the SMEs sector.

The program consists of a line of credit dedicated specifically to energy efficiency projects. The characteristics of the program are adapted to meet the SMEs` needs, with very attractive interest rates and the financing of up to 70% of the project cost. The main objective of the program is to exploit the savings potential detected in the sector, that range between 10% and 30% of the total energy consumption of each company.

Mechanism

In order to obtain a credit through the FAEE, a company has to present a technical project, supported by an assessment of the energy consumption baseline and the expected savings as well as the company's accounting statement. For a company to obtain approval for the credit it applied for, the net present value of the energy savings along the project's lifetime must be at least equal to the total cost of implementation of the project.

Since the beginning of the FAEE in September 2014, there have been five uninterrupted calls for project applications, resulting in grants of 30 credits totalling almost USD 2,5 million.

Some of the approved projects include, among others:

- The replacement of electric drivers, compressors, and boilers,
- The improvement of thermal insulation,
- Lighting systems replacement,
- Refrigeration systems

FONDO ARGENTINO
DE EFICIENCIA ENERGÉTICA



Barriers and activities to overcome them

- Lack of information about the program and its benefits: Since December 2015, the SSAyEE has carried out 35 events for communication and training for SMEs throughout the country, in order to create awareness about the importance of energy efficiency in lowering operating costs and the benefits of the program.
- Difficulties in filling in the application form: The form was simplified, reducing its extension and complexity.
- Lack of technical capacity for project development in the SMEs: Every company interested in the program can get personalised technical support given by the SSAyEE.

Lessons learnt

Energy efficiency incentive policies, together with energy and gas tariff updates, have increased the demand of credits through this program. Even though SMEs technical capacity for the development of this kind of project is still weak, with more dedicated technical assistance the number of successful applications for the last quarter of 2016 doubled the total number of projects approved previously.

Building a portfolio of EE financing mechanisms to scale up EE investments

Recent years have seen significant growth in the size and number of energy efficiency financing programs in the United States, especially since the implementation of the American Recovery and Reinvestment Act (ARRA). The establishment of the ARRA was followed in subsequent years by the launch of green banks in several states and the ramp up of other ratepayer supported financing initiatives. The success and applicability of the various financing programs continues to depend on the state context, including policy environment, sector (Industry, commercial, private property, SME etc.), debt capacity etc.³⁷

Mechanisms

Some of the most notable programmes that have been put in place, expanding across different U.S. states and also abroad, cover a spectrum of financing mechanisms ranging from more conventional measures such as savings-backed arrangements, on-bill financing and repayment, to innovative approaches such as the property assessed clean energy (PACE) and the warehouse for energy efficiency loans (WHEEL)³⁸. While all of these mechanisms have demonstrated the potential to scale up energy efficiency investments, they each have their benefits and drawbacks, and must therefore be contextualised:

<p>Savings-backed arrangements</p>	<p>Include Energy Savings Performance Contracts (ESPC), Energy Service Agreements (ESA), and Managed Energy Service Agreements (MESA). Still make up the largest segment of energy efficiency financing in the US. They typically comprise of a contract, whereby the service provider assumes the performance risk of efficiency projects by guaranteeing or sharing energy savings.</p>
<p>On-bill financing and repayment</p>	<p>Let borrowers pay back the cost of efficiency improvements on their utility bill – a payment channel that is existing and familiar to the borrower.</p> <p>Benefits: These structures can potentially open up access to financing for more people, make for a fast and easy application process, result in negligible or positive cash flow impact for the borrower; allow borrowers that move to transfer any balance to the incoming occupant and may survive bankruptcy. Offer many of the benefits of PACE and WHEEL (such as overcoming split incentives).</p> <p>Challenge: cost to upgrade billing system to accommodate these loans can be significant, which is why utilities are sometimes reluctant to participate.</p>
<p>Property-Assessed Clean Energy (PACE) financing</p>	<p>Enables participants to pay off clean energy investments through a special tax assessment applied by their municipality. Participants can repay the investment through additional annual payments on their property tax bill, without a down-payment or paying full/partial up-front capital cost for the retrofit works. There are significant differences between residential and commercial PACE.</p> <p>Benefits: Uses an alternative underwriting approach that opens up access to financing for more consumers, and the loan transfers to a new occupant if a borrower moves before the loan is paid off.</p> <p>Challenge: High set-up costs and development time. PACE also faces significant administrative challenges as it may require changes in local tax framework. Long payback periods (and corresponding interest rate payments), coupled with underperforming efficiency upgrades, may mean customers do not experience a positive net present value (NPV) on the loan. This could adversely impact low income customers with poor credit, who this product is meant to serve.</p>

37 LBNL (2016) Energy Efficiency Program Financing – Where it comes from, where it goes, and how it gets there
 38 LBNL (2016) Current Practices in Efficiency Financing: An Overview for State and Local Governments

<p>Warehouse for Energy Efficiency Loans (WHEEL)</p>	<p>Offers large-scale capital to utility sponsored loan programs for residential energy efficiency by providing a mechanism to securitise portfolios of unsecured residential energy efficiency loans as green bonds. Homeowners can borrow upwards of USD 20,000 for a series of improvements including HVAC equipment, water heaters, roofing, insulation, windows and energy efficient appliances.</p> <p>Benefits: The securitization mechanism created through WHEEL helps to create secondary market liquidity, lowering the cost of capital (and therefore a lower interest rate for borrowers) due to the diversification benefit it provides to investors, and risk tranching.</p> <p>Challenge: WHEEL is an expensive mechanism that relies heavily on the infusion of public funds (such as from ARRA). Moreover, loans did not follow proper protocols to achieve high credit ratings, hence WHEEL debt reserve was low.</p>
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In addition to these mechanisms, there is a plethora of other programmes that target energy efficiency improvements in specific sectors, especially in buildings. One such example are the mortgage programs sponsored by the US government, including Fannie Mae, Freddie Mac, the Federal Housing Administration (FHA) and the Veterans Administration (VA). These federal mortgage agencies have all adopted special underwriting guidelines to take into account energy efficiency in the mortgage underwriting process for homes. Recently these guidelines have introduced “stretched” underwriting and increase of the debt-to-income ratio and of the total household debt to income ratio used to determine mortgage affordability. In line with these efforts, congress is finalising the Sensible Accounting to Value Energy (SAVE) Act, which requires banks to consider energy saving repayments in the assessment of loan applications, providing more easily accessible and affordable financing for energy efficiency improvements in homes.

Lessons learnt

In line with Principle 4, the US has developed a wide range of finance mechanisms over time to unlock the energy efficiency finance supply, which have been designed to address barriers hindering supply of finance, including risk, liquidity and cost of capital as well as demand barriers such as split incentives. There is no silver bullet, and as this case study shows, each mechanism has its benefits and challenges – the appropriate mechanism must be chosen to fit and be adapted to local contexts (down to state level). To further scale up energy efficiency finance, countries can share their experiences with respective mechanisms, streamline them where relevant (on-bill repayment) and address shortfalls in others (developing transparent disclosure protocols for PACE and WHEEL).

UK's LENDERS Project: Nudging borrowers towards more energy efficient homes

There is a paucity of research linking the energy efficiency rating of a home with the probability of default on the underlying mortgage for that home.

The "LENDERS³⁹" project is a UK research collaboration of eight partners⁴⁰, which seeks to demonstrate the link between energy cost, affordability and mortgage borrowing and develop a method for lenders to improve mortgage affordability calculations. The project exploits the principle that for similar borrowers, those with lower energy costs have more uncommitted household income than those with higher energy bills, and therefore those with lower costs might have a lower default risk and support higher monthly repayments for borrowing⁴¹.

Mechanism

The project is developing a robust method that improves the accuracy of predictions used to estimate home owners' energy costs when calculating mortgage affordability. This improved method should enable the mortgage industry to offer larger maximum loan amounts to properties with lower energy costs, thereby raising awareness amongst borrowers about the benefits of more energy efficient homes.

The LENDERS method combines information available to mortgage companies to large scale data from Energy Performance Certificates (EPC) to forecast different energy costs across the EPC bands, enabling the lending institution to offer different maximum loan amounts for different EPC bands.



Projected impact and lessons learnt

LENDERS believes that the behavioural impact of this will be considerable, and that the difference in total lending clearly tied to energy costs will drive homebuyers to look for more energy efficient properties. Over time, it is likely that increased demand would create a modest price gradient between low and high energy properties. With this anticipated change in sales values combined and the provision of finance through additional borrowing using the LENDERS method, home owners are equipped with both motivation and means to undertake energy efficiency measures.

LENDERS demonstrates the innovative use of available EPC data and conventional information available to mortgage companies to develop a method that can improve mortgage affordability calculations, and thereby not only enable more responsible lending, but also nudge home owners towards investing in more energy efficient homes and measures.

39 Levering Economics for New Drivers to Energy Reduction & Sustainability = LENDERS

40 Nationwide Building Society, Building Research Establishment, Principality Building Society, UK Green Building Council, University College London, Energy Saving Trust, Arup and Constructing Excellence Wales

41 LENDERS (2016) [website] retrieved from <http://www.epcmortgage.org.uk/>

Canada's Green Municipal Fund (GMF): financing that mirrors environmental benefits

The Federation of Canadian Municipalities (FCM) has set up the Green Municipal Fund (GMF) to simplify public support programmes and enable more effective use of scarce public funding to resolve key barriers, unlock finance supply and lever private capital.

Mechanism

The GMF is a revolving fund designed to encourage investment in municipal projects, which deliver environmental and socio-economic benefits, through grants, loans and loan guarantees⁴³. Energy efficiency and recovery is one of the six key projects areas that the GMF funds. Since 2015, the GMF has renewed its funding offer, which specifies that proposed energy sector projects must aim for net-zero energy performance⁴⁴. The fund provides two instruments to deliver on its mandate:

- **Grants** of up to 50% of eligible costs are available for plans and feasibility studies (up to CAD 175,000) and pilot projects (up to CAD 350,000).
- **Low-interest loans** of up to 80% of eligible costs are available for capital projects, to a maximum of CAD 10 million. They are typically combined with a grant amount for 15% of the loan amount, to a maximum of 1.5 million CAD.

As of 2016, 139 GMF funded capital projects, of which 71 are energy projects, have delivered a range of positive environmental results. Overall, the projects have delivered energy savings of 693,000 GJ of energy savings per year, which is equivalent to powering 6600 households for one year⁴⁵. One of the projects that benefitted from the GMF is the Halifax's Solar City Program, which applies the PACE financing model to extend loans to homeowners for solar water heaters and efficient water fixtures, has been made possible through a blend of GMF grant and loan (at a ratio of 1:10)⁴⁶. The 388 installations are projected to save homeowners more than CAD 5.5 million combined over the lifespan of the systems as well as 320 million litres of water. Upon the success of this project, many other Canadian municipalities are looking to implement similar projects following the PACE model with GMF support.



Lessons learnt

The GMF has been instrumental in supporting projects that would not have otherwise happened with a blend of grant and loans. Its streamlined fund application procedure, clear guidelines and accessibility for all municipalities has enabled effective mobilisation of private finance streams, management of funding flows and set a good basis for scale up of projects. Beyond the Halifax project, which was provided here as an example, many other projects that started off in one municipality have also seen similar scaling up from one municipality to others.

42 Federation of Canadian Municipalities. (2014). Green Municipal Fund Annual Report 2013-2014. Retrieved from http://www.fcm.ca/Documents/reports/GMF/2014/Green_Municipal_Fund_Annual_Report_2013_2014_EN.pdf

43 Federation of Canadian Municipalities. (2016). Green Municipal Fund Annual Report 2015-2016. Retrieved from http://www.fcm.ca/Documents/corporate-resources/annual-report/Raising_the_bar_Annual_Report_2015%E2%80%932016_EN.pdf

44 ibid

45 ibid

India's Energy Efficiency Services Limited (EESL)

The potential for energy efficiency improvements in India is tremendous with an overall market estimated at Rs. 74,000 crores (USD 11bn). However, a number of regulatory, financial and capacity barriers had left this potential largely untapped.

In 2009, Energy Efficiency Services Limited (EESL) was founded with the aim to develop and sustain energy efficiency markets in India through public and private partnerships and supporting private sector investments. Created under the Ministry of Power as a joint venture between four public entities⁴⁶, EESL works as a public energy service company (ESCO), a consultancy and a resource centre to facilitate energy efficiency projects, provide consulting and expertise to utilities and financial institutions. It leads the market-related components of the India's National Mission for Enhanced Energy Efficiency (NMEEE).

Programs

Working as a public ESCO, EESL's programs are built on the concept of performance contracting where the energy efficiency project is financed, fully or in part, by the energy cost savings resulting from the improved energy efficiency. In the different areas where it operates, both in the public and private sectors, EESL works with energy efficiency technical suppliers and utilities to implement innovative business models allowing to deploy energy efficiency at scale.

- **Domestic Efficient Lighting Program:** In this program, EESL procures large quantities of LED bulbs to harness economies of scale and distributes them at a lower price to households. Investments are recovered through an on-bill financing model where a portion of the energy cost savings incurred by the LED bulbs are transferred to EESL via the utility company. Started in 2013 as a pilot, this program was progressively scaled-up at the national level and allowed to drastically reduce the market price of LED bulbs in India.
- **Municipalities street lighting program:** In this program, EESL enters in a tri-partite contract with a municipality and with the state to retrofit street lights. As in the domestic LED program, EESL recovers its investment through the local urban energy supplier. Using a similar model, EESL works with municipalities to deploy energy efficiency in public buildings and for other equipment.
- **Agricultural Demand Side Management:** Benefiting from subsidised energy, Indian farmers have little incentives to save energy and tend to use inefficient pumps for irrigation. EESL aims to replace 20 million inefficient agricultural pumps-sets with free of cost energy efficient pump-sets with a 5 year guarantee covering all maintenance costs and a control panel. Energy savings are used to pay back investments via utilities.

Key achievements

- Largest domestic efficient LED lighting program in India: replacement of 150 million conventional bulbs with annual power savings of 11 billion kWh worth USD 702M⁴⁷
- Largest energy efficient LED street lighting project in India: replacement of 750,000 street lights with an estimated annual energy savings of 98 million kWh and monetary savings of USD 6.4M

46 NTPC Ltd, Power Grid Corporation of India Ltd, Power Finance Corporation Ltd and Rural Electrification Corporation Ltd.
47 As of August 2016. The amounts of domestic and municipal LEDs installed and the incurred energy savings are updated in real time online on two dashboard here: EESL. (2016). Dashboard. [Database]. Retrieved from http://www.eeslindia.org/User_Panel/UserView.aspx?TypeID=1145

Sector	Project	Annual Energy Savings Acvhieved	Estimated Investments in 2014-15 and 2015-16
Home efficient lighting (DELP) Project completed in Puducherry	Replacement of inefficient incandescent bulbs to LEDs in households	56 million kWh/ 6 lakh replacements	Rs. 500 crores (2 crores replacement) 500 MW load reduction
Agriculture Demand Side Management Project completed in Hubli	Replacement of inefficient agriculture pumps with energy efficient pumps	4867 kWh/ pump replacement	Rs. 100 crores (10,000 pump replacement) 10.5 MW load reduction
Urban EE – Street lighting in ULBs Project under implementation in Nashik	Racement of 3 lakhs inefficient street lights across the states of AP, Delhi, Puducherry, Tripura, Kerala, and Nashik	186 million kWh	Rs. 300 crores 10.5 MW load reduction

Table Source: EESL, 2014

Lessons learnt

- Strong Public Private Partnership model
- Enable financing for Public Private Partnership projects at reasonable rates
- Investment de-risking Mitigates political, regulatory, and payment risks
- Upfront investments (equity and debt) for project implementation

Principle 5

Case study | Sustainable Energy Financing Facilities

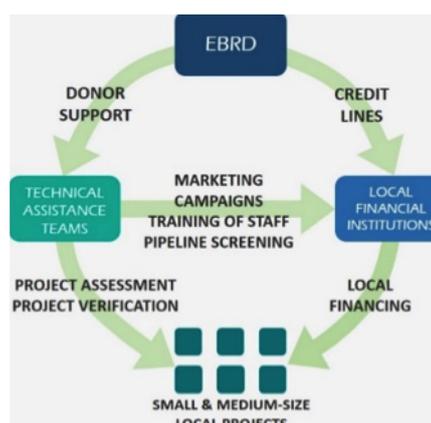
Building Knowledge and Confidence to Spur EE Investments

The European Bank for Reconstruction and Development (EBRD) is at the forefront of efforts to channel resources from existing and emerging global climate finance funds to projects on the ground. Accounting for around 40% of the final energy consumption, the building sector is the largest energy consumer in the EBRD region. As a response, the EBRD has been active in mainstreaming sustainable energy financing in this sector.

Through Sustainable Energy Financing Facilities (SEFFs), the EBRD extends credit lines to local financial institutions for on-lending to small and medium-sized projects. The SEFFs are tailored for each country/region and serve as “one-stop-shops”, comprising credit lines for local financial institutions, and comprehensive technical assistance to enhance the FIs’ project origination and assessment capacity. In addition, the SEFFs provide concessional financing and grants to help overcome barriers, such as affordability, first-mover costs, and early stage development of markets for advanced technologies. In due course, local financial institutions have acquired expertise on how to properly assess the feasibility of energy efficiency projects and how to develop suitable financial products. Furthermore, clients gain access to a new line of financial products and learn how sustainable energy investments can improve productivity and increase profits, triggering a positive feedback loop of demand for and supply of energy efficiency finance⁴⁸.

SEFF Results and Impacts

- Present in 25 countries
- Over 100 partner financial institutions received credit lines and technical assistance
- Over 100,000 investments supported via the SEFFs
- Worth EUR 3.9 billion
- Energy savings of 15.5 TWh each year
- Helping to avoid 6.1 million tonnes of CO2 emissions annually



SEFF Activities, Selected Cases:

TurSEFF: TurSEFF combined EBRD credit lines with concessional loans from the Clean Technology Fund to overcome barriers related to perceived risks, banks’ first-time transaction costs and availability of long-term finance. As of the end of 2015, 700 EE projects have been executed for a total value of USD 790 million, equivalent to 5 TWh of primary energy consumption savings.

RuSEFF: follows a similar model as TurSEFF. In addition to enabling access to finance, RuSEFF also provides free-of-charge technical assistance and a list of eligible materials and equipment (LEME), which facilitates the selection process for equipment thereby simplifying the assessment process of banks for loan proposals.

SlovSEFF: This programme aims to ensure energy security and smooth transition following closure of the outdated Bohunice nuclear power plant in Slovakia by targeting energy efficiency and renewable energy sub-projects in the corporate and residential sectors. As of early 2016 its results are promising. EE projects have been executed for a total value of USD 257 million, equivalent to 5 TWh of primary energy consumption savings and green energy generation benefiting 86,000 residents.

UK's Salix, Simple Compliance Tools lead to Successful Funding Applications

Salix provides 100% interest-free capital to public sector organisations across the UK to help them reduce energy costs through the replacement of inefficient technologies with new modern energy efficient ones. As of 2015, Salix has funded over 13,000 projects valued at 375.8 million GBP. The results are impressive as the savings for the public sector represent 90.6 million GBP annually and 1.2 billion GBP over the projects' lifespan. "Compliance Tools" are a key feature⁴⁹ of Salix as these enable clients to effectively check their applications for projects against the Salix loan compliance measures.

Current set of projects compliance tools:

- **Single Fuel Compliance Tool** - to be used for projects that involve saving in one fuel type.
- **Multiple Fuel Compliance Tool** - to be used when seeking Salix funding for a technology changing from one fuel type to another e.g. CHP plant.
- **Multiple Project Site Tool** - can be used when more than one Salix funded project is taking place on a site. This takes an average payback across all measures included and therefore may allow more flexibility if individual measures fall outside of the compliance criteria.

Example: In 2014, the city of Dundee in Scotland was awarded a Salix 100% interest-free 223,644 GBP capital finance loan in addition to client support. The Salix "Compliance Tool" (see indicators below) revealed major financial savings from implementing new LED street lighting, which in turn enabled the Dundee City Council to attain a project payback of under eight years⁵⁰.

Salix Indicators:

- **Total loan Value:** 223,644 GBP
- **Project payback:** 7.6 years

	Annual	Lifetime
Cost savings	GBP 29,473	GBP 589,460
Energy savings	267,934 kWh	5,358,680 kWh
Emission reductions	129 tonnes of CO2	2,591 tonnes of CO2

It is expected that lifetime financial savings for the Dundee City Council will stand at over 589,000 GBP once the project has been paid back.

49 Salix. (2015). About Us Section [Website]. Retrieved from <http://salixfinance.co.uk/about-us>

50 Dundee City Council. (2014). Salix Case Study. Retrieved from <http://salixfinance.co.uk/system/files/documents/dundee.pdf>

China’s CHUEE⁵¹ Programme : Reducing Financial Risk and Raising the Awareness of Energy Efficiency

Since 2006, the IFC has delivered the China Utility-based Energy Efficiency Finance (CHUEE) programme with financial support from the Chinese Ministry of Finance, the Global Environment Facility (GEF), Finland and Norway.

Approach

The CHUEE approach involves:

- Supporting Chinese banks in shouldering partner banks’ risk by means of a risk guarantee mechanism by the IFC for loans the banks issue for climate related energy projects.
- Helping banks expand their presence in the sustainable energy finance market by providing assistance in their building of project pipelines, portfolios, experience and expertise.
- Assisting in assessing the risks and opportunities found in the multiple renewable energy and energy efficiency projects.

As of 2014, CHUEE has provided USD 520 million in loans that were subsequently leveraged to a total of USD 936 billion in project investment to 78 companies, without a single default loss⁵². Previously focussing on extending loans to utilities, the CHUEE programme, now in its third phase is increasingly working with a series of medium sized financial institutions to reach more industrial consumers and SMEs.

As an example, the Shenzhen Henglihua Cleaning Services Company was able to conduct investments to upgrade its machinery and achieve substantial energy savings thanks to a EUR 1.5 million loan from the China Industrial Bank (CIB) via the CHUEE programme.

Power and fuel savings	> 60%
reduction of production costs	EUR 736,000 per year
Reduction of CO₂ emissions	7,188 tonnes per year

Lessons learnt

CHUEE demonstrates that a combination of risk guarantee measures and targeted project development assistance can effectively help banks scale up their energy efficiency financing activities. Banks, especially those new to energy efficiency financing, often perceive energy efficiency projects as riskier than investments in supply side energy projects. A risk guarantee can mitigate that risk perception. Another barrier that the CHUEE project addresses is the lack of a pipeline of bankable projects and capacity in developing new projects, by providing project development assistance and capacity building activities to banks. This points to the important role that public finance institutions (PFIs) have in scaling-up energy efficiency investments and supports the shift from pure grant and lending activities by PFIs towards technical assistance and capacity building as a more effective use of their resources in scaling-up energy efficiency financing.

51 SwitchAsia. (2016). Enabling SME access to finance for sustainable consumption and production in Asia: An overview of finance trends and barriers in China. Retrieved from http://www.switch-asia.eu/fileadmin/user_upload/Publications/2016/Green_Finance_Study_-_2016_-_China.pdf

52 UNECE. (2015). Best Policy Practices for Promoting Energy Efficiency. Retrieved from http://www.unece.org/fileadmin/DAM/energy/se/pdfs/geee/pub/ECE_Best_Practices_in_EE_publication.pdf

Other case studies

Case study | Private Financial Institutions

Good practice of banks

The EFTG's survey of banks, conducted by UNEP FI showed that banks see energy efficiency financing as an area with strong growth potential, even though demand for it is at present moderate. Key drivers of demand being energy prices, anticipation of carbon taxes, public incentives, awareness, and greater availability of technologies and professionals.

The majority of banks that participated in the survey already have in place a specific policy, strategy or target for the financing of energy efficiency, as well as specialised product and service offerings.

Description	Ideal For
Dedicated products	Greek bank ⁵³ offers green mortgage and tailored loans to encourage its customers to buy energy efficient houses or upgrade the energy performance of properties. It also offers specialised insurance products tailored for energy efficiency projects.
Data provision and advisory services	Dutch bank ⁵⁴ provides its corporate clients a web-based platform through its partner to its corporate clients, which provides digital analysis of their real estate, including tools to calculate investment, payback period and carbon reduction figures for each particular measure, including insulation, LED lighting and solar panels. This allows them to determine opportunities for energy efficiency investments, and also connects them (just with one-click) with offers from service and product providers.
Advisory services	Latin American bank partners with technical energy product suppliers to provide preferential terms and guarantees to clients. Audits and advisory services on structuring are provided for free to clients looking for financing.

Lessons learnt

The benchmarking tool is available to all investors and has received strong support since its launch. Investors are credible champions of energy efficiency investment towards companies due to their underlying interest in the long-term development of the companies they invest in and the reduced GHG exposure that efficiency investment ensures for their own portfolios. The assessment of companies through the benchmarking tool creates an incentive for companies to integrate energy efficiency in their operations to improve their company profile and enable access to capital from investors.

53 Piraeus Bank. (2017). Energy Performance Studies & Certificates. Retrieved from <http://www.piraeusbank.gr/en/idiwtes/green-banking/prasino-spiti/meletes-energeiakis-apodosis-pistopoiitika>

54 Case study drafted using information from:
 ABN AMRO. (2016). ABN AMRO makes 1 billion euros available for energy transition of real estate clients. Retrieved from <https://www.abnamro.com/en/newsroom/press-releases/2016/abn-amro-makes-1-billion-euros-available-for-energy-transition-of-real-estate-clients.html>
 CFP. (2017). About CFP. Retrieved from <http://www.cfp.nl/en/cfp/>

“Green Tagging” to catalyse the energy efficiency lending activities in Europe and the United States

“Green tagging” is defined as the tagging of loans according to the energy efficiency performance of the underlying assets. Momentum for this concept and tool is growing, and has been applied in the mortgage business of banks – both in the European Union and the United States.

The European Mortgage Federation – European Covered Bond Council (EMF-ECBC⁵⁵) launched an Energy Efficient Mortgage Initiative in 2016 (the EMF-ECBC represents the interest of mortgage lenders and covered bond issuers in the EU and beyond and brings together over 130 members, covering an estimated 2000 banks). This initiative has been inspired by experience in the United States, where several financial institutions and mortgage programs have been offering energy efficient mortgages from as early as the 1980s, mainly focussed on large residential buildings.

Main benefits

The Energy Efficient Mortgage Initiative in Europe aims to incentivise households to improve the energy efficiency of their homes with a pan-European private bank financing mechanism by accounting for the benefits of energy efficiency improvements (including energy savings and property value) into calculations of mortgage affordability.

This is backed by evidence from multiple studies, including an analysis of 365,000 house sales in Denmark last year, according to which renovated house that moves from an ‘E’ to a ‘B’ grade in its energy performance certificate (EPC) will achieve an estimated EUR 24,000 in energy savings over 30 years. The analysis also showed significant value increases generated by energy efficiency improvements.

The benefits of green tagging to borrowers, lenders, investors SMEs and governments are that:

- Banks can capture the benefits of an improved risk profile due to improved loss mitigation capacity, enhanced loan-to-value (LTV), and lower probability of default of the mortgage taker.
- Public policy makers leverage the close relationships of banks with their customers to land the policy signal with mortgage-takers.
- Produces much better information about bank activity in energy efficiency, facilitate the tracking of efficiency finance upscaling, and allows for the repackaging of energy efficient mortgages into energy efficiency covered bond portfolios (“green bonds”) by pooling energy efficiency collateral.

Lessons learnt

Green tagging enhances the traceability of energy efficiency activities by banks, enables the market to further recognise the opportunity, capture the benefits of an improved risk profile, aggregate these assets and by bringing these into capital markets further upscale capital flows into energy efficiency.

In February 2017, the EMF-ECBC published the preliminary results of a market survey on ‘Green’ Mortgage Lending and Funding Instruments, which revealed strong willingness among financial market actors in entering and developing the ‘green’ financing market and highlighted the importance of standardisation and a better understanding of how to differentiate between ‘green’ and conventional funding within data gathering, portfolios and risk management processes.

56 UNC Center for Community Capital & Institute for Market Transformation. (2013). Home Energy Efficiency and Mortgage Risks. Retrieved from http://www.imt.org/uploads/resources/files/IMT_UNC_HomeEEMortgageRisksfinal.pdf

Investors driving energy efficiency integration into company assessments

As stewards of the major share of global capital flows into companies, and with a long-term interest into company value creation, investors are uniquely positioned to encourage the integration of energy efficiency by companies they invest in. Complementary to company management through investors’ engagement and resolution voting, investors play an important role in appraising the energy efficiency performance of companies and benchmarking them. These company assessments are in turn used by investors to strategically inform their investment activities and portfolio management towards decarbonisation of their portfolios.

Benchmarking companies’ energy productivity

ClimateWorks Australia, in collaboration with CalSTRS, developed a global energy efficiency benchmark tool⁵⁷ which helps investors identify listed industrial companies for whom improving energy efficiency presents a material opportunity. The tool determines energy productivity⁵⁸ ratings for 70 of the world leading industrial companies by drawing from measures reported in the CDP⁵⁹ questionnaires and public financial reports⁶⁰. This tool develops three metrics which can then be compared against each other: energy cost resilience; energy productivity outcome and energy efficiency performance.

Sectors assessed	<ul style="list-style-type: none"> Over 70 companies from 6 sectors: Airlines, Automobiles, Chemicals, Construction Materials, Paper, and Steel 		
Key Metrics	<p>A / Energy Cost Resilience Consists of two metrics that measure a company’s resilience to current and future energy bills.</p> <ul style="list-style-type: none"> Combined, they can show the material impact energy issues have on a company and its risk exposure. 	<p>B/ Energy Productivity Outcome This metric compares a company’s current ability to generate revenue or products using a given amount of energy, relative to its peers.</p>	<p>C/ Energy Efficiency Performance Consists of two metrics which measure a company’s internal efforts to improve energy efficiency.</p> <ul style="list-style-type: none"> Highlight company efforts to reduce exposure to energy risks and improved competitiveness.
Rating Companies	<ul style="list-style-type: none"> To benchmark this number, users can compare their company’s results against the average energy cost range and average profitability results (column A and column B) for the same sector. 	<ul style="list-style-type: none"> Users can benchmark their company’s results compared to average annual productivity (column C) and aggregated statistics from other relevant sources. Average annual change in energy productivity can be compared with annual rates of improvement in other areas of the business. 	<ul style="list-style-type: none"> Companies achieving annual improvements >1% of their energy bills are considered best in class, while companies achieving <1% have scope to improve their energy efficiency performance.

Lessons learnt

The benchmarking tool is available to all investors and has received strong support since its launch. Investors are credible champions of energy efficiency investment towards companies due to their underlying interest in the long-term development of the companies they invest in and the reduced GHG exposure that efficiency investment ensures for their own portfolios. The assessment of companies through the benchmarking tool creates an incentive for companies to integrate energy efficiency in their operations to improve their company profile and enable access to capital from investors.

Scaling up energy efficiency investments through specialised insurance solutions

Energy efficiency investments are often hampered by the uncertainty associated with risks in terms of the assets installed, the revenues resulting from the project, and the energy savings generated. In upscaling energy efficiency investments, all these risks need to be addressed. Insurance products and services can help remove these uncertainties, thereby improving risk profiles of projects, which allows banks and non-specialist investors to focus on credit, process and corporate risks.

Specialised energy efficiency insurance products and services

Targeted insurance products for energy efficiency reduce the economy-wide cost of carrying the risks associated with energy efficiency investments, free up balance sheet resources at client companies that can then be used for further investment, establish predictability for the many stakeholders involved in energy efficiency works, and improve bankability.

Leading insurance companies have been developing a number of specialised solutions that transfer risks from a wide range of client segments involved in energy efficiency improvements to the insurance company. The table below provides a non-exhaustive list of insurance company products and services offered by leading insurance companies. The products offered cover the entire energy efficiency value chain, from manufacturers of technology solutions to ESCOs, project hosts and project sponsors.

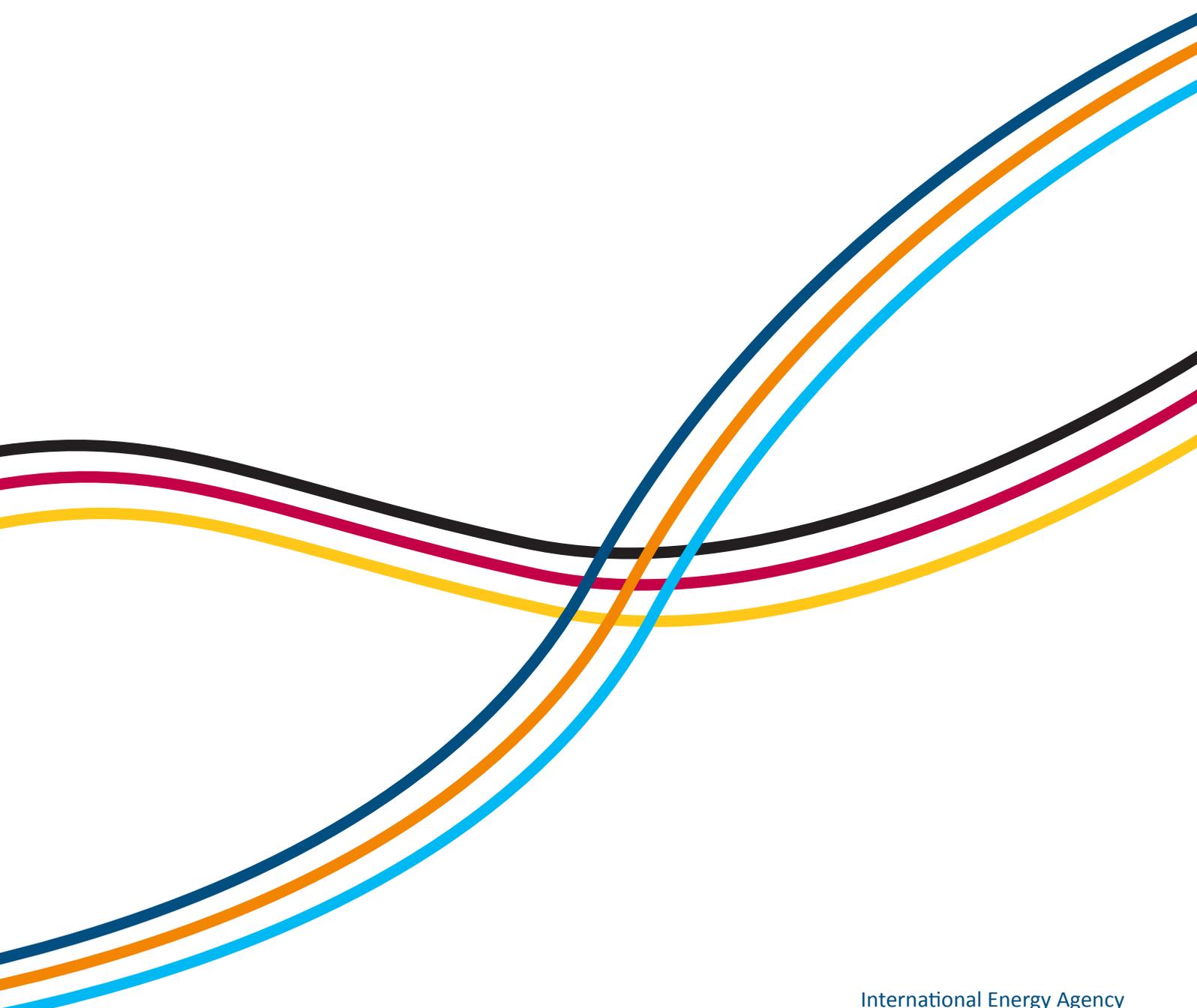
Target Customer / Segment	Product	Description
<p>Energy Performance Guarantee:</p> <p>Energy performance guarantees cover the financial risk when energy efficiency improvements do not lead to projected levels of energy savings. EPGs can cover performance risks, technology risks or a combination of both.</p>		
Commercial clients (ESCOs)	SMART REPAIR Allianz France	Coverage is available for construction companies, contractors or sub-contractors involved in the efficiency works and essentially enables these companies to take on this risk from the project sponsor.
	Energy Savings Warranty Energi with Hannover RE	Energy Savings Warranty (ESW) offers energy savings warranty insurance to high quality EE contractors providing a guarantee based on an EPG. ESW will allow contractors to remove the liability attached to energy savings guarantee contracts from their balance sheets, freeing up capital and improving their financial condition. Energi will first review the project and estimated cost savings to ensure they are confident in the projections.

	<p>HSB Engineering Insurance - Energy Efficiency Insurance Munich RE</p>	<p>The policy is specifically designed for investors in energy conservation measures, energy services companies and those financing energy savings projects (aimed mainly at ESCOs). The product combines asset performance and technical risk insurance and is based on a unique model which gives a realistic projection of energy savings considering the interplay of all conservation measures in a building. The benefit for the client is an improvement of the project credit rating and the removal of the technical risk for the lender.</p> <p>Available for periods of up to five years, the Energy Efficiency policy provides cover for material damage and breakdown of the installed systems, business interruption protecting against loss of revenue in the event of equipment failure and asset performance insurance covering a shortfall in energy savings. The cover is available across UK, Europe and internationally, and covers energy saving technologies in buildings such as LED lighting, thermal window films and more efficient boilers in commercial properties.</p>
<p>LED performance warranties</p> <p>LED manufacturers face technology risks with every product they bring to the market. When extending warranties to their customers, LED manufacturers take on the risk of serial losses should an entire product line be faulty– they consequently need to make balance sheet provisions in order to protect their solvency should such an event occur.</p>		
Commercial clients	<p>LED Technology solution Munich RE</p>	<p>Munich RE offers bespoke solutions to LED manufacturers to reduce the need for balance sheet provisions, which in turn reduces the cost of capital of LED manufacturers and enables them to allocate investment into other areas that important for business and product development.</p>
<p>Technical assistance, advisory services, and business development</p> <p>Insurance companies also offer energy efficiency services to existing and new clients, thus leveraging their existing relationships.</p>		
Homeowners; commercial clients	<p>HSB Energy Efficiency Services Munich RE</p>	<p>Provides energy efficiency recommendations and tools to help clients achieve greater energy savings. Service offerings include advisory services on optimising energy efficiency through technical and operational measures.</p>
Commercial clients	<p>Energie Einspar Protect (EEP)™ KlimaProtect with with Hannover Re</p>	<p>KlimaProtect acts as the certifying body assessing a project proposal or a framework contract with a supplier, once a project is certified the calculated energy savings are insured. The return is guaranteed plus the transaction costs to identify and select a suitable project are reduced significantly.</p>
	<p>Fleet Telematics Allianz Suisse</p>	<p>Allianz Suisse offers its insurance-takers for corporate fleets advanced telematics as an add-on in order to track driving behaviour and other parameters to optimise the organisation of corporate fleets, thus improving fuel consumption and reducing emissions.</p>
	<p>SEAF</p>	<p>The EU’s Sustainable Energy Asset Evaluation and Optimisation Framework (SEAF) Project, is currently developing an online portal matching ESCOs and SMEs seeking to make energy efficiency improvements to enable them to develop investable proposals backed up by insurance solutions. The beta version of the portal was launched recently.</p>

Homeowners	Global Assistance Allianz	Presents package of services directed to improve energy savings in homes. Offered as a stand-alone product or an add-on product, e.g. in combination with a loan or another insurance policy. Includes: energy audit, access to network of contractors to carry out retrofit, assistance in installing energy equipment and technology.
	Matching platform Region of Normandy	The region of Normandy has established a platform matching project sponsors and professionals who are certified for the newest efficiency standard, combining this with some financial support. The region also created a new profession (essentially an energy efficiency coordinator) who oversees work by the various contractors and sub-contractors involved.
Add-on coverage to existing insurance policies		
Insurance companies also offer their clients add-ons that extend the coverage of existing policies to take into account value increases resulting from efficiency investments and enabling building to standard after a loss has occurred.		
Homeowners	Green Coverage Form Allianz USA	Offers coverage expansions of standard policies for homeowners undertaking green building construction or renovation – to cover additional costs incurred through “green” elements of buildings, after partial or total loss.
	Zurich Insurance	Presents a green rebuilding insurance after full or partial loss to upgrade the building to standard.
	«Green Homeowner» policy AXA UK	AXA UK «Green Homeowner» is a policy distributed through the M&S Money scheme. Where customers make a claim, AXA seeks to reinstate / replace property and possessions in a sustainable way - either using environmental rebuilding standards or improved energy efficiency of electrical replacement items. All buildings and contents claims to a varying degrees are covered.
	Green building endorsements	Endorsements, coverage expansions of standard policies, for green building construction or renovation, reflecting the specific risks and value increase.
Commercial clients	Fleet Telematics Allianz Suisse	Offers its insurance-takers for corporate fleets advanced telematics as an add-on in order to track driving behaviour and other parameters to optimise the organisation of corporate fleets, thus improving fuel consumption and reducing emissions.
	Professional liability insurance Generali	The region of Normandy (France) has established a platform matching homeowners and professionals who are certified for the newest efficiency standard, combining this with some financial support. The region also created a new profession (essentially an energy efficiency coordinator for such retrofits) who oversees work by the various contractors and sub-contractors involved. Bespoke insurance product for this new profession, key for the quality of the end work delivered as per specific standards.

Lessons learnt

- The products analysed show that energy efficiency services are almost as important for insurance companies as targeted insurance products covering energy performance of efficiency projects and manufacturers. There is a real potential to leverage the insurance companies' client relationships further to drive efficiency investment.
- Digitalisation will further contribute to the refinement of insurance products and the integration of energy efficiency solutions into standard insurance policies.



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