GREEN CLIMATE FUND | Simplified Approval Process

SIMPLIFIED APPROVAL PROCESS (SAP) TECHNICAL GUIDELINES

Energy efficiency for industry and appliances

INTRODUCTION

DEFINITION

Energy efficiency (EE) is the process of reducing the energy consumption of infrastructure, facilities, machines, devices, products, services, business processes, activities and transport. It can be thought of as the first fuel of a sustainable world and as such it has a key role in ensuring cost-effective energy transitions.

For practical purposes, EE is defined as the ratio between the output of the end-use service and the associated energy input. In other words, it is the relationship between how much energy is needed to power a technology (e.g. a light bulb, boiler or motor) and the energy that the end-use technology expends/provides (e.g. lighting, space heating or motor power).

LINKS TO CLIMATE CHANGE

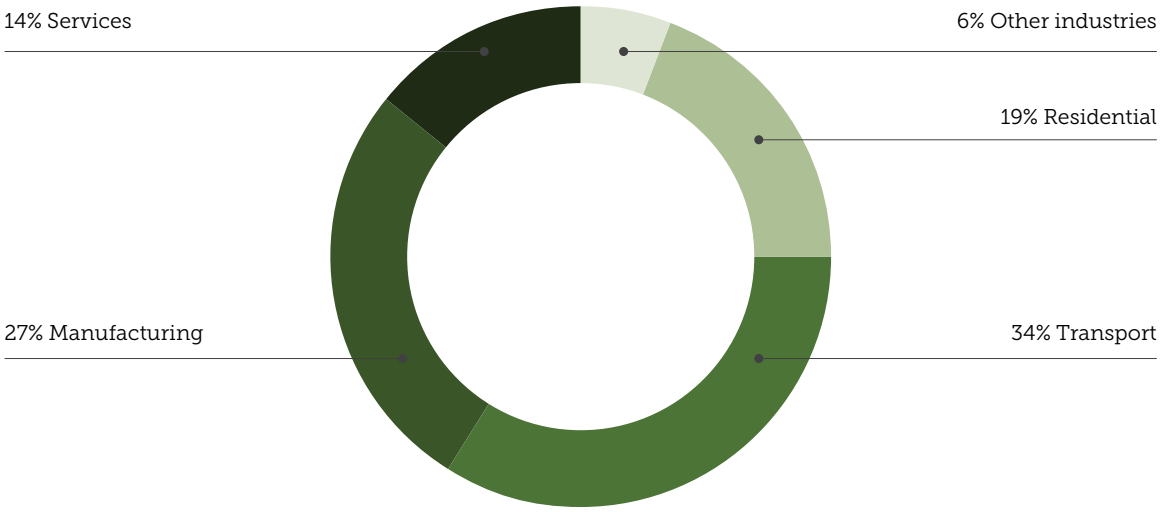
Effectively reducing the amount of energy that the world wastes is the first and most effective step towards fighting climate change. The International Energy Agency (IEA) estimates that almost half of all necessary climate mitigation actions will need to come from improved EE.[1] The key sectors for tracking the progress of EE are transport, services, manufacturing and the residential sector. In 2014, across the countries of the IEA, the transport sector accounted for the highest share of final energy consumption (34 percent), followed by the manufacturing sector (27 percent), the residential sector (19 percent), the services sector (14 percent) and finally the other industries sector (6 percent).[2]

The relevance of EE in the fight against climate change is most evident in the building,[3] industry and appliances sectors. According to IEA, there are major cost-effective energy savings to be made in the appliances and equipment sector estimated to be at least 3.7 EJ per year.[4] Energy efficient appliances and equipment can help to reduce energy demand and greenhouse gas (GHG) emissions, and decrease the energy costs of the industry sector, reducing the negative impact of volatile energy prices on competitiveness. IEA estimates global mitigation potential

1. *IEA (2017) 2017. Energy Efficiency. Available at: <www.iea.org/efficiency2017/>.*
2. *IEA (2017). Energy Efficiency Indicators. Available at: <https://webstore.iea.org/energy-efficiency-indicators-2017-highlights>.*
3. *Please refer to the GCF SAP Technical Guidelines on Cities and Climate Change. Available at: [https://g.cf///2ZxaNoA].*
4. *See footnote 2.*

for industry sector overall (including efficiency measures and the adoption of lower emission sources of energy) at 5.5–7.5 $GtCO_2eq$ in 2050, with more than 40 percent of this potential in India and the People's Republic of China.[5]

Figure 1: Final energy consumption by sector IEA, 2014



APPROACH

KEY AREAS / COMPONENTS

Improving EE or reducing energy input for a given output is a process of technical and/or behavioural change that is driven by technological, financial, social and policy drivers and constraints. As such, when EE is referred to, it is usually in terms of a process of improvements rather than a state at a single point in time. The fundamental EEs of all technologies tend to improve over time due to improvements in existing technologies and the invention of new technologies. In light of this, simplified approval process (SAP)-able EE interventions can be broadly divided into two categories, namely, operational changes or process optimization and equipment/technology interventions:

- **Operational changes and process optimization** refer to the changes to existing processes that ensure the highest possible efficiency. In other words, they are demand-side management interventions that focus on process optimization, which achieve reductions in energy use.

- **Equipment and technology interventions** seek to ensure that the infrastructure in place is energy efficient. These interventions include, for example, purchasing energy efficient equipment, replacing/retrofitting existing infrastructure with energy efficient alternatives and upgrading from old infrastructure to energy efficient systems.

PARADIGM SHIFT POTENTIAL

The industry sector is the second largest producer of energy-related emissions, and it is responsible for 33 percent of emissions worldwide.[6] Contributing roughly 33 percent of global primary energy consumption, industrial energy use is poised to increase at an annual rate of up to 3.1 percent over the next 25 years, which will make this sector the single largest sectorial source of emissions. Its share of emissions is destined to rise from its current level of 29 percent to 46 percent in 2050. Developing countries will pay the highest price for these emissions, with industrial energy use already consuming nearly half of their entire energy supply, thus exacerbating conflicts between economic and social development targets (e.g. Sustainable Development Goal 7, Ensure access to affordable, reliable, sustainable and modern energy for all). EE initiatives are vital to achieving nationally determined contribution (NDC) goals and tackling the energy trilemma of environmental sustainability, energy security and energy access. In fact, in addition to improving competitiveness, reducing environmental impact and improving quality of life, EE has been shown to drive multiple

5. IEA (2012) Energy Technology Perspectives 2012: Pathways to a Clean Energy System. Available at: <https://www.iea.org/publications/freepublications/publication/ETP2012_free.pdf>

6. International Renewable Energy Agency (IRENA) (2018). Analysis and Insights in Key Sectors. Available at: <www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Apr/IRENA_Report_GET_2018.pdf>

benefits, such as macroeconomic development, increase in the public budget, enhanced health and well-being, industrial productivity, and energy delivery improvements.[7]

The application of EE in industry and appliances sectors can effectively decouple economic growth and environmental degradation while increasing competitiveness and reducing energy intensity. Improving EE in industry is one of the most cost-effective measures in helping developing and emerging countries to meet their increasing energy demand and to loosen the link between economic growth and climate change. The application of the best-available technologies in the industry and appliances sectors could reduce the sector's energy consumption by 25 percent, making it one of the best available options to fight climate change. Attaining the level of decarbonization needed to meet the Paris Agreement will require an investment of USD 5 trillion from 2015 to 2050 in the industry sector alone.[8] GCF can play a pivotal role in ensuring that developing and least developed countries have access to affordable finance to cover the higher upfront costs of climate-focused infrastructure investments over long periods of return, which can improve the financial viability of such investments, and achieve climate targets in line with their national and local priorities.

IMPACT MEASUREMENT

Applicants should ensure that a project's paradigm shift potential is measured using a combination of quantitative and qualitative information aligned with the GCF performance measurement framework (PMF).[9] Where applicable, EE projects that also generate adaptation results should report adaptation indicators; similarly, sex disaggregation for the indicators is to be applied, where relevant.

7. See footnote 2.
8. See footnote 6
9. GCF (2008). Mitigation and Adaptation Performance Measurement Frameworks. Available at: <www.greenclimate.fund/documents/20182/239759/5.3_-_Performance_Measurement_Frameworks__PMF_.pdf/60941cef-7c87-475f-809e-4ebf1acbb3f4>

EXPECTED RESULTS	INDICATORS	NOTES
Fund-level Impacts		
Emission mitigated	Tonnes of carbon dioxide equivalent (tCO_2eq) reduced	Aggregate summation of tCO_2eq reduction indicators. Intended to be estimated ex ante and reported annually and ex post
	Cost per tCO_2eq decreased	Intended to help understand anticipated costs (ex-ante) as well as trends in reducing the costs of mitigation over time
Finance leveraged	Volume of finance leveraged by GCF	Considered synonymous with the term "mobilized" (used by other funds); to be disaggregated by public and private sources
Reduced emissions from buildings, cities, industries and appliances	tCO_2eq reduced or avoided as a result of the project	Greenhouse gas (GHG) reductions/low-emission development pathways from buildings, cities, industry and appliances sectors
Co-benefits achieved	Social, environmental, economic co-benefits	Co-benefit indicator related to GHG reductions/low-emission development pathways and sustainable development
Project/Programme outcomes		
Technology transferred	Number of technologies and solutions transferred	Technology transfer licensed, facilities created, and projects that included transfer of technology and solutions
Strengthened institutional and regulatory systems for low-emission planning	Regulatory systems for low-emission development	Indicate what can be measured at different levels and what changes are tied to the work of GCF
	Number and level of effective coordination mechanisms	Seeks to quantify evidence of measures taken to promote coordination and synergy at the regional and international levels
Energy intensity of buildings, cities, industries and appliances lowered	Energy intensity/Improved efficiency of buildings, cities, industries and appliances	Will need to be calculated sector by sector and case by case
Financial savings from reduced energy intensity	Savings per capita (USD/capita)	–
Energy efficiency awareness increased	Number of users trained/ made aware	Disaggregated by sex
Energy efficient appliances disseminated	Number of appliances installed	–

INDICATIVE SIMPLIFIED APPROVAL PROCESS ACTIVITY MATRIX FOR ENERGY EFFICIENCY[10]

10. These activities may not be eligible for the SAP under certain conditions. Accredited entities will need to screen their projects to determine if they are low risk and therefore eligible for consideration under SAP. Factors such as the scale of operations may increase the risk level.

SAP-ABLE EXAMPLES

Reduced emissions from buildings, cities, industries and appliances

SECTOR	SAMPLE SAP-ABLE ACTIVITY	SAMPLE INDICATOR	NOTES
Energy efficiency (EE)	Establishment of credit lines for energy efficient equipment, including chillers, motors, boilers at a micro scale, pumps, etc.	Investment leveraged Number of items of equipment distributed	Boilers could result in air emissions, which might have moderate risks
	EE improvement in lighting and/or appliances	Number of lighting units and/or appliances with improved EE Amount of energy saved	
	Retrofit of existing buildings: architectural or structural changes that enable the reduction of energy consumption	Amount of energy saved	
	Development of EE insurance/ guarantee schemes for small and medium-sized enterprises	Investment leveraged Number of appliances disseminated	–
	Vendor-based financing/ factoring for the leasing of energy efficient equipment	Finance leveraged Number of items of energy efficient equipment leased	–
	Delivery of capacity-building and awareness-raising initiatives to state and non-state actors; training of specialized personnel in the installation and maintenance of energy efficient appliances	Number of personnel trained and certified Number of workshops organized Number of technologies and solutions transferred	Number of personnel trained and certified should be disaggregated by sex

NON SAP-ABLE EXAMPLES

SECTOR	SAMPLE NON-SAP-ABLE ACTIVITY	NOTES
Energy efficiency (EE)	EE interventions of activities linked to climate change and environmental degradations	Example: EE interventions in mining and oil and gas operations
	Research and development	
	Installation of untested technology	
	Interventions requiring further due diligence of existing facilities	
	Activities involving the maintenance or rehabilitation of critical infrastructure that would require further technical assessment and safety studies	Examples: maintenance of large-scale power plants; upgrade of high-voltage electricity distribution networks

PROJECT SCENARIOS

PROJECT SCENARIO 1

CONTEXT

Heating, ventilation and air conditioning (AC) account for as much as 65 percent of energy consumption in the commercial and residential sectors. Of this total, 10 percent is from AC alone, with the increasing demand for AC being manifested in the increased sales of AC appliances. Sales of such appliances have an annual growth rate exceeding 4 percent in developed countries and 9 percent in developing countries.

PROJECT ACTIVITIES:

This project contributed to the reduction of GHG emissions through the transformation of the national AC market. It focused on removing key barriers in the AC industry that affected the manufacture and sale of energy efficient appliances. The project approach included:

- **Technical assistance:** comprising of design training, upgrade planning, coordination and technology transfer to assist manufacturers of AC compressors and room air conditioners (RACs) to improve the EE levels of AC. This included the rollout of an incentive programme to provide incremental-cost funding for the development and commercialization of new energy efficient units.
- **Training and technical assistance on conducting environmental impact assessments:** comprising training and technical assistance for manufacturers covering refrigerant options, environmental risks and regulatory requirements regarding the use of high global warming potential refrigerants.
- **Consumer education campaign:** including educational and informational materials at the point of sale to reduce informational barriers and increase consumer confidence. In addition, the campaign upgraded national energy labels to provide consumers with more complete information and promote the purchase of energy efficient products.
- **Buyback programme:** providing financial incentives to consumers to return old air conditioners and purchase new energy efficient models. Manufacturers of RACs are incentivized to take back old RACs and recycle them in an environmentally sound manner.

IMPACT POTENTIAL

The project resulted in an improved efficiency in locally manufactured AC compressor and RAC units of 13 percent and 23 percent, respectively. The estimated potential cumulative CO_2 emission reduction during the influence period is 1,117 $MtCO_2eq$. While the actual impact is conservatively estimated at 40 percent of the potential CO_2 emission reduction, equivalent to 446 $MtCO_2$.

PROJECT SCENARIO 2

CONTEXT

Small and medium-sized enterprises (SMEs) active in emerging economies have a limited ability to innovate largely due to limited access to credit. Investments in EE fall under this category. In fact, despite the strong case for EE intervention in a context of high relative energy costs, their implementation is perceived by local financial institutions (LFIs) as being of high risk. The main barriers reported by SMEs and LFIs hindering the adoption of EE technologies are higher upfront costs, uncertainty over their reliability and long payback periods.

PROJECT ACTIVITIES:

To address barriers to EE investments by SMEs and build confidence among key market actors, the project sponsor developed an innovative business model consisting of a "package" of financial instruments and non-financial mechanisms. A market analysis was completed to investigate the replacement of four technologies (air conditioners, motors, refrigerators and boilers) having a large energy savings potential. The following components make up the main activities financed under the project:

- **Financing scheme:** consisting of a concessional loan granted to LFIs to enable them to provide concessional credit to SMEs to finance eligible EE investments, with adequate terms and grace periods.
- **Standardized performance contract:** consisting of a contractual arrangement between clients (SMEs) and energy services and technology providers (ESTP) in which the risks associated with achieving future energy savings are shared by both parties. Indeed, the contract included a contractual retention (around 25 percent) deducted from the total value of the project and retained by the client until the EE saving performance promised by the ESTP was achieved.
- **Energy saving insurance:** consisting of a financial risk mitigation instrument in the form of a surety that partially covers the energy saving commitment made by the ESTP to minimize the performance risk of the project for SMEs and their potential financiers.
- **Capacity-building:** the project developed the capacity of ESTPs to develop a new line of business - the sale of guaranteed energy savings rather than just energy efficient technologies. Also, it supported the development, diffusion and dissemination of information on new risk mitigation products, such as standard contracts and Energy Saving Insurance (ESI) products, among relevant stakeholders.

IMPACT POTENTIAL

At the time of its implementation, the project was expected to finance investments in EE technologies for about 494 eligible firms (8 percent of the total) while increasing the number of beneficiary SMEs led by women from 30 to 40 percent of the total. Emission reduction was forecasted to be of 562,037 tCO_2eq for an average of 15 years, or 37,469 tCO_2eq annually. The project helped to leverage EE investments in the measure of USD 50 million.

PROJECT SCENARIO 3

CONTEXT

Public, residential and commercial buildings are among countries' top priorities for climate change mitigation. Unsustainable energy use in buildings underpins the development, security and climate-related challenges of the least developed countries. These countries register high levels of energy poverty causing indoor temperatures during winter and summer seasons to drop or exceed the established international standards for human capacity. Achieving thermal modernization through EE retrofits in all building sectors is a priority.

PROJECT ACTIVITIES:

The project aims to create a favourable market environment for investment in EE building retrofits – in particular, those to achieve thermal modernization – leading to sizeable energy savings and GHG emission reductions, green job creation and energy poverty reduction. The activities of the project were structured around four components:

- **The establishment of a building sector Monitoring Results & Verification (MRV) framework and a knowledge management structure** to enable the monitoring of energy use in buildings, prioritization of buildings for EE retrofits and the quantification and monetization of the resulting energy savings.
- **Policy de-risking** to support national, sub-national and local authorities in their adoption and implementation of an enabling policy framework for EE retrofits. De-risking instruments directly and indirectly addressed investment risks for commercial lenders of EE retrofit finance. This component supported ongoing legal reform in the field of EE and the gradual introduction of binding legislation on energy auditing, certificates and labelling for existing buildings.
- **Financial de-risking and incentives;** local commercial banks and other relevant national and international financial institutions provided access to affordable capital for EE retrofits. Targeted financial incentives (credit enhancement, blended co-financing and capital grants) were offered to apartment owners and energy service companies to ensure vulnerable households could afford the costs of EE retrofits. In addition, technical assistance was provided to local commercial banks on EE investment appraisal.
- **Environmental and social impact assessments** verified the non-existence of environmental and social risks.

IMPACT POTENTIAL

The paradigm shift potential of the proposed project lies in its focus on the private sector as the driving force for investment in and the implementation of EE retrofits, as opposed to current models that are primarily based on public finance and lack repayment mechanisms. The project is expected to deliver energy savings and GHG emission reductions of up to 5.8 million tCO_2 over the 20-year equipment lifetimes. It will directly benefit over 200,000 people and catalyse private- and public-sector investment of approximately USD 100 million.

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