G20 Energy Efficiency Finance Task Group ("EEFTG") Activity Report 2015

Annex to the Report to G20 on the G20 Energy Efficiency Action Plan containing Full Technical Analysis and Case Studies supporting voluntary Energy Efficiency Investment Principles for G20 participating countries

Prepared by EEFTG Secretariat

02-10-2015

This work is published at the direction of the International Partnership for Energy Efficiency Collaboration (IPEEC). It is intended to collate and feedback the detailed technical work of the G20 Energy Efficiency Finance Task Group, which was constituted as one of the six work streams under the G20's Energy Efficiency Action Plan.

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

Legal Disclaimer

This document has been prepared by the EEFTG Secretariat for the benefit of IPEEC and with input and collaboration provided by the members and participants of the IPEEC G20 Energy Efficiency Financial Task Group ("EEFTG") as listed herein and represents a consensus view. The views and opinions expressed herein are wholly those of IPEEC and the EEFTG Secretariat reached by consensus at the time of writing. This consensus view does not necessarily reflect, in its entirety, the individual view of each of the EEFTG nor any EEFTG member country or participant; nor does membership or participation in EEFTG bind any member or participant to the consensus views described here. IPEEC, EEFTG and EEFTG Secretariat views and opinions are subject to change without notice. Neither EEFTG, the IPEEC, the EEFTG Secretariat nor any individual member therein nor Climate Strategy (as expert consultant) or any individual member or participant of these bodies may individually or collectively be held responsible for any use which may be made of the information contained herein. The examples and case studies described in this document have been provided by specific participants to EEFTG meetings and are based upon information gathered by these individuals; the references used to develop these illustrative examples (which are quoted) should always be considered as the most accurate and complete source of information.

Preface

The work of the G20 Energy Efficiency Finance Task Group ("EEFTG") comes at a time when the profile and importance of energy efficiency investing is rising as countries balance energy efficiency, and its multiple benefits, in the context of delivering a globally sustainable energy system with access for all. EEFTG notes the increasing policy references to energy efficiency as the "first fuel" in developed countries, and the parallel emergence of "energy efficiency first" and "conservation first" policies, along with energy productivity and efficiency targets at different rates in different economies depending upon their national priorities.

Before becoming "the first fuel", energy efficiency has certainly been the "hidden fuel", as energy efficiency investments are notoriously diffuse and hard to individually track, yet highly impactful: Annual global energy efficiency investment levels are estimated at 310 billion USD[1] which places energy efficiency investing globally at the same level as 2014's global total clean energy investment estimated at 310 billion USD[2] (a figure which includes 37 billion USD for Energy Smart technologies). According to the IEA, investments in energy efficiency have been responsible for a 60% reduction in total final energy consumption over the last four decades among its member countries. This, in fact, places energy efficiency as the first fuel ahead of any other energy source in terms of the economy that it has enabled over that time. As examples, the specific energy efficiency performance of white goods, automobiles, buildings and industrial processes has been remarkable, since the 1970s, often with improvements of 4-5 times the output per unit of energy used.

As EEFTG notes in 2015, the "energy efficiency story" is far from over, and many G20 countries and regions are adopting specific energy efficiency/ productivity targets with 2020-2030 horizons. The pace of energy efficiency technology innovation means that all countries can do so much more per unit of energy produced than ever before. For developing countries specifically, this opens the door to "leap-frogging" through the use and direct installation of new energy saving devices and systems that will accelerate their pathway to energy access, economic development and prosperity.

Underpinning this global trajectory, of course, is finance and the unrelenting flow of investments into those very necessary projects and technologies that will enable our collective and energy efficient future. As energy efficiency often forms an integral part of a larger investment decision (e.g. building design, industrial technology, and energy system) which has multiple outputs and evaluation criteria besides energy performance, it is critical that policy makers and the finance community work together to better understand energy efficiency investments, their benefits and risks. It is for this purpose that finance was included as a key, cross-cutting work stream within the G20 Energy Efficiency Action Plan in November 2014, and why the 2015 work of the G20 Energy Efficiency Finance Task Group is so important.

Enhancing capital flows for energy efficiency investments requires a new level of collaboration between policymakers and public and private finance providers. The improved understanding of the investment framework for energy efficiency, as well as of the interplay between policy ambition, multiple benefits and the core technical realities of energy efficiency investments, is key. The ultimate aim of this work is to elevate the profile and importance of energy efficiency investments and their critical economic, developmental and environmental benefits so that G20 countries can together work to resolve some of the unnecessary technical impediments to allow more funds to flow and deliver greater benefits to all.

[1] IEA. (2014). *Energy Efficiency Market Report 2014*. [Executive Summary]. Retrieved from: http://www.iea.org/Textbase/npsum/EEMR2014SUM.pdf

[2] Bloomberg New Energy Finance (2014), Retrieved from: http://about.bnef.com/press-releases/rebound-clean-energy-investment-2014-beats-expectations/

Foreword

The Energy Efficiency Finance Task Group (EEFTG) was formed with the aim of enhancing capital flows for energy efficiency investments. The EEFTG provides G20 Governments with a forum for engaging directly with members of the private and public finance community, industry and international organisations.

In 2015, the work of EEFTG was led by a Steering Group, comprised of director-level individuals from 13 participating economies, and co-chaired by France and Mexico. The EEFTG currently counts among its members and supporters:

- G20 countries that directly support the initiative: Australia, Argentina, Canada, China, European Union, France, Germany, India, Mexico, South Korea, Russia, United States and United Kingdom;
- Representatives from international organisations, including the Organisation for Economic Co-operation and Development (OECD), European Bank of Reconstruction and Development (EBRD), United Nations Environment Programme Finance Initiative (UNEP FI), Sustainable Energy for All (SE4All), IEA, the Energy Charter, and the Clean Energy Solution Center of the Clean Energy Ministerial (CEM).

The EEFTG was formally launched in March 2015, by IPEEC, and immediately held its first Steering Group meeting in Paris on 13th March 2015. At this meeting, a Secretariat was formed to support EEFTG and this is composed of nominated experts selected from their own teams, IPEEC (the overall coordinator of the G20 Energy Efficiency Action Plan) and named individuals recognised for their specific expertise and networks in the subject matter.

The EEFTG 2015 work plan contains a series of technical engagement activities including: technical engagement workshops in key geographies, group engagements in the context of global conferences, bilateral discussions with country members and experts, coordination with IOs and one-on-one meetings with Financial Institutions and policymakers in various geographies.

This report provides the reader with a summary of these technical engagements, organised around the key technical themes which emerged to form EEFTG's voluntary Energy Efficiency Investment Principles of G20 participating countries and illustrated by important case studies most of which were provided to EEFTG by its Steering Group member countries.

Many thanks are due to all those who have worked hard to enable EEFTG to deliver against its own high expectations in 2015 and for creating such a strong platform for continued engagement in 2016.

Co-signed by EEFTG Co-Chairs:

Sylvie Lemmet, Co-chair France

Director for European & International Affairs

Directorate for European & Int. Affairs

Ministry of Ecology Sustainable development & Energy
Ministry of Housing, Territorial Equality & Rurality

Santiago Creuheras, Co-chair Mexico

Director General for Energy Efficiency and Sustainability
Deputy Ministry for Planning and Energy Transition
IPEEC Policy Committee Chairman
Mexico's Ministry of Energy, SENER

Acknowledgements

The work of the G20 Energy Efficiency Finance Task Group has been a collective effort with the fundamental support and committed engagement from its 13 country members (Australia, Argentina, Canada, China, European Union, France, Germany, India, Mexico, South Korea, Russia, United States and UK) under the strong and dedicated leadership of its co-chairs France and Mexico.

As a key work stream under the G20 Energy Efficiency Action Plan, EEFTG has benefitted from the support of the highly committed and resourceful team at IPEEC, led by Benoît Lebot, with special mention of IPEEC team members Stefan Buettner, Ailin Huang and Zoe Lagarde for their engagement with various aspects of the co-ordination, procedures and organisation of EEFTG throughout 2015.

The daily operation of EEFTG and its technical activities were managed, on behalf of the Co-chairs and the Steering Group, by a Secretariat formed of five key individuals selected for their specific technical input and relevant networks which they brought to EEFTG. The members of the EEFTG Secretariat are: Ms Rosario Vadillo (*Ministry of Energy, Mexico*); Ms Véronique Massenet (*Ministry of Ecology, Sustainable Development and Energy, France*); Mr Stefan M. Buettner (*IPEEC/EEP*); Ms Annie Degen (*UNEP FI*); and - in the role of rapporteur - Mr Peter Sweatman (*Climate Strategy & Partners*). EEFTG wishes to acknowledge all of their hard work and dedication to help deliver 2015's key outcomes. Special mention is reserved for Peter Sweatman, and the Climate Strategy team led by Mauricio Yrivarren, for their diligence to deliver timely and excellent drafting work and workshop moderation support throughout the year.

EEFTG estimates that over 180 individual experts around the globe were engaged in Technical Engagement Workshops (TEWs), group meetings or 1-on-1 discussions in the context of EEFTG's technical work. These experts represented the views and input from Financial Institutions, policy makers and energy efficiency market stakeholders across multiple geographies. We do not have room to list each person individually; however, we wish to thank all and every one of those individuals and their institutions for the time they dedicated to EEFTG and for their invaluable inputs to our work.

Finally, EEFTG's work and activities benefitted from the crucial support and input from numerous collaborating organisations. These entities performed a variety of roles including content review, expert support, convening meetings, workshop coordination, identifying experts, resourcing and networking on EEFTG's behalf. EEFTG would like to extend its particular thanks to:

Alliance to Save Energy, French Agency for Environment and Energy Management (ADEME), Bank of America, Bloomberg New Energy Finance (BNEF), China Quality Certification Centre (CQC), Clean Energy Ministerial/ Clean Energy Solution Center (CEM/ CESC), ClimateWorks Foundation, Energy Charter, Energy Efficiency Finance Institutions Group (EEFIG), European Bank for Reconstruction and Development (EBRD), Institute for Energy Efficiency in Production (EEP) International Energy Forum (IEF), International Institute for Sustainable Development (IISD), International Partnership for Energy Efficiency Cooperation (IPEEC),National Development and Reform Commission (NDRC), Organisation for Economic Cooperation and Development (OECD), Sustainable Energy For All (SE4All), United Nations Environment Programme (UNEP), UNEP Finance Initiative (UNEP FI), UNEP Inquiry, and the World Bank Group.

Table of Contents

Acronyms and Abbreviations

ADEME	(French) Agence de l'Environnement et de la Maîtrise de l'Énergie (Agency for Environment and Energy Management)
AP	Andhra Pradesh
ASE	Alliance to Save Energy
ATEE	(French) Technical Association Energy Environment (Association Technique Énergie Environnement)
BNEF	Bloomberg New Energy Finance
BofA	Bank of America
CEFC	(Australian) Clean Energy Finance Corporation
CEM	Clean Energy Ministerial
CESC	Clean Energy Solution Center
CHP	Combined Heat and Power
CHUEE	China Utility-based Energy Efficiency Finance
CO2	Carbon Dioxide
CQC	Construction Quality Control
CUMAC Actualisés)	(French) Cumulative Amount and Updated Value (Kilowattheures Cumulés
CWF	Climateworks Foundation
DELP	(Indian) Home Efficient Lightning
EBRD	European Bank for Reconstruction and Development
ECP	(German) Energy Conservation Protect (Energy Einspar Protect – EEP)
EE	Energy Efficiency
EEFIG	Energy Efficiency Financial Institutions Group
EEFTG	G20 Energy Efficiency Finance Task Group
EESL	(Indian) Energy Efficiency Services Limited
EPC	Energy Performance Certificate
ESCO	Energy Service Company
ESPA	Energy Savings Performance Agreement

ESWG	G20 Energy Sustainability Working Group
FI	Financial Institution
GEF	Global Environment Facility
GHG	Greenhouse gas
GMF	(Canadian) Green Municipal Fund
GWH	Gigawatt Hour
IBRD	International Bank for Reconstruction and Development
IEA	International Energy Agency
IEF	International Environmental Forum
IFC	International Finance Corporation
IIWG	Investment and Infrastructure Working Group
IOs	International Organisations
IPEEC	International Partnership for Energy Efficiency Cooperation
IISD	International Institute for Sustainable Development
IRR	Internal Rate of Return
KEMCO	Korean Energy Management Corporation
kWh	Kilowatt Hour
LED	Light Emitting Diode
MOTIE	Korean Ministry of Trade Industry and Enterprise
MW	Megawatt
NBFCs	Non-Banking Financial Institutions
NDRC	National Development and Reform Commission
NJPACE	New Jersey Property-Assessed Clean Energy Programme
NMEEE	(Indian) National Mission for Enhanced Energy Efficiency
NTPC	National Thermal Power Corporation Limited
OECD	Organisation for Economic Co-operation and Development
PACE	Property-Assessed Clean Energy
PAEEEM	(Mexican) Programmea de Ahorro Energético Empresarial (Enterprise's Energy Efficiency Financing Programme)

PRONUREE	(Argentine) Programmea Nacional de Uso Racional y Eficiente de la Energía (National Programme for Rational and Efficient Use of Electric Energy)
RUSEFF	Russian Sustainable Energy Financing Facility
SE4All	Sustainable Energy for All
SENER	(Mexican) Ministry of Energy (*Secretaría de Energía*)
SME	Small and Medium Enterprise
TAF	Toronto Atmospheric Fund
TCH	Toronto Community Housing Corporation
TEW	Technical Engagement Workshop
TWh	Terawatt Hour(s)
UK	United Kingdom
UNEP FI	United Nations Environmental Programme Finance Initiative
ULB	(Indian) Urban Local Bodies
USD	United States Dollar
WBG	World Bank Group

Energy Efficiency Finance Task Group: Mandate and Approach

In November 2014, G20 leaders endorsed a France and Mexico co-chaired initiative, coordinated by IPEEC[3], to enhance capital flows to energy efficiency investments as one of the six work streams forming the G20 Energy Efficiency Action Plan: Voluntary Collaboration on Energy Efficiency.

The G20 Energy Efficiency Action Plan proposes that participating countries work with IPEEC to create an Energy Efficiency Finance Task Group (EEFTG), supported by relevant international organisations and initiatives, to facilitate a high-level dialogue with representatives of the international finance community. EEFTG's G20 members are also requested to communicate with and draw on the work of the G20 Investment and Infrastructure Working Group (IIWG) and ensure that the lessons learned by the IIWG are applied where appropriate.

As determined in the first meeting of the EEFTG Steering Group, it is anticipated that EEFTG will be a multi-annual initiative in the context of the G20 Energy Efficiency Action Plan. The long-term goals of EEFTG are to contribute to best practice and capacity building by collecting and analysing case studies of successful energy efficiency investment and financing initiatives from both the demand side (borrowers) and the supply side (banks and investors). In subsequent years, and with the support of collaborating organisations, it is expected that EEFTG will move to disseminate its lessons learned through a combination of information packs, best practice toolkits, online tutorials and through direct engagement.

In 2015, to appropriately frame its outputs and ensure fully inclusive global outreach and content, EEFTG identified and arranged a global series of Technical Engagement Workshops (TEWs), with the support of collaborating organisations, targeting key Financial Institutions, policy makers and energy efficiency market stakeholders across multiple geographies. These workshops were specifically designed to reach out to expert participants and identify the critical technical considerations influencing capital flows to energy efficiency investments in each geography as well as globally. In 2015, EEFTG's TEWs attracted some 150 expert participants who collectively influence an estimated 1 trillion USD of aggregate finance and include many of the world's leading experts and practitioners in the field.

In addition to organising its own events, the EEFTG Secretariat (on behalf of the work stream) attended and presented EEFTG's work to gather input and feedback in the context of selected relevant global forums including: OECD's Green Investment and Finance Forum, EE Global 2015, Bloomberg's 2015 Future of Energy Summit, Vienna Energy Forum 2015, Second Annual SE4All Forum, 2015 Energy and Climate Partnership of the Americas Summit and the 15th Clean Energy Ministerial.

Finally, EEFTG, supported by the IPEEC Secretariat, have co-ordinated global conference calls, 1-on-1 meetings and bilateral discussions with member countries, selected experts and supporting organisations to analyse the emerging technical themes and identify case studies to illustrate these.

[3] *The International Partnership for Energy Efficiency Cooperation (IPEEC) is an autonomous international forum that provides global leadership on energy efficiency by facilitating government implementation of policies and programs to yield energy efficient gains. IPEEC has 16 country members and brings its collective, multi-annual experience from leading nine similar initiatives that assist its member countries to identify and share proven, innovative practices and data on energy efficiency and better inform decision makers.*

*Voluntary **Energy Efficiency Investment Principles of G20** participating countries*

As EEFTG's work progressed it became apparent that a set of "technical themes" with global relevance and resonance were emerging which strongly influence capital flows to energy efficiency investments. Furthermore, nearly all of the emerging themes were relevant in most of the countries consulted – although often in a different priority order. Such a strong pattern gave rise to the drafting of a proposed set of voluntary Energy Efficiency Investment Principles of G20 participating countries which were sent for comments and input to each of the EEFTG Steering Group member countries. The proposed Principles deal with the critical common technical themes which EEFTG's engagement work and research have identified, and provide a series of remedial activities around which G20 countries can focus collaborative resources in order to enhance capital flows to energy efficiency investments.

Given the common interest among EEFTG countries to find ways to unblock and enhance capital flows to energy efficiency investments, the following voluntary Energy Efficiency Investment Principles for G20 participating countries emerged through the EEFTG process of engagement:

'Sharing a common understanding of the positive economic and societal benefits of public and private energy efficiency investments, we agree to collaborate and work together, on a voluntary basis, to:

1. Recognise the importance of energy efficiency considerations in all relevant decision making to significantly increase and strengthen energy efficiency investments in our economies in the context of a balanced progression of the three dimensions of sustainable development;

2. Encourage energy efficiency investments and their positive impacts to be systematically considered alongside supply-side investments relating to our energy systems. This can be achieved through consideration of possible reforms relating to decision-making, planning, pricing and regulation of energy and infrastructure investments;

3. Country-level review and consideration of measures and policies which will stimulate demand for energy efficiency investments, including the following:

a. The provision of clear regulatory and investment signals to encourage the uptake of energy efficiency investments within the development and upgrade cycles of our infrastructure, consistent with national development priorities and strategies.;

b. Appropriate national and regional incentives and mechanisms that: stimulate improved energy management; support energy efficient investment choices; and improve awareness of the value of energy efficiency investments with key decision-makers;

c. Contribute to and facilitate national and, where appropriate, regional mechanisms that make the data needed for energy efficiency measures and investments easily accessible to market participants involved in the development of these investments considering in-country communication protocols and clear systems of labels and certificates;

d. Support for the appropriate development, packaging, aggregation, standardisation, bundling and provision of tailored financing for energy efficiency investments through multiple national, regional or local retail channels (such as utilities, financial institution branches, and other retail distribution networks), to deliver a change of scale for consumer and SME energy efficiency investing;

e. Review and identify policies at the national and local level that help to accelerate the replacement cycle for "worst in class" facilities and buildings with respect of their relative energy performance;

f. Build a pipeline of bankable and replicable energy efficiency projects.

4. Encourage collaboration to identify and explore how to unlock barriers preventing the supply of and access to finance for energy efficiency investments in local markets including:

a. Reviewing accounting and regulatory treatment for energy efficiency investments, where appropriate, to fairly reflect the net benefits and business risks of these investments;

b. Developing national and/ or regional standards and policies that will support energy efficiency investment processes in key market segments consistent with regional and national priorities and conditions;

c. Developing finance mechanisms, where relevant, that can enhance the creditworthiness of the repayment streams to energy efficiency investments, such as including these repayments within existing payment collection mechanisms;

d. Simplifying public support programmes, where relevant for energy efficiency, to enable their efficient combination with and mobilisation of private finance streams to maximise overall funding flows and delivered benefits;

e. Involving public financial institutions, where appropriate, to help formulate lending policies to prioritise and mobilise private capital toward energy efficiency investments in the respective countries.

5. Build greater internal energy efficiency investment awareness within public and private financial institutions, expand their use of tailored approaches to structure and facilitate energy efficiency investments, and develop their capacity through the pro-active sharing of good practice. This can be achieved through support for financial institutions which adopt their own systems based upon voluntary energy efficiency investment commitments. These would aim to appropriately govern their own internal decision-making processes, investments in, and interventions to mobilise greater investment in energy efficiency.'

The following sections of this report provide a more in-depth view of each of the voluntary Energy Efficiency Investment Principles for G20 participating countries and include excerpts from the EEFTG engagement activities, illustrating expert perspectives, and specific case studies that have been supplied by EEFTG member countries.

1. The Importance of Energy Efficiency as a Horizontal and Cross-Cutting Economic and Developmental Priority

"Recognise the importance of energy efficiency considerations in all relevant decision making to significantly increase and strengthen energy efficiency investments in our economies in the context of a balanced progression of the three dimensions of sustainable development."

Rationale: Energy efficiency considerations and investments are integral to multiple national economic and development areas such as: energy, infrastructure, housing, industry and transport, among others. Large investment decisions with long-term, structural impact on economies should consider energy efficiency among their priorities. Often energy efficient choices are more cost effective to implement early in the life of a policy or investment choice rather than as a late stage retrofit or criterion. Notable examples might be in the procurement of new public buildings, social housing, and infrastructure or energy systems. A lifetime energy usage and operational cost consideration can be integral to many capital expenditure decisions that in its absence may be tilted towards lowest up-front cost, especially when energy is not the primary cost-driver.

Different countries have different ways of articulating their consideration of energy efficiency in a horizontal manner to influence policies and public and private investment decisions. Many countries (86%, or 72 countries, from 2012 survey by the World Energy Council) have qualitative energy efficiency targets of which 60% are based upon "end-use" in various sectors and 35% are based upon total consumption[4] and around half of these countries also have an energy efficiency law. Most countries also (75% from the 2012 survey) have an energy efficiency agency which is a technical body with the appropriate skills to implement, monitor and evaluate progress towards targets as well as coordinate with public and private stakeholders on programmes and measures.

During 2015, EEFTG countries selected specific case studies of successful policies and instruments which illustrate the specific technical discussions which were undertaken. From these, an interesting illustration of the promotion of energy efficiency in a horizontal way was provided to EEFTG by Argentina, whose PRONUREE decree includes energy efficiency as a key component of its sustainable development policy across many of the key growth segments of the Argentine economy.

Argentina's PRONUREE – Promoting Energy Efficiency at the National Level

Issued by national decree in 2007, the National Programme for Rational and Efficient Use of Electric Energy (PRONUREE) makes the rational and efficient use of energy a national priority. The Argentine government seeks to encourage energy efficiency as a key component of its sustainable development policy as energy efficiency policies mitigate environmental impacts associated with the production, transport, distribution and consumption of energy.

At present, Argentina's Energy Secretariat is implementing the "Global Environmental Facility (GEF) Project on Energy Efficiency in Argentina", through a concessional donation of 15 million USD, in accordance with the Energy Efficiency Donation Agreement between Argentina and the International

[4] World Energy Council 2013 Energy efficiency policies retrieved from: http://www.worldenergy.org/wp-content/uploads/2013/09/World_Energy_Perspective_Energy-Efficiency-Policies-2013_Full_Report.pdf

Bank for Reconstruction and Development (IBRD – World Bank), which acts as the GEF Implementing Agency.

The project's key activities are:

1. **National standardisation, labelling and energy efficiency standards:**
    a. Finalisation of national labelling standards for household appliances and building envelopes.
    b. Establishment at the national level of minimum energy efficiency national standards for refrigerators and freezers, washing machines and air conditioners.
    c. Approval of a ban on imports and trade of incandescent bulbs for residential use.

2. **Argentine energy efficiency fund:**
    a. Implementation of a mechanism for financing energy efficiency projects, called the Argentine Energy Efficiency Fund, aimed at facilitating investment in these types of projects in small and medium-sized enterprises (SMEs).

3. **Energy efficiency in the industrial sector:**
    a. Development of energy diagnostics in small and medium-sized enterprises (SMEs) from different economic sectors and regions of the country.
    b. 127 diagnoses carried out to date, with approximately 325 studies expected to be conducted.

4. **Energy efficiency in the residential sector:**
    a. Current implementation of the Programme for the Promotion of Production and Commercialisation of Energy Efficient Household Electrical Appliances, called "RENOVATE" ("Renovate yourself").

5. **Dissemination and training on energy efficiency:**
    a. Through workshops in primary schools;
    b. General training courses on rational and efficient energy use – co-ordinated with national standardisation institutions and consumer associations – aimed at end users;
    c. Sector-specific Manuals and Guides for Energy Efficiency Good Practices; and
    d. National advertising strategy to promote public awareness of responsible and efficient uses of energy.

EEFTG was also informed of the Chinese government's ambitious energy conservation targets and its intention to drive these forwards using a series of key horizontal measures:

1. Strengthening the implementation of energy conservation targets through the "dual control" of both total energy consumption and energy intensity targets;
2. Accelerating the implementation of key transformative projects;
3. Focusing on high-potential energy saving units;
4. Strengthening the implementation of standards;
5. Improving the market mechanisms and expanding the energy services industry; and
6. Strengthening the regulatory framework for energy conservation, enforcement through supervision and inspection.

As finance is a cross-cutting issue and a key pillar supporting activity across many sectors in China, the Chinese government clearly highlights the need to nurture the energy efficiency finance system with new financial products and further "marketisation" as key components to accelerate economy wide energy conservation. In this vein, its "Energy Efficiency Credit Guidelines", jointly issued by the NDRC and CBRC on 1st January 2015, provide a strong foundation for the stimulation of energy efficiency investments by Financial Institutions.

A successful mechanism which has been used in China to raise awareness of energy efficiency and reduce its financial risk is the CHUEE programme which was referenced by many of the experts which EEFTG engaged with:

China's CHUEE 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. The CHUEE approach involves:

- The work of the IFC supporting Chinese banks shouldering partner banks' risk by guaranteeing loans they 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 520 billion USD in loans that were subsequently leveraged to a total of 936 billion USD in project investment to 78 companies, without a single default loss[5]. Currently in its third phase, CHUEE has transitioned from working with utilities to working with a series of medium sized financial institutions to reach more industrial consumers and SMEs. (Kato et al. 2014).

The CHUEE SME programme focuses on:

- Those industries with the highest potential for efficiency gains to encourage and fund less energy intensive production.
- Provinces where SMEs' energy consumption is highest.

Enterprise Example: Sinen En-Tech is a high tech company involved in the development, manufacturing and marketing of environmental protection equipment. Thanks to a loan from the Bank of Beijing's under the CHUEE programme, the company was capable to install condensed water

[5] 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

recovery equipment in four petrochemical companies across China. As a result, the company was able to increase its sales, and boosted its corporate image as well as that of the bank[6].

Project: Condensed water recovery project.

Loan: 1 year, 5 million yuan, from Bank of Beijing.

Water Savings: 2.7 million tonnes per year.

Coal Equivalent Reduction: 38,000 tonnes per year.

Carbon Dioxide Reduction: 104,672 tonnes per year.

[6] IFC. (2015). *China Utility-based Energy Efficiency Finance Programme (CHUEE)*. [Brochure]. Retrieved from http://www.ifc.org/wps/wcm/connect/region__ext_content/regions/east+asia+and+the+pacific/publications/ifc-chuee+brochure

3. Balanced Approach to Demand and Supply-side Measures

"Encourage energy efficiency investments and their positive impacts to be systematically considered alongside supply-side investments relating to our energy systems. This can be achieved through consideration of possible reforms relating to decision-making, planning, pricing and regulation of energy and infrastructure investments"

Rationale: In a world of finite resources and increasingly efficient ways to deliver improved products and services, energy planners have a greater array of tools and can adopt increasingly sophisticated approaches to developing energy systems. A stable, transparent and integrated "investment-grade"[7] policy environment that considers demand-side and supply-side investments and addresses the barriers to energy efficiency investments for long-term investors is a fundamental component of a sustainable investment framework.

The implementation debate around this principle is very active at present in Europe with the European Coalition for Energy Savings[8] considering that energy efficiency improvements should be prioritised in cases where such improvements are shown to be most cost-effective, in addition to driving jobs and economic growth, increasing energy security and reducing climate change. As an organising principle, the EU's "energy efficiency first" principle can be applied throughout the energy system, to all policy making and investment decisions, thereby including all decision points concerning the energy system where energy saving solutions might otherwise be overlooked or undervalued.

Often the policy making core of a transformational approach to balancing demand and supply-side measures relates highly to the role of the public service utility or operators in the energy markets themselves, and their own economic incentives to act or invest in one way or another. In order to address the "changing role of the utility" – another much debated global issue in the context of EEFTG's work – the incentives of these public and private purposed entities needs to be aligned with the delivery against government and national objectives.

In Washington, EEFTG was informed that utilities have the most active energy relationships with retail customers, unsurprisingly, and also appear to provide around half of all consumer oriented energy efficiency finance – and yet their engagement varied greatly from state to state and by company. Over half of US States have Energy Efficiency Resource Standards that have generated "Negawatts"[9] (energy savings) at approximately half the cost of new generation. This value proposition was also illustrated by the 2.5 billion USD "Conservation First" programme 2015-2020 in Ontario, Canada, where every 1 CAD spent on Conservation = 2 CAD saved on supply side investments.

In Europe, France is undertaking an ambitious "energy transition" which is its national plan for the post-oil era and a step towards a new French energy model, which will be stronger and more sustainable in its response to key energy supply challenges, changes in prices, the depletion of

[7] The term "investment grade" was used by financial institutions engaging with EEFTG to denote a policy framework with long-term projections and goals, stability of implementation, sophistication and with sensitivity to key variables, including environmental and social factors.

[8] This Brussels-based coalition is made from more than 400 associations and 150 companies, 15 million supporters and more than 2 million employees and 1,000 cities and towns in 30 countries in Europe and its Position paper. Sourced from: The Coalition for Energy Savings. (2015, May 7). *"Energy Efficiency First": How to make it happen"*. Retrieved from: http://energycoalition.eu/sites/default/files/20150504%20Energy%20Efficiency%20First%20-%20making%20it%20happen%20FINAL_0.pdf

[9] A term first coined by Amory Lovins in 1989 to be a measure of energy saved. For more detail please refer to http://www.rmi.org/Knowledge-Center/Library/E90-20_NegawattRevolution

resources and environmental protection requirements. In this energy transition, France will take full advantage of energy savings, especially through massive incentives for investment in home renovations and access to clean transport. In fact, since 2005, France has been among the leading countries to use an energy efficiency obligation (or "white certificate scheme") to reduce its energy intensity and re-align its energy companies to address energy efficiency investments in a more balanced way. The following case study from France illustrates this programme and its impacts:

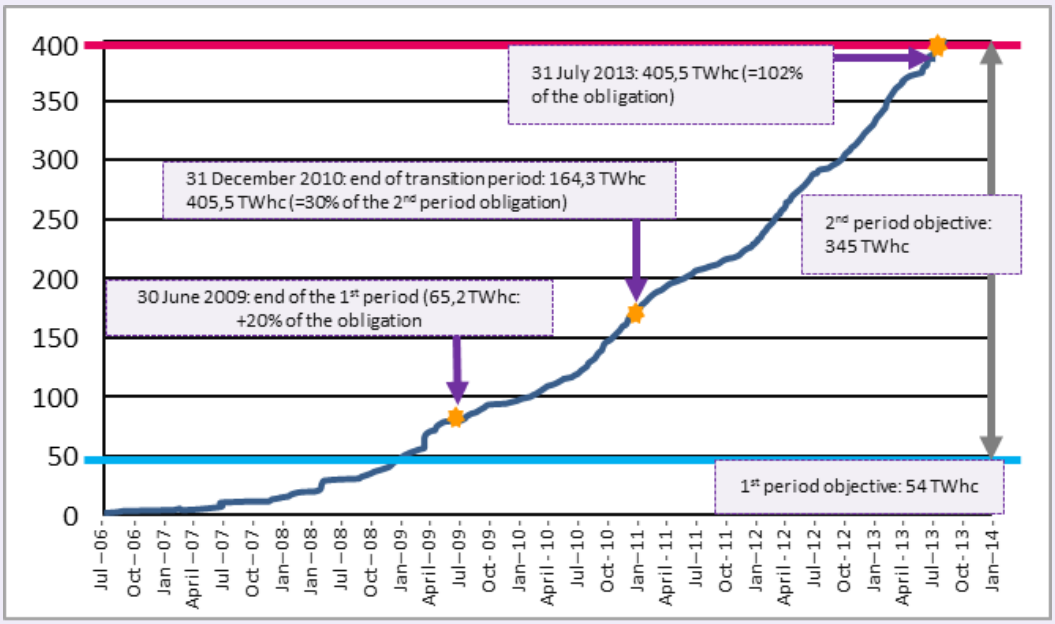
France + White Certificates = Success

Born out of the 2005 French energy policy law, the French White Certificate scheme has been central to the country's target of reducing its energy intensity by 2% per year from 2005 to 2015[10]. Through this scheme France aims to refurbish its building stock, promoting energy efficiency in a liberalised market.

Key Enablers:

- **Scheme Rules**: favouring the development of energy services thanks to special bonuses.
- **Special Accounting Rules**: these are applied by the French government to particular programs depending on policy targets –such as fighting fuel poverty-, with a fixed rate of kWh *cumac* (cumulative amount and updated value) per euro invested.
- **Catalogue of Standardised Operations**: these number around 300 and were structured and defined by ADEME (French Agency for Environment and Energy Management) and ATEE which is a stakeholder association focused on energy and the environment.

The table below highlights the energy targets for the French White Certificate scheme for its three different phases from 2006-2009, 2011-2013, and 2015-2017 whose objective is at present 700TWh *cumac*.



Graph source: Ademe, 2013

[10] RAP. (2014). *French White Certificates and Energy Savings in the Transport Sector*. Retrieved from http://www.raponline.org/press-release/frances-innovative-efficiency-obligation-in-the-transport-sector-leads-to-efficiency-gains-in

Moving forward, the scheme – combined with fiscal support and other measures - will be instrumental in reducing French energy intensity by 2.5% per year for the period 2015-2030[11] as France seeks to expand its efforts in refurbishing its building stock, where the energy efficiency potential remains large.

In a very different market context, and as an illustration of a different way to support utility delivery of energy efficiency outcomes, India has established a joint venture to facilitate and finance energy efficiency projects and demand-side projects for 30 distribution companies related to India's National Mission for Enhanced Energy Efficiency (NMEEE). This investment and finance driven approach brings national financial resources to support utilities' investments in energy efficiency activities as shown in the next case study.

India's EESL – Assisting in the Creation of Sustainable Energy Efficiency Markets

Founded in late 2009, India's Energy Efficiency Services Limited (EESL) is a joint venture comprised of four public entities: NTPC Ltd, Power Grid Corporation of India Ltd, Power Finance Corporation Ltd and Rural Electrification Corporation Ltd. EESL's purpose is to facilitate the implementation of energy efficiency projects[12]. In addition, EESL also works as an energy service company (ESCO) and as a resource centre providing consulting and expertise to utilities and financial institutions. EESL is designed to support the implementation of and lead the market-related actions of India's National Mission for Enhanced Energy Efficiency (NMEEE).

EESL's Portfolio:

- Implementation of India's Bureau of Energy Efficiency-Demand Side Management programme for 30 distribution companies.
- Completed Energy Efficiency projects in 11 states – 15 on-going.
- Completed 22 consultancy projects.
- 2013-14 resulted in energy savings of 4.5 MW and GHG emission reductions of 3.3 million tonnes CO2. 2014-15 estimated savings to reach 100 million KWh.

EESL business model:

- 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.

Flagship Projects:

Sector	Project	Annual Energy Savings Achieved	Estimated Investments in 2014-15 and 2015-16

[11] ATEE. (2015). *Snapshot of Energy Efficiency Obligations schemes in Europe: main characteristics and main questions.* Retrieved from http://atee.fr/sites/default/files/1-snapshot_of_energy_efficiency_obligations_schemes_in_europe_27-5-2015.pdf

[12] EESL. (2015). *Annual report 2013/2014*. Retrieved from http://eeslindia.org/writereaddata/EESL-ANNUAL-REPORT-2013-14.pdf

Home efficient lighting (DELP) Project completed in Puducherry	Replacement of inefficient incandescent bulbs to LEDs in households	56 million kWh/ 600k replacements	Rs. 500 crores (78.3 million USD) 2 million replacements **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 (15.6 million USD) 10,000 pump replacement **10.5 MW load reduction**
Urban EE – Street lighting in ULBs Project under implementation in Nashik	Replacement of 300kinefficient street lights across the states of AP, Delhi, Puducherry, Tripura, Kerala, and Nashik	186 million kWh	Rs. 300 crores (47 million USD) **10.5 MW load reduction**

Table Source: EESL, 2014

4. Country-led Measures and Policies to Stimulate Demand for Energy Efficiency Investments

"Country-level review and consideration of measures and policies which will stimulate demand for energy efficiency investments, including the following:

a. The provision of clear regulatory and investment signals to encourage the uptake of energy efficiency investments within the development and upgrade cycles of our infrastructure, consistent with national development priorities and strategies.;

b. Appropriate national and regional incentives and mechanisms that: stimulate improved energy management; support energy efficient investment choices; and improve awareness of the value of energy efficiency investments with key decision-makers;

c. Contribute to and facilitate national and, where appropriate, regional mechanisms that make the data needed for energy efficiency measures and investments easily accessible to market participants involved in the development of these investments considering in-country communication protocols and clear systems of labels and certificates;

d. Support for the appropriate development, packaging, aggregation, standardisation, bundling and provision of tailored financing for energy efficiency investments through multiple national, regional or local retail channels (such as utilities, financial institution branches, and other retail distribution networks), to deliver a change of scale for consumer and SME energy efficiency investing;

e. Review and identify policies at the national and local level that help to accelerate the replacement cycle for "worst in class" facilities and buildings with respect of their relative energy performance;

f. Build a pipeline of bankable and replicable energy efficiency projects."

Rationale: In EEFTG's mandate it was asked to differentiate between policies and instruments designed to address and stimulate the demand for energy efficiency investments and those designed to help stimulate and unlock the supply of energy efficiency finance. In many EEFTG workshops and discussions countries and experts often stated that the stimulation of demand for energy efficiency investment was a priority, but this "demand" is multi-sectorial and requires a framework of complimentary policies and instruments to encourage. Under this principle, EEFTG has selected six of the most resonant and common approaches from its engagement activities and research to help identify and accelerate the demand for energy efficiency investments in industry and buildings. These include:

- Appropriate regulatory signals to support the integration of energy efficiency investments at the critical upgrade or investment moments in an asset's life;

- Finding ways to ensure that energy efficiency investments do not get relegated to a technical or asset-level, but that they are considered by asset owners as strategic to the future value of the business;
- Ensuring that the regulatory environment supports the low cost provision and transparency of relevant data which third parties require to build energy efficiency investment cases;
- Identifying and supporting financial and non-financial retail channel to provide out-reach to market energy efficiency investments to the broad base of distributed asset owners;
- Ensuring, through regulation, that markets realise that there is reduced public tolerance for inefficiency and that those assets whose energy performance is "worst in class" will become increasingly un competitive and costly to run; and
- Finding ways to showcase "shovel ready" energy efficiency investment opportunities that can be replicated across sectors and the economy.

In the industrial sector in the US, EEFTG was told that financing needed to be ready to coincide with the natural retirement of equipment, and that financial institutions needed to be able to use energy savings as collateral and focus on reduced energy waste. Similarly, EEFTG was also informed that in Australia, the "issue" with buildings upgrades was with engaging the owner and the easy provision of energy efficiency finance, otherwise energy efficiency can often "get lost" in traditional bank lending and renovation projects can become side-lined.

To ensure that businesses and business owners had access to specifically tailored energy efficiency finance instruments supported by a knowledgeable team and to prioritise the implementation of energy productivity measures, Australia created the Clean Energy Finance Corporation (CEFC) in 2012. CEFC targets the manufacturing sector with "energy efficiency loans" that support energy efficient choices and covers these specific strategic finance needs and therefore freeing up corporate working capital for other purposes. This is illustrated in the following case study.

Australia's CEFC Energy Efficient Loans – Helping Business Compete in a Low Carbon Economy

Born out of the 2012 "Clean Energy Finance Corporation Act"[13], the Clean Energy Finance Corporation (CEFC) understands that Australian business ought to better position themselves in a low carbon economy and therefore seeks to assist them in improving their energy productivity, transforming energy use and reducing costs.

CEFC has a co-financing agreement with the Commonwealth Bank to support businesses –mostly those in the manufacturing sector-in improving their energy productivity. So far, the CEFC has committed 50 million USD with matched financing from Commonwealth Bank for energy efficiency loans.

"Energy Efficient Loans" on average range from 500,000 AUD to 5 million AUD[14]. Their key benefits are:

[13] The CEFC Act establishes the CEFC Special Account which is credited with A$2 billion per year from 1 July 2013 to 2017. This provides the CEFC with certainty in funding. The Act provides that these amounts will roll over to be available in future years if not invested in one year.

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

- Can be used to finance up to 100% of purchase price
- Allow 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

Examples:

- **Labelmakers** provides label printing services for some of Australia's best known consumer brands. It has been able to replace its presses with new efficient ones (at a cost of 5.5 million AUD) thanks to an "Energy Efficient Loan" financed by the CEFC and the Commonwealth Bank and to a grant of the Australian government Clean Technology Investment Programme. When compared to the old presses, these new ones:
    - Operate at twice the speed and use half the energy;
    - Reduce energy costs and onsite carbon emissions by 14%;
    - Create operational savings thanks to a reduction in paper waste and the use of cheaper inks.
- **Radevski Coolstores** is a major supplier of apples and pears that faced increased business operating costs due to increased energy and refrigerant. It was able to install an innovative ammonia-based refrigeration system thanks to a 1.15 million AUD "Energy Efficient Loan" financed by the CEFC and the Commonwealth Bank. This refrigeration update has enabled the company to:
    - Reduce costs by over 140,000 AUD a year
    - Reduce carbon emissions by about 25%
    - Remain competitive in the domestic produce market

Regulatory frameworks in some regions support energy efficiency investments in ancillary processes (e.g. renewable heat tariffs) and provide tax breaks or accelerated depreciation for more energy efficient equipment choices. Often the energy point may not be enough on its own to drive a decision and therefore finance solutions need to encourage energy efficient choices when an industrial client comes to investors seeking finance for expansion. With energy efficiency in the package, the financing treatment is improved.

Specialist energy efficiency financing facilities which target specific technologies and industrial segments that are heterogeneous and composed mainly of SMEs can help address these points, as also well illustrated by Mexico's Eco-Credit Programme for Enterprises.

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 Eco-Crédito Empresarial*) is designed to support the industrial national sector including SMEs through financing schemes with attractive rates.

The Mexican government understands that there is momentum for the programme as SMEs are responsible for 17% of total energy consumption (215 GWh), 47% of electricity (92 GWh) and 11% of fuel consumption (34,167 GWh). Yet, their workers are unskilled, most business transactions are informal, and they lack access to credit. Numbering over 4 million in the services, commerce and industry sectors, SMEs indeed provide very attractive opportunities in terms of energy efficiency with proven energy saving potentials ranging from 10% to 20%. Nevertheless, lack of awareness, scarce

technical know-how and limited sources of funding have contributed to low energy efficiency levels among SMEs.

The programme has two areas of focus:

- The massive substitution of non-efficient electrical equipment with certified high-efficiency units
  - Those established in the PAEEEM (Enterprise's Energy Efficiency Financing Programme)
- Implementation of energy audits, through a "case by case approach"
  - Aiming at identifying further alternatives for furthering energy efficiency

As of June 2015, the programme figures are encouraging (see table below).

Equipment Replaced and Amount Invested Under the Eco-Crédito Empresarial		
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 MXN (1.8 million USD)
Electrical Substations	77	9,022,270.67 MXN (557k USD)
Electric Motors	1	22,942.69 MXN (1.4k USD)
Capacitor Banks	2	17,874.86 MXN (1.1k USD)
TOTAL	**20,815**	**406,200,833.91 (25 million USD)**

Table Source: SENER, 2015

Resources like the Mexican Eco-Credit Programme for Enterprises go some way to address the "bundling" issues which hamper many traditional banks and investors from deploying larger amounts of capital into the energy efficiency sector. In addition, they can identify "worst in class" technologies in some sub-sectors and target these for rapid replacement with financing support and reducing transaction costs.

Some of the aggregation issues and outreach/ marketing of energy efficiency investments are undertaken by companies designed to deliver energy services – the ESCO. The ESCO market in the US was described to EEFTG by experts as having initially been a sector dominated by large equipment suppliers with large sales forces of engineers, offering energy audits and benchmarking studies to identify viable opportunities. Initially, margins allowed for completion of the works and guaranteed performances, but over time these margins became compressed and there was a new growth of regional ESCOs and many of the large contractors learned to "self-implement" (in essence bringing the ESCO skills in-house). Even in the US, considered an advanced ESCO market, some sectors (like the commercial building market, as compared with Federal and State Buildings) have experienced difficulties with the ESCO model. These complications often stem from tenancy horizons, and frequently there is an existing mortgage provider which makes the negotiation and structuring of the financing for the building's retrofit more complex.

In China, where the ESCO model has been widely embraced there are around 5,000 registered ESCOs nationally. EEFTG was told that ESCOs in China tend to focus on relatively large projects (eg. replacement of 500 kW industrial motors) for strong credit-worthy counterparties with target pay-back periods of 2-3 years. While Chinese ESCOs are keen to work on smaller investments and bundles, there was a sense that aggregation of smaller interventions in facilities involved more risk and transaction costs for ESCOs and hence some kind of "bundling assistance" for these smaller and SMEs transactions might be of use in the form of project development support. Providing secondary market liquidity for Energy Performance Contracts, with ESCOs being able to use them as collateral to raise finance, could also increase their capacity to take on more projects.

In South Korea, KEMCO funds a programme that targets the replacement of dated and "worst in class" technologies by promoting the ESCO model, outlined in this case study provided to EEFTG:

South Korea's KEMCO ESCO Programme

The Korean Energy Management Corporation (KEMCO), recently renamed Korean Energy Agency, is an independent corporation working under Korea's Ministry of Trade Industry and Enterprise (MOTIE) responsible for drafting and executing energy related policies that address climate change[15]. Among its services, KEMCO provides loans to those projects where Energy Service Companies (ESCOs) can replace dated and inefficient facilities of energy consumers lacking the proper technology as well as financing[16], thus ensuring the reduction of their consumption of energy. Main focus areas include[17]: 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. KEMCO reviews the application and conducts an expert review of the proposed project
3. If accepted, KEMCO 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 KEMCO

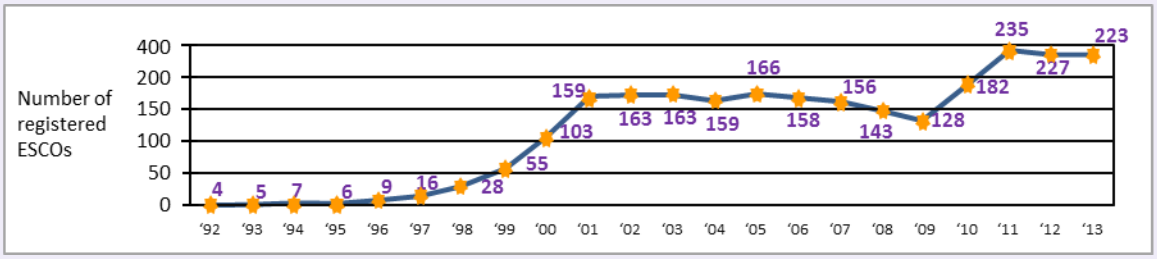
Since the inception of the programme in the early 90s, the number of ESCOs registered with KEMCO has steadily grown. . This has led to the training of technical experts and the creation of jobs, as well as the development of standard contract models plus guidelines[18].

[15] 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

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

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

[18] 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



Graph Source: KEMCO, 2014

Funding allocated for the programme in 2012 was about 502 million USD, resulting in savings equivalent to 550 tonnes of oil (roughly 5.7 TWh), which can be translated into 11 kWh saved per dollar spent. Interestingly, the programme has been successful at fostering the voluntary participation of private parties[19], as the initiative has shifted from the government to the private sector.

Finally, it was noted in many geographies that banks could engage more to develop energy efficiency retail products to reach out to SMEs and residential customers (a positive example being Germany's KfW programmes). Experts believe that with simple offerings for SMEs and residential customers, banks could build portfolios of energy efficiency loans which could then be securitised (as has been recently done in the US through the WHEEL transaction) as the individual performance risk is reduced through diversification.

[19] Ibid

6. *Unlocking Barriers Preventing the Supply of Finance for Energy Efficiency Investments*

"Encourage collaboration to identify and explore how to unlock barriers preventing the supply of and access to finance for energy efficiency investments in local markets including:

a. Reviewing accounting and regulatory treatment for energy efficiency investments, where appropriate, to fairly reflect the net benefits and business risks of these investments;

b. Developing national and/ or regional standards and policies that will support energy efficiency investment processes in key market segments consistent with regional and national priorities and conditions;

c. Developing finance mechanisms, where relevant, that can enhance the creditworthiness of the repayment streams to energy efficiency investments, such as including these repayments within existing payment collection mechanisms;

d. Simplifying public support programmes, where relevant for energy efficiency, to enable their efficient combination with and mobilisation of private finance streams to maximise overall funding flows and delivered benefits;

e. Involving public financial institutions, where appropriate, to help formulate lending policies to prioritise and mobilise private capital toward energy efficiency investments in the respective countries."

Rationale: The supply or availability of tailored or appropriate financing instruments, tools and/ or facilities is often cited by project developers as a reason why more energy efficiency investment capital does not flow to this sector. While it is reasonable to say that demand for finance must naturally come before supply, the two sides of this equation are connected as project developers tend to develop projects which they know will find finance and so therefore if finance providers do not have the skills, appetite or capacity to invest in energy efficiency this will impact the creation of energy efficiency investment opportunities.

During 2015, EEFTG had a great deal of positive input from financial institutions regarding the keys to unlock greater capital flows for energy efficiency as summarised in the five sub-principles above. The roles of relevant standards and data came up in each EEFTG technical workshop. Some long-term US fund investors use Energy Star ratings as benchmarking tools and some investors believe that energy efficiency is a proxy for best practice. It was noted that "Green Button" (in the US) and other initiatives designed to improve access to energy data were useful but that presently energy and financial performance are usually managed in separate silos and there remains an issue around getting relevant energy usage data from utilities to project developers. It was noted, however, that energy data systems (e.g. ISO 50001 Energy Management Systems) allow people to see opportunities across the whole organisation and raises energy efficiency investments' visibility.

In China, EEFTG was informed that while some data exists (such as the data from detailed energy audits of some 500-600 large companies), financial institutions do not find that this data is either available in a form that they find useful or they do not have access to it. Presently, there is no

registered platform in China with verified information on energy efficiency projects by sector or asset type. It was noted that in regions where energy efficiency experts require accreditation to undertake energy audits and prepare projects (as in some EU member states), the technical performance of each of the undertaken projects by each assessor could be tracked, and that this would help the finance sector.

However, uncertainty around the performance of energy efficiency investments is being addressed by the insurance industry and there are increasing numbers of insurance products coming to market to help fill the gap around performance risk (e.g. Germany, Mexico and Colombia). One new initiative of this nature is Germany's Energy Conservation Project's Insurance for Energy Savings that uses project certification to reduce performance risk and free up contractor's balance sheets from the requirements of guarantees.

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

The Energy Conservation Protect *(Energy Einspar Protect – EEP)* offered by Germany's KlimaProtect is a ground-breaking private sector initiative that works as an insurance for energy savings capable of driving increased investment into the sector.

KlimaProtect stands as the certifying body that assesses a project proposal with a supplier. Once a project is certified, the predicted energy savings will be insured, meaning that the client has the guarantee that he/she will receive the estimated amount[20]. This gives planning security to customers, who are able to know in advance when their investment will be amortised. And in the event that the energy efficiency works do not provide the predicted savings, the difference will be covered by the insurance[21].

The ECP is suitable for all enterprises which are active in the area of energy efficiency such as energy savings contractors, planning officers for energy related renovation, and general contractors and sub-contractors who plan and implement building insulation, illumination solutions and CHP units.

Given that ECP offers customers a degree of trust so that they can be certain they will not incur a loss, the contractor can win more customers more quickly and increase his/her 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.

Graph Source: Klimaprotect, 2015

In the further context of unlocking the supply of energy efficiency finance, EEFTG addressed the security of an energy efficiency loan and its resale value and whether or not the assets can be

[20] 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

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

reclaimed (and if so, at what cost). These are key questions that are made more complex in multi-family residences and multiple ownership structures. Experts felt that it is better to find a way to attach energy efficiency investment repayments to the asset such as: to its value (e.g. green mortgages), to its tax payments (e.g. US PACE) or inside its energy payments (e.g. On-Bill Finance or Repayment/ "OBR"). These repayment securitisation mechanisms have the additional advantage of resolving split incentives between owner and occupant, and pass-on the energy efficiency repayments to new owners in case of the sale of the building. One programme that has been celebrated for its successful track-record is the US Property Assessed Clean Energy financing programme, which has seen strong success across many of US States.

USA's PACE – EE + Renewables = Saving Money, Creating Jobs & Helping the Environment

Property-Assessed Clean Energy (**PACE**) financing programmes allow municipalities as well as counties to form special tax districts known as "Clean Energy Assessment Districts[22]". These districts are designed to:

a. Protect the locality's overall debt rating, as **PACE** effectively shields its risk.
b. Assist property owners to finance energy retrofits, as they are allowed to place an extra tax assessment on their property.

Those property owners that conduct energy efficiency works and small renewable energy systems repay them over 15 to 20 years by making additional annual payments on their property tax bills.

Furthermore, **PACE** programmes provide financing without requiring:

a. A down payment or
b. Payment of the full or partial up-front capital cost of the works.

Benefits that stem out of PACE Programmes:

- **Saves Money** – By lowering energy costs, **PACE** helps property owners save money. Also, long term payback makes projects funded by **PACE** immediately cash flow positive.
- **Creates Jobs -** Every 1 million USD spent on **PACE** projects creates 15 new jobs and results in 2.5 million USD in economic output.
- **Helps the environment** – Efficiency projects reduce energy use, and renewables substitute fossil fuels and reduce GHG emissions.

Examples:

NJPACE, New Jersey's PACE Programme represents an investment opportunity of about 8 billion USD in the state of New Jersey, capable of creating 85,000 new jobs, as well as lowering the state's carbon emissions by 14%[23].

San Diego's Figtree PACE financing programme operates in 75 jurisdictions in the state and is responsible for financing and completing 23 projects without a single default[24].

[22] NREL. (2010). *Energy Analysis: Property-Assessed Clean Energy (PACE) Financing of Renewables and Efficiency.* Retrieved from http://www.nrel.gov/docs/fy10osti/47097.pdf

[23] NJPACE. (2014, March). *NJPACE/CRCS Annual Report 2013: Laying a Foundation for Cleaner, Greener, More Resilient Buildings in New Jersey Cities and Towns*. Retrieved from http://www.newjerseypace.org/wp-content/uploads/2013/11/CRCS-AnnualReport2013.pdf

EEFTG was told that Commercial PACE programmes can help resolve the lack of alignment between owners and tenants and raise the seniority of claims on energy performance payments (i.e. there is no lien and no loan, just a tariff which enjoys special status) and that this mechanism has space to grow. One of the issues with PACE is at a country level and a financial level where there can be regulatory issues that could prevent lenders from investing. Also EEFTG was told that the US accounting treatment for Energy Savings Performance Contracts (ESPCs) as a liability in public accounts has hindered the ability of ESCOs to do more in the Federal Government segment. "Pay as You Save" is a scheme which was cited as providing improvements to segments of the population which often do not have high FICO scores in the US and resolving some balance sheet treatment considerations.

As third party financing (where the finance is provided by a party who does not own the asset) grows in importance in G20 countries, accounting standards will play an increasingly important role. It was noted that the balance sheet treatments of operating and financial leasing arrangements is key to some forms of energy efficiency investments. A call for clarification around the fair accounting and regulatory treatment was made in many of EEFTG's technical workshops and therefore it has been highlighted in EEFTG's analysis and Principles.

The blending of public and private financing schemes to both lever scarce public funding and resolve key barriers to unlock finance supply were also seen as critical areas of focus. EEFTG was told that the barriers to move away from grants to energy efficiency loans or other support mechanisms are multiple: There is often a natural momentum to grant-giving institutions; there is an ecosystem which has adapted to the grant approach; and often there is a preference by asset owners to get grants rather than loans for energy efficiency. This illustrates the "moral hazard" attached to giving public grants for energy efficiency investments which can be funded privately and free energy audits as they have the tendency to not be as well valued within the target asset owner. EEFTG was informed that it could be better to align economic incentives by keeping the energy efficiency solution provider engaged with the performance of the measures and with delivering value to the asset owner. From this basis combinations of grants and loans are more powerful; however the detailed structure is important. While this transition process is already underway in some countries (e.g. EU 28 member states), it can be accelerated, and this is something which is on-going within the 2014-2020 EU Structural and Investment Funds amounting to around €38 billion.

An interesting reference for the blending of grants and loans which also recognises the wide multiple benefits of energy efficiency investments (those which include the economic, environmental and social benefits) can be found in Canada's Green Municipal Fund.

[24] Center for Sustainable Energy. (2014, October). *Residential and Commercial Property Assessed Clean Energy (PACE) Financing in California Rooftop Solar Challenge Areas*. Retrieved from http://energycenter.org/sites/default/files/docs/nav/policy/research-and-reports/PACE_in_California.pdf

Canada's Green Municipal Fund (GMF) – Financing that Mirrors Environmental Benefits

The GMF is a revolving fund designed to encourage investment in municipal projects focused on the environment through grants, loans and loan guarantees. The key feature of the GMF is its modus operandi through which it only finances those projects that will lead to environmental benefits within an economic and social dimension[25].

- **Grants** of up to 50% of eligible costs are available for plans, studies and field tests, to a maximum of 175,000 CAD.
- **Low-interest loans** of up to 80% of eligible costs are available for capital projects, to a maximum of 10 million CAD. They are typically combined with a grant amount for 15% of the loan amount, to a maximum of 1.5 million CAD.
- **Brownfield projects** are eligible for below-market loans only, with no specified funding limit.

The GMF has been widely successful as it has approved funding (as of 31st March 2014) for over 180 capital projects. These will in due course generate upwards of 3.7 billion CAD in economic activity across 134 communities. In addition, these projects –upon completion- will provide tangible environmental benefits as well as savings of around 96.8 million CAD per year to municipalities[26]. The GMF was conceived to address municipal sector requirements, and it works to fill those crucial gaps that determine a project's viability.

Example: In 2013 the GMF approved funding for the City of Toronto and Toronto Atmospheric Fund (TAF) to conduct the energy retrofit of seven social housing buildings managed by the Toronto Community Housing Corporation (TCH). The Project – which was in progress at the time this report was published – is valued at 3,906,000 CAD (Grant 511,466 CAD & Loan 2,557,333 CAD)[27]. The project targets the following:

- A 30% reduction in energy use and GHG emissions across the seven buildings, which equates to approximately 1,323 tonnes of CO2-equivalent.
- A 24% reduction in water use.
- Each building will be retrofitted with a range of energy-efficient equipment as well as state-of-the-art monitoring technology.

For the above project, the GMF was instrumental in supplying the so called Energy Savings Performance Agreement (ESPA). The ESPA is a performance-based, non-debt financing solution which is structured as a service agreement. Moreover, it gives parties a financial stake to attain expected energy and water savings, while providing support for ongoing works on buildings[28]. In essence, GMF's ESPA will allow the TCH to repay loan capital as a percentage of verified energy savings that are guaranteed and insured.

[25] 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

[26] Ibid

[27] Federation of Canadian Municipalities. (2014). *Green Municipal Fund: Funded Initiatives, City of Toronto & Toronto Atmospheric Fund's Green Energy Retrofit of Seven Social Housing Buildings*. [Website]. Retrieved from http://www.fcm.ca/home/programs/green-municipal-fund/funded-initiatives.htm?lang=en&project=9b32563a-65f5-e211-a4e5-005056bc2614&srch

[28] Ibid

7. The Development of Public and Private Financial Institution Capacity for Energy Efficiency Investing

"Build greater internal energy efficiency investment awareness within public and private financial institutions, expand their use of tailored approaches to structure and facilitate energy efficiency investments, and develop their capacity through the pro-active sharing of good practice. This can be achieved through support for financial institutions which adopt their own systems based upon voluntary energy efficiency investment commitments. These would aim to appropriately govern their own internal decision-making processes, investments in, and interventions to mobilise greater investment in energy efficiency."

Rationale: Energy efficiency investing seems to be very well suited to the blend of public and private finance. The reason for this is that energy efficiency investments are often impacted by regulation (especially those in the energy sector) and the private sector does not fully value the public benefits to energy efficiency investing (often the long-term benefits to the wider economy, social and environmental). For these reasons some of the most experienced energy efficiency investors in the world are public banks and newly formed "green banks" or specialist finance providers.

The unique and complementary roles of public and private financing institutions are best illustrated through energy efficiency investments. A development bank that has successfully focused on the interface of public and private lending has been the European Bank for Reconstruction and Development (EBRD), arguably one of the largest energy efficiency funders in the world having fully one third (3.5 billion EUR) of its lending in 2014 relating to sustainable and energy efficiency investments. EBRD participated at the launch of EEFTG and the success of its facilities, as used in multiple countries, is illustrated well by a case from Russia.

Russia's RUSEFF – Combining Financial and Technical Assistance

Developed by the EBRD, the Russian Sustainable Energy Financing Facility (RUSEFF) is a credit facility whose objective is to provide technical support to loans – via participating banks- for the implementation of small-scale energy efficiency projects in industry and SMEs. The concept behind RUSEFF is to provide simple access to finance and to combine loan requests with proper equipment selection as it offers free-of-charge technical assistance financed by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety's International Climate Initiative and the EBRD Shareholder Special Fund. Applicants can select from over 2000 pieces of approved and renowned equipment.

Free Technical Support includes:

a. Performing energy assessments to propose sustainable energy solutions and support the preparation of investment project proposals.
b. Calculating the economic and financial benefits of the proposed investment.
c. Supporting the selection of eligible equipment and enhanced performance technologies.

Projects are expected to be financially viable and result in energy savings of at least 10%, while energy measures are assessed in terms of:

- Substitution with renewable energy
- Absolute savings
- Efficiency of operation
- Efficiency of production
- All of the above

Example:

Thanks to the technical assistance of the RUSSEF team, a Footwear producer based in the Moscow region was able to undertake the energy efficiency upgrade of its entire production line, as it had become an issue for its survival in the market. Replacing outdated production lines resulted in the company reducing its energy costs, increasing the efficiency of its production and improving the quality of its products[29].

- Investment Size: 3,700,000 EUR
- Project results (per year):
  - Primary energy savings 3,870 MWh
  - CO2 – emission reduction of 2,140 tonnes
- Financial Viability:
  - Cost savings & efficiency effects: 606,000 EUR
  - IRR (Internal Rate of Return): 11.7%

The appropriate mix of technical assistance facilities (to help local authorities and public bodies prepare public tenders for energy efficiency investments), project development assistance (the funds available to all types of energy efficiency project developers to help bundle projects and reduce transaction costs), grants, reduced interest rates, risk absorption facilities and standard loans is fundamental, and EEFTG supports SE4All, UNEP FI and the EBRD it their endeavours to promote greater engagement and awareness among private sector banks.

Green Investment Banks – as an institutional class – have been identified as the kind of institutions that have the mandate and in-house capacity to focus on energy efficiency. At the OECD's Green Investment Bank Workshop, EEFTG was able to engage with green bank executives and officials from Australia, Japan, Malaysia, Switzerland, United Kingdom and United States (New York, California, Connecticut and Hawaii) and noted that for nearly all of them energy efficiency investing was a core theme.

The UK's Green Investment Bank employs one of the largest dedicated energy efficiency investing teams in Europe in response to the early-stage and fragmented nature of the UK's energy efficiency financing market. UK Green Investment Bank's investment strategy has focused on developing financing products for three sets of customers: project hosts such as local authorities, the National Health Service, and commercial and industrial partners; project developers such as energy services companies and utilities; and, financial services companies that finance projects and for whom the UK Green Investment Bank's capital or expertise can help expand their business.

It was good to hear this point reflected in EEFTG's workshop in China where participants saw an opportunity for a national level green bank (like the UK Green Investment Bank) and on a subnational

[29] RUSEFF. (2015). *Energy efficiency Modernization improves market position of shoe producer*. [PDF Slide]. Retrieved from http://www.ruseff.com/filebank/case%20studies/16.pdf

level, local governments who could start their own green banks and/ or encourage private sector actors to become green banks, launch them or grow green departments (citing Hawaii's experience through the issuance of green bonds). As noted here, and at multiple times during EEFTG's work, many G20 countries are encountering similar issues in the context of energy efficiency investing and this strongly underpins the EEFTG's voluntary Energy Efficiency Investment Principles for G20 participating countries.

A final case study is one from the UK which blends "Compliance Tools" with interest-rate subsidies as core components that have allowed the UK's public sector to reduce energy costs and replicate through simple tool application and standardised approach:

UK' 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 feature[30] 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 years[31].

Salix Indicators:

Total loan Value: 223,644 GBP
Annual £ savings: 29,473 GBP
Annual energy savings: 267,934 kWh & 129 tonnes of CO2
Lifetime £ savings: 589,460 GBP
Lifetime energy savings: 5,358,680 kWh & 2,591 tonnes of CO2
Project payback: 7.6 years

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.

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

[31] Dundee City Council. (2014). Salix Case Study. Retrieved from http://salixfinance.co.uk/system/files/documents/dundee.pdf

G20 Energy Efficiency Investor Statement

Following the consultation work with financial institutions, and in order to extract the full benefits of all inputs received, a "G20 Energy Efficiency Investor Statement" has also been drafted with the participation of UNEP FI, and proposed to investors to endorse. Through their signing, they express their support to the importance of the topic, and the key action areas to fully embed energy efficiency into their investment process. UNEP FI, Ceres[32], and its partner investor initiative, the Principles for Responsible Investment (PRI), with 1,400 signatories representing $59 Trillion of assets under management, support the Investor Statement. Additional support is also received from individual investors. All this shall contribute to establishing a good working base to facilitate continued dialogue with the financial sector and its mobilisation.

Financial Institutions' Declaration of Intent on Energy Efficiency[33]

Further, following the consultation work with financial institutions, and in order to extract the full benefits of all inputs received, a "Financial Institutions' Declaration of Intent on Energy Efficiency" has been drafted with the participation of UNEP FI and EBRD, and been proposed to financial institutions, notably banks, to endorse. Through their signing, they express their support to the importance of the topic, and the key action areas to fully embed energy efficiency into their financing operations. On the launching day alone, 70 financial institutions from 20 countries pledged to integrate Energy Efficiency investments into their business processes. All this shall contribute to establishing a good working base to facilitate continued dialogue with the financial sector and its mobilisation.

[32] EDIT to version presented to the G20 Energy Ministers on 02 October 2015: Ceres joint the initiative

[33] EDIT to version presented to the G20 Energy Ministers on 02 October 2015: The Financial Institutions'Declaration of Intent on Energy Efficiency was added to this report, as it is a complementing initiative.

G20 Energy Efficiency Investor Statement

As our contribution to the work of the G20 Energy Efficiency Finance Task Group, as managers and investors, we share a common understanding of the positive economic and societal benefits of energy efficiency. In order to ensure that our activities promote and support energy efficiency, and in consideration of our fiduciary responsibility: **We recognise the need to fully embed energy efficiency into our investment process.**

We, the undersigned, undertake to:

1. Embed material energy efficiency considerations into the way in which we **evaluate** companies;
2. Include energy efficiency as an area of focus when we **engage** with companies;
3. Take into consideration energy efficiency performance, to the extent relevant to the proposal being considered, when we **vote** on shareholder proposals.
4. To the extent relevant, incorporate energy efficiency investment considerations when we **select** managers;
5. Assess our existing real estate assets and managers and **monitor and report on** their energy efficiency performance;
6. Seek appropriate opportunities to **increase energy efficiency investments** in our portfolios.

Signed and endorsed by:

UNEP FINANCE INITIATIVE
CHANGING FINANCE, FINANCING CHANGE

PRI Principles for Responsible Investment

Ceres

European Bank
for Reconstruction and Development

FINANCE
UNEP INITIATIVE

FINANCIAL INSTITUTIONS' DECLARATION OF INTENT ON ENERGY EFFICIENCY

Energy efficiency plays a key role in addressing the climate change challenge. According to scenarios by the International Energy Agency, more than the 40 per cent of greenhouse gas emission reductions required to limit increases in the global average temperature within 2 degrees Celsius by the end of the century, will have to come from increases in energy efficiency.

The Global Tracking Framework measures how the world is progressing towards achieving the goal of the Sustainable Energy for All initiative of the United Nations to double the global rate of improvement in energy efficiency by 2030. With current energy efficiency investments estimated at US$ 130 billion, there is a significant opportunity and financing gap with the US$ 560 billion estimated to be required annually to achieve the efficiency objectives already pledged by major economies around the world. Energy efficiency investment needs to increase by more than four times relative to current levels.

We, the Alliance of Energy Efficiency Financing Institutions:

- acknowledge that the financial sector is uniquely placed to channel finance to activities that promote energy efficiency
- understand there are many unaddressed energy efficiency financing opportunities in our markets
- are already providing finance to support our clients with energy efficiency investments
- will actively contribute to scaling up energy efficiency financing
- without taking on undue burden, are willing to work towards tracking our deployment of energy efficiency finance
- recognise the need to further embed energy efficiency investment principles into the way in which we engage with our clients
- have a special interest in guiding our clients towards best practice financing decisions, including on modernisation and competitiveness strategies that instil enhanced energy efficiency
- are willing to work with institutional and public financiers seeking to deploy climate finance to our clients
- welcome the opportunity to share our experiences and acquire knowledge of successful business strategies for integrating energy efficiency across our financing operations.

Bibliography

ADEME. (2013). *Les certificats d'économie d'énergie.* Retrieved from http://www.developpement-durable.gouv.fr/IMG/pdf/rapport_certificats_economie_energie_1_.pdf

Allen & Overy. (2015, March 13). *Vienna Forum on European Energy Law 13 March 2015 Session 2: Decarbonisation and renewables – what is the masterplan?* [PPT Slide]. Retrieved from http://fsr.eui.eu/Documents/Presentations/Energy/2015/150313ViennaForum/LilianaEskenazi.pdf

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

ACEEE. (2015). *Publications and Resources*. [Website]. Retrieved from http://aceee.org/publications

ASAP. (2015). *Reports*. [Website]. Retrieved from http://www.appliance-standards.org/reports

ATEE. (2015). *Snapshot of Energy Efficiency Obligations schemes in Europe: main characteristics and main questions.* Retrieved from http://atee.fr/sites/default/files/1-snapshot_of_energy_efficiency_obligations_schemes_in_europe_27-5-2015.pdf

Berkeley Lab. (2015). *Financing Energy Efficiency*. Retrieved from http://emp.lbl.gov/projects/financing-energy-efficien

CEE. (2015). *Purpose of the Efficiency Programme Industry By State and Region Appendices and Limitations of Data*. Retrieved from http://library.cee1.org/sites/default/files/library/12206/CEE_2014_AIR_Tables_April_2015.pdf

Center for Sustainable Energy. (2014, October). *Residential and Commercial Property Assessed Clean Energy (PACE) Financing in California Rooftop Solar Challenge Areas.* Retrieved from http://energycenter.org/sites/default/files/docs/nav/policy/research-and-reports/PACE_in_California.pdf

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

CEFC. (2015). *Support for manufacturers, small business with Energy Efficient Loans.* [PDF Fact Sheet]. Retrieved from http://www.cleanenergyfinancecorp.com.au/media/76221/cefc-factsheet-energyefficientloans_lr.pdf

The Coalition for Energy Savings. (2015, May 7). *"Energy Efficiency First": How to make it happen"*. Retrieved from: http://energycoalition.eu/sites/default/files/20150504%20Energy%20Efficiency%20First%20-%20making%20it%20happen%20FINAL_0.pdf

Diario Oficial de la Federación. (2015). *ACUERDO por el que se expide la Estrategia de Transición para Promover el Uso de Tecnologías y Combustibles más Limpios, como parte integrante del Programa Nacional para el Aprovechamiento Sustentable de la Energía 2014-2018, DOF: 19/12/2014.* [Website]. Retrieved from http://dof.gob.mx/nota_detalle.php?codigo=5376676&fecha=19/12/2014

Diario Oficial de la Federación. (2015). *DECRETO por el que se expide la Ley para el Aprovechamiento Sustentable de la Energía, DOF: 28/11/2008*. [Website]. Retrieved from http://dof.gob.mx/nota_detalle.php?codigo=5070928&fecha=28/11/2008

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

E2e. (2015). Working Paper 020: Do Energy Efficiency Investments Deliver? Evidence from the Weatherization Assistance Programme. Retrieved from http://e2e.haas.berkeley.edu/pdf/workingpapers/WP020.pdf#page=1

Energy Efficiency Financial Institutions Group. (2015). *How to Drive New Finance for Energy Efficiency Investments: Final Report covering Buildings, Industry and SMEs*. Retrieved from www.eefig.org

Energy Efficiency Financial Institutions Group. (2014). *How to Drive New Finance for Energy Efficiency Investments: Part 1: Buildings (Interim Report)*. Retrieved from https://ec.europa.eu/energy/sites/ener/files/documents/2014_fig_how_drive_finance_for_economy_0.pdf

EESL. (2015). *Annual report 2013/2014*. Retrieved from http://eeslindia.org/writereaddata/EESL-ANNUAL-REPORT-2013-14.pdf

EESL. (2014, October 31). *Portfolio of Services and Programmes*. [PDF Presentation]. Retrieved from http://www.cseindia.org/userfiles/07-vekatesh-EESL.pdf

FIDE - Fideicomiso para el Ahorro de Energía Eléctrica – *Finance programme information*. Retrieved from: http://www.fide.org.mx/index.php?option=com_content&view=article&id=342&Itemid=224

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

Federation of Canadian Municipalities. (2014). *Green Municipal Fund: Funded Initiatives, City of Toronto & Toronto Atmospheric Fund's Green Energy Retrofit of Seven Social Housing Buildings.* [Website]. Retrieved from http://www.fcm.ca/home/programs/green-municipal-fund/funded-initiatives.htm?lang=en&project=9b32563a-65f5-e211-a4e5-005056bc2614&srch

Federation of Finnish Technology Industries. (2014, January 1). *Energy Efficiency in Russia*. [PDF Presentation]. Retrieved from https://teknologiateollisuus.fi/sites/default/files/file_attachments/elinkeinopolitiikka_kestava_kehitys_julkaisut_energiatehokkuus_venajalla.pdf

IFC. (2015). *China Utility-based Energy Efficiency Finance Programme (CHUEE).* [Brochure]. Retrieved from http://www.ifc.org/wps/wcm/connect/region__ext_content/regions/east+asia+and+the+pacific/publications/ifc-chuee+brochure

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

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

IFC. (2015). *China Utility-based Energy Efficiency Finance Programme (CHUEE).* [Brochure]. Retrieved from http://www.ifc.org/wps/wcm/connect/region__ext_content/regions/east+asia+and+the+pacific/publications/ifc-chuee+brochure

Kato, T., et al. (2014). *Scaling up and Replicating Effective Climate Finance Interventions*. OECD/IEA Climate Change Expert Group Papers, No. 2014/01, OECD Publishing, Paris. Retrieved from http://dx.doi.org/10.1787/5js1qffvmnhk-en

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

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

Lawrence Berkeley National Laboratory. (2015). *Appliance Standards*. Retrieved from http://eetd.lbl.gov/l2m2/standards.html

NASEO. (2013). *Unlocking Demand: An Analysis of State Energy Efficiency and Renewable Energy Financing Programmes in the Buildings and Industrial Sectors*. Retrieved from http://www.naseo.org/data/sites/1/documents/publications/Unlocking-Demand.pdf

NREL. (2010). *Energy Analysis: Property-Assessed Clean Energy (PACE) Financing of Renewables and Efficiency*. Retrieved from http://www.nrel.gov/docs/fy10osti/47097.pdf

NJPACE. (2014, March). *NJPACE/CRCS Annual Report 2013: Laying a Foundation for Cleaner, Greener, More Resilient Buildings in New Jersey Cities and Towns*. Retrieved from http://www.newjerseypace.org/wp-content/uploads/2013/11/CRCS-AnnualReport2013.pdf

OECD. (2015). Mapping Channels to Mobilise Institutional Investment in Sustainable Energy, Green Finance and Investment, OECD Publishing, Paris. Retrieved from http://dx.doi.org /10.1787 /9789264224582-en

RAP. (2014). *French White Certificates and Energy Savings in the Transport Sector*. Retrieved from http://www.raponline.org/press-release/frances-innovative-efficiency-obligation-in-the-transport-sector-leads-to-efficiency-gains-in

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

Secretaría de Energía. (2015). *PRONUREE*. Retrieved from http://www.energia.gov.ar/contenidos/verpagina.php?idpagina=3101

State and Local Energy Efficiency Action Network. (2014). *Financing Energy Improvements on Utility Bills: Market Updates and Key Programme Design Considerations for Policymakers and Administrators*. Retrieved from https://www4.eere.energy.gov/seeaction/system/files/documents/publications/executive/onbill_financing_es.pdf

RUSEFF. (2015). *Energy efficiency Modernization improves market position Of shoe producer.* [PDF Slide]. Retrieved from http://www.ruseff.com/filebank/case%20studies/16.pdf

RUSEFF. (2015). *RUSEFF Loan Categories*. [Brochure]. Retrieved from http://www.ruseff.com/filebank/downloads/RUSEFF_brochure_eng_upd.pdf

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

Salix. (2015). *Compliance Section* [Website]. Retrieved from http://salixfinance.co.uk/knowledge-share/compliance-tools

Therkelsen, P., Sabouni, R., McKane, A., & Scheihing, P. (2013). *Assessing the Costs and Benefits of the Superior Energy Performance Programme*. 2013 ACEEE Summer Study on Energy Efficiency in Industry, Niagara Falls, NY. Retrieved from http://energy.gov/sites/prod/files/2014/07/f17/sep_costbenefits_paper13.pdf

U.S. Department of Energy. (2012). *Evaluation of the Impact of EISA Federal Project Investments*. Retrieved from http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-22074.pdf

U.S. Department of Energy. (2015). *Office of Energy Efficiency & Renewable Energy: Federal Government Energy Management Conservation Programmes Reports to Congress*. [Website]. Retrieved from http://energy.gov/eere/femp/downloads/federal-government-energy-management-conservation-programs-reports-congress

U.S. Department of Energy. (2013). *Final Report Preliminary Energy Savings Impact Evaluation: Better Buildings Neighborhood Programme American Recovery and Reinvestment Act of 2009*. Retrieved from http://www1.eere.energy.gov/analysis/pdfs/energy_savings_impact_bbnp_110413.pdf

U.S. Department of Energy. (2015). *Office of Energy Efficiency & Renewable Energy: The Business Case for SEP*. [Website]. Retrieved from http://energy.gov/eere/amo/business-case-sep