



Diagnostic Review and Analysis of Energy Efficiency Development in Vietnam

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ACRONYMS

ADB	Asian Development Bank
AE	Accredited Entities
AEE	Association of Energy Engineers
AFD	Agence Française de Développement
AIIB	Asian Infrastructure Investment Bank
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
BAU	Business as Usual
BIDV	Bank for Investment and Development of Vietnam
CFC	Chlorofluorocarbon
C&I	Commercial & Industrial
CEA	Certified Energy Auditor
CEM	Certified Energy Manager
CESV	Certified Energy Saving Verifier
CHP	Combined Heat and Power
CIF	The Climate Investment Fund
CIGA	Certified Investment Grade Auditor
CMSC	Committee for Management of State Capital at Enterprises
CPI	Consumer Price Index
CRAFT	Climate Resilience and Adaptation Finance Technology Transfer Facility
DEG	Deutsche Investitions und Entwicklungsgesellschaft

DEU	Designated Energy Users
DMC	Developing Member Countries
DOIT	Department of Industrial and Trade
DPSD	Dedicated Private Sector Programs
EE	Energy efficiency
EEBC	Energy Efficiency Building Code
EEP	Energy Efficiency Project
EEPPF	EE Project Finance Professional
EESD	Energy Efficiency and Sustainable Development
EIB	European Investment Bank
EOR	Energy Outlook Report
ERAV	Electricity Regulatory Authority of Viet Nam
ESCO	Energy Service Company
ESG	Environmental, Social, and Governance
ESI	Energy Savings Insurance
EU	European Union
EV	Electric Vehicles
EVN	Electricity of Vietnam Group
EVO	Efficiency Valuation Organization
FDI	Foreign Direct Investment
GAs	Government Agencies
GABC	Global Alliance for Buildings and Construction
GCF	Green Climate Fund

GDP	Gross Domestic Product
GEF	Global Environment Facility
GFA	Ground Floor Area
GHG	Greenhouse gas
GIS	Geographical Information Centre
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GVN	Government of Vietnam
HEPS	Highly Energy Efficient Product
IBRD	International Bank for Reconstruction and Development
ICSID	International Center for Settlement of Investment Disputes
IDA	International Development Association
IFC	International Finance Corporation
IGA	Investment Grade Audit
IIEE	Institute of Integrated Electrical Engineers
INDC	Intended Nationally Determined Contribution
IPMVP	International Performance Measurement and Verification Protocol
IRR	Internal Rate of Return
ISO	International Organization for Standardization
ITDI	Industrial Technology Development Institute
IZ	Industrial Zone
JCM	Join Crediting Mechanism
JICA	Japan International Cooperation Agency

LATD	Lighting and Appliances Testing Division
LCEP	Low Carbon Energy Program
LEAP	Leading Asia's Private Infrastructure Fund
LEEC	The Law on Energy Efficiency and Conservation
LEED	Leadership in Energy and Environmental Design (Green Building certification)
LFI	Local Financial Institution
LOTUS	Green Building Rating System developed by Vietnam Green Building Council
LULUCF	Land use, Land use change and Forestry
M&V	Measurement and Verification
MEPS	Minimum Energy Performance Standards
MIGA	Multilateral Investment Guarantee Agency
MOC	Ministry of Construction
MOF	Ministry of Finance
MOIT	The Ministry of Industry and Trade
MONRE	Ministry of Natural Resources and Environment
MOST	Ministry of Science and Technology
MOT	Ministry of Transport
MPI	Ministry of Planning and Investment
MRV	Monitoring-Reporting and Verification
NAPA	National Adaptation Programs of Action
NCCS	National Climate Change Strategy
NDC	Nationally Determined Contribution

NGO	Non-governmental Organization
NGGS	National Green Growth Strategy
NSCC	National Strategy on Climate Change
O&M	Operation and Maintenance
ODA	Official Development Assistance
OFID	OPEC Fund for International Development
OPEX	Operating Expenses
PC	Power Company
PCG	Partial Credit Guarantee
PDP 8	Power Development Planning VIII
PPP	Public Private Partnership
PSF	Private Sector Facility
PSSA	Private Sector Set-Asides
PVN	Vietnam National Oil and Gas Group
RE	Renewable Energy
REF	Reference Scenario
RECP	Resource Efficiency and Cleaner Production
RES	Retail Electricity Suppliers
RSF	Risk Sharing Facility
RTS	Rooftop solar system
SBV	State Bank of Vietnam
SCCF	The Special Climate Change Fund
SDG	Sustainable Development Goals

SEC	Securities and Exchange Commission
SGRM	Smart Grid Road Map
SME	Small Medium Enterprise
TA	Technical Assistance
TES	Total Energy Supply
TFEC	Total Final Energy Consumption
VAT	Value Added Tax
VBSCD	Vietnam Business Council for Sustainable Development
VCCI	The Vietnam Chamber of Commerce and Industry
VEEIP	Vietnam Energy Efficiency For Industry Project
VEIS	Vietnam Energy Information Security
VEPG	Viet Nam Energy Partnership Group
VGBC	Vietnam Green Building Council
VINACOMIN	Vietnam Coal and Mineral Industry Group
VNEEP 3	National Program on Energy Efficiency and Conservation 3
VSD	Vietnam Securities Depository
UK	United Kingdom
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
WB	World Bank

UNITS AND CURRENCIES

GBP	British Pound Sterling
GWh	GigaWatt hour
kTOE	kilotonnes of oil equivalent
kW	kilowatt
kWh	kilowatt hour
MTCO₂e	Million Tons of CO ₂ Equivalent
MTOE	MegaTonne of Oil Equivalent
USD	United States Dollar
VND	Vietnamese Dong

EXECUTIVE SUMMARY

This report presents the current energy and energy efficiency (EE) landscape of Vietnam in which relevant policies, regulations, market barriers and gaps are discussed. The on-going donor's initiatives on EE are also reviewed to eliminate duplication in new interventions that can be implemented in delivering the way forward for low carbon technologies adoption.

Vietnam continues to experience high economic growth compared to regional and global economies. Average gross domestic product (GDP) growth rate reached approximately 7 % during 2001-2010, dropped to around 5.8 % during 2011-2015 and gradually recovered to 6.8 % from 2016 to present. This economic growth, in combination with urbanization and rapid population growth, has boosted demand for energy in general and electricity in particular.

In 2015, total primary energy (PE) supply in Vietnam was 70,588 kiloton of Oil Equivalent (KTOE). Since 2010, the Total Final Energy Consumption (TFEC) grew by 4.3% per year to reach 61,853 KTOE in 2019. However, the growth rates were relatively higher in 2018 (11.86%) and in 2019 (6.7%) and resulted in a total final PE supply by GDP in 2018 of 0.35 TOE/1000 USD while the average of other countries in the region are at 0.21 TOE/1000 USD. Also, energy consumption intensity has not decreased much, which indicates that Vietnam's energy efficiency is very low and needs to be improved soon.

Vietnam has a high level of energy intensity compared to other international contexts. In 2019, the Total Energy Supply (TES) by GDP was 15.2 GJ/1000USD (IEA¹, 2021), while the world average amounted to 8 GJ/1000USD of GDP, equating to 0.363 TOE for Vietnam versus the world average of 0.191 TOE (almost double). The fact that energy intensity has not decreased much indicates that Vietnam's EE is very low.

According to the final draft National Power Development Plan for the period 2021-2030 in Vision 2045, Vietnam's power demand is forecasted to increase on average by 9.1% and 7.9% annually for the period 2021-2025 and 2026-2030, respectively. Accordingly, domestic supply capacity of electricity would need to increase almost

¹ <https://www.iea.org/countries/viet-nam>

twofold, from 69,258 MW in 2020 to 137,662 MW in 2030. This growth rate is considered high compared to the region and the rest of the world.

The Government of Vietnam (GVN) is well aware that it needs to balance the need for increasing energy supply for socio-economic growth with ensuring energy security and environmental protection. This requires working different strategies that include enhancing EE to allow for savings and improving energy performance to reduce future supply needs and current losses. GVN recognizes that with the overall shortage of power, one of the main benefits of implementing EE would be a reduction of the total energy system cost by significantly reducing fuel costs and demand on the electrical power system.

One of the central EE policies issued in March 2019 is the National Program on Energy Efficiency and Conservation for the period 2019-2030 (VNEEP 3), and it targets a reduction of TFECE by 5-7% in 2025 and 8-10% in 2030 compared to the baseline development. VNEEP 3 also has many different detailed targets for reducing electricity losses, achieving EE and energy savings in various industrial subsectors, green building programs, industrial units with energy management systems, fuel economy for vehicles, etc. VNEEP 3 also contains a legal framework, enhancement of legislative enforcement, promulgation of EE standards, establishment of ESCO technical/financial capacity building support, plus creating energy information systems and establishing an EE fund. Unfortunately, VNEEP 3 is only a policy and not a law that can be legally enforced by GVN.

VNEEP 3 is followed by Vietnam's commitment at the 26th United Nations Climate Change Conference of the Parties (COP26) in Glasgow to target net zero emissions by 2050. Vietnam also introduced stronger measures to reduce greenhouse gas (GHG) emissions on its own abilities as well as with international support in terms of finance and technology transfer. It also vowed to continue implementing its stated goals in the Paris Agreement. In 2022, Vietnam will provide updates for the country's NDC commitment that features the initiatives and efforts to green the energy mix and support the further adoption of EE.

A rough estimate of the potential EE investment and energy savings market opportunity is provided in the below Table 1. It shows a total EE investment potential for the industrial, residential and governmental primary energy consuming sectors of USD 4.359 billion and an average annual energy savings of USD 361 million over the 12-year period ended 2023.

Table 1. Estimated EE Market Savings and Investment²

Sector	2018-2030 Cumulative Investment (USD Million) under current policy	Energy savings potential (%) by 2030	Average annual investment needs (Million USD)
Industrial Sector EE	2,551	7.40%	210
Residential Sector EE	1,246	11.60%	104
Commercial Sector EE	562	5.10%	47
TOTAL USD million	4,359		361

Unfortunately, the status of the Vietnam EE market is that very little EE has been or is being implemented in any of its sectors, which makes the achievement of the above estimates quite challenging. One of the most significant contributors to the low EE penetration is the limited awareness and market demand for EE in Vietnam caused by the same common barriers faced by many countries in Southeast Asia and other developing countries around the world, plus the additional significant barrier to EE of having low electric rates. However, there are good EE policies, but they are not effectively enforced and none of them contain any incentives or removal of regulatory barriers in the Governmental sector that could significantly drive EE demand or overcome many of the EE barriers currently facing Vietnam.

Taking into consideration the EE market barriers that are creating the EE Gaps identified in section 6 and eliminating those gaps that are being addressed by current Donor programs in section 5, to avoid duplication, the following EE interventions are recommended for Vietnam. They are prioritized from highest to lowest potential impact in being able to create EE demand and scale-up the implementation of EE in Vietnam, except for the creation of a government EE/ESCO market in section 7.7, which will require delayed implementation until MOIT determines it is a priority within VNEEP 3. It should be noted that MOIT, as the designated GA responsible for

² Vietnam Times Model Energy Sector Final report

all EE in Vietnam, will likely be the lead counter-party agency with which all interventions are to be coordinated and approved.

1. Develop/Implement/Fund Private-Sector Demonstration ESCO Projects
2. Develop New Cash Incentives to Drive Private-Sector EE Demand
3. Deliver EEP Development Capacity Building
4. Develop EE Finance De-Risking Products
5. Develop an Industrial EE Benchmarking System
6. Create/Deliver 'EE Product' Awareness and Promotion Programs
7. Remove EE Regulatory Barriers for GAs
8. Create a Robust ESCO Association

1. ENERGY EFFICIENCY (EE) MARKET

1.1 Status and Potential

Despite the rapid industrialization and the large potential of energy saving and GHG emission reduction in Vietnam, the Energy Efficiency (EE) market is still nascent, due to many barriers, that include limited market awareness and demand, lack of capacity to develop 'bankable' EE projects (EEPs), limited access to financing and insufficient financial capacity of local financial institutions (LFIs), industrial enterprises, ESCOs and government entities. The local banking sector is experiencing undercapitalization and suboptimal resource allocation making a capital allocation for new lines of business like EEP finance very unlikely and limited.

There have been a number of national EE initiatives of the Government of Vietnam (GVN) and support programs implemented by development partners, but they are not sufficient to push the EE market forward beyond its current early stage. To deal with growing energy intensity and carbon emission of the industrial sector in conjunction with a shortage of power generating capacity, the GVN and local players are in need of effective interventions that will open up the wide-spread implementation of a sustainable EE market.

Foreign studies and scientists have verified that saving energy is a cheaper investment than building a power plant to satisfy additional electric demand with new generating capacity. Therefore, using energy economically and efficiently is the top priority solution. In Vietnam, it was reported that after implementing the National Target Programs on EE during 2006-2010 and 2011-2015, total energy consumption decreased by 3.4% and 5.6%, respectively compared to Business as Usual (BAU) scenarios. However, in the context of exhausting the available domestic energy resources to accommodate the high/increasing demand for energy consumption and ensuring energy security, the ability to meet commitments to the Paris Agreement creates major challenges for the energy industry in Vietnam. On March 13, 2019, the Prime Minister approved the National Energy efficiency and conservation program from 2019 to 2030 (VNEEP3) in Decision No. 280/QD-TTG, which targets 8-10% energy savings of total commercial energy consumption for 2019-2030.

Vietnam has a high level of energy intensity compared to other international contexts. In 2019, the Total Energy Supply (TES) by GDP was 15.2 GJ/1000USD (IEA³, 2021), while the world average amounted to 8 GJ/1000USD of GDP, equating to 0.363 TOE for Vietnam versus the world average of 0.191 TOE (almost double). With the issuance of GVN's Law on Energy Efficiency and Conservation in 2010, many EE activities were carried out throughout the country covering different economic sectors, with good progress in applying EE measures for user appliances and partly in industrial facilities. The GVN believes the Amended Law on Environmental Protection, effective January 2022, together with the Investment Law 2020, VNEEP 3's policies and its commitments will create a foundation of mechanisms and methods to increase EE and reduce GHG emissions as needed to meet the international targets to which GVN is committed to achieve.

Vietnam's pending PDP8 power development plan will have a broad-sweeping, positive impact on RE, LNG, and coal projects as well as on Vietnam's COP 26 announced goal to be carbon neutral by 2050. It will also improve the ability of many companies to meet their growing energy requirements with energy efficient and carbon-neutral solutions. Researchers and ministries are looking at developing a roadmap to zero carbon, along with a newer NDC proposal in 2022.

In 2010-2017, total GDP increased by 6.1% per year with the highest growth rate being in the industrial sector (7.4%) followed by the commercial sector (6.8%). This

³ <https://www.iea.org/countries/viet-nam>

economic growth resulted in increased energy consumption, with the industrial sector showing the most significant increase of 9.3%, followed by the commercial and transportation sectors at 6.4% and 5.2%, respectively. On the other hand, the final energy consumption in the residential sector decreased mostly due to a trend involving displacing traditional biomass use with electricity and other fossil fuels (especially for cooking purposes in rural areas). In 2019, the industrial sector represented 51.3% of Total Final Energy Consumption (**TFEC**), followed by the transportation and residential sectors at 23% and 12%, respectively.

In 2010-2019, TFEC grew by 4.3% per year to reach 61,853 KTOE in 2019. However, the growth rates were relatively higher in 2018 (11.86%) and in 2019 (6.7%) and resulted in a Total final energy supply by GDP in 2018 of 0.35 TOE/1000 USD for Vietnam while the average of countries in the region are at 0.21 TOE/1000 USD. The energy consumption intensity has not decreased much, showing that Vietnam's energy efficiency is very low and needs to be improved soon.

With Vietnam's overall shortage of power situation, one of the main potential main benefits of implementing EE measures would be a reduction of the total energy system cost by significantly reducing fuel costs and power demand of the system. The latest Vietnam Energy Outlook Report 2019 (EOR19) provides a scenario-based foundation for policy action on the development of the energy system towards 2050 targets. These scenarios feature an increased application of industrial combined heat and power (CHP) plants, based on biomass and natural gas. Even though the additional investment in EE technologies is estimated to be USD 7 billion by 2030 and 16 billion USD by 2050, a large share of fuel costs and assets in the power sector can be saved, thus resulting in an overall reduction of the annual total system cost of 8.9% and 10.6% in 2030 and 2050.

EOR 19 estimates that the application of EE measures can save up to 15 MTOE by 2030 and 47 MTOE by 2050 in the TFEC, which is based on energy use intensities of current technologies in 2014 and an assumed limited penetration of EE demand technologies. This would result in a reduction in TFEC of 12% in 2030 and 20% in 2050, primarily due to decreased oil consumption in the transport sector and power demand in the industry and residential sectors. As a result, the EE activities can save annually a total of 83 Mt CO₂ by 2030 and 237 Mt CO₂ by 2050, in the power, industry and transport sectors. In addition, a large share of fuel costs and investments in the

power sector can be saved that could result in an overall reduction of the annual total system cost of 8.9% and 10.6% in 2030 and 2050.⁴

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Industrial EE measures include:

- Process heat efficiency improvements (primarily more efficient boilers and furnaces)
- Cogeneration
- Industrial process improvements, which reduce the amounts of process heat or motor drive energy needed for a unit of production
- Motor drive efficiency improvements (primarily variable speed drives)
- Facility/Other efficiency improvements (primarily more efficient air conditioning)

⁴ Vietnam Energy Outlook Report

⁵ Vietnam Times Model Energy Sector Final report

- Biomass utilization in boilers & furnaces

Residential EE measures include:

- Solar water heater
- Use of high-performance refrigerators, AC, Lighting, appliances, water heater
- Clean cooking fuels

Commercial EE measures include:

- Solar water heater
- Use of high-performance AC, Lighting, water heater, office equipment

1.2 EE Improvement in Primary Energy Consuming Sectors

According to the 2021 Electricity of Vietnam Annual Report⁶, industry and construction consumed 54% of Vietnam's total power consumption and buildings consumed 39% in which ~34% was consumed by residential and administrative buildings and 5% by commercial, hotel and bank buildings.

a. Industry

Cement, iron & steel, pulp & paper, food and textile are the main industrial subsectors with the most opportunity for EE improvements. It is expected that of the total potential energy to be saved by 2030, 61% will come from EE measures in heat processes, 21% from new EE machine-driven equipment and 18% from EE retrofits in facilities. In the period to 2050, EE improvements in the process heat use by the cement, iron and steel, pulp and paper, food, and textile subsectors are the most critical area for realizing the energy savings potential. EE improvements of the machine-driven equipment that includes efficient motors and variable speed drive are essential in all subsectors, especially for iron and steel and textile production. New EE LED lighting is expected to be implemented in all industrial subsectors.

Technological solutions related to industrial ecology and circular economy, which have co-benefits of energy savings and GHG emission reduction, are at the initial

⁶ EVN Annual Report 2021

stage of implementation in some industries. By 2019, 60 solutions had been identified in the Ninh Binh, Da Nang and Can Tho industrial parks, of which 2 solutions have been implemented, 5 are in the development phase and 5 are in the planning phase. Although there is no information on the specific technological solutions, it was reported that about 25 million kWhs of electricity and 135 TJ of fossil fuels have been saved, reducing GHG emissions by about 35,000 tCO₂e⁷.

Some of the manufacturing in Viet Nam is dominated by foreign companies via foreign direct investment (FDI). Policies to encourage technology transfer are needed, such as the creation of knowledge hubs through collaborative R&D funding. Ensuring technical transfers that benefit domestic players and encourage a domestic market for EE equipment will help the emergence and strengthening of local manufacturing companies (Climate Works Australia & Vivid Economics 2020).

According to an unpublished business survey in the context of COVID-19 effects, the number of enterprises in Viet Nam applying the National Energy Management Standards or the ISO:50001 International Energy Management Standards certification is very limited, focused mainly on building management and garment enterprises. The potential for EE and of GHG emissions reduction is to invest in the production lines, air conditioning, energy management and wastewater treatment areas. Different sectors will have different energy saving potential, implementing different energy saving solutions. The current technologies and equipment in the agriculture, aquaculture processing, paper and garment industries is outdated, and thus have a higher potential for EE than the garment and building management sectors. The motivation to apply new technology is mainly due to competitive pressure and to meet the requirements of foreign customers.

Lighting equipment and steam systems are mainly supplied from domestic enterprises, while refrigeration systems, production lines and machinery are imported from countries such as USA, Thailand, China, Japan, India, Germany, and Belgium. The agricultural product processing industry uses mainly equipment and production lines manufactured by domestic mechanical companies. When investing in new equipment and systems, companies are most interested in getting the needed

⁷ VNCPC (2021). This amount of GHG emission reduction is relevant to all resource efficiency solutions in 73 enterprises in Ninh Binh, Da Nang and Can Tho.

capacity and consumption of input materials at the lowest upfront cost, and they are not so interested in the amount of energy consumed.

b. Transportation

Road transport is one of the main areas for EE improvements with significant contributions expected from cars, motorbikes and other commercial vehicles (buses and trucks) mainly due to the introduction of higher fuel economy standards. An increasingly large share of oil products for transportation is expected to be imported, thus making EE in vehicles a significant focus area.

The international trends in the development and cost reduction of e-vehicles support the expectation that electro-mobility might become a focus area for Vietnam. The master plan on e-vehicle is under development by Ministry of Transport. If the expansion of RE supplies the electrified transport, it will potentially increase EE, reduce air pollution and reduce oil import dependency. There is a draft amendment of Decree No. 140/2016/ND-CP to reduce registration fee of EVs, making the passenger vehicle registration fee for electric car about 50% of the fee of a similar conventional vehicle.

Vinfast, the largest domestic moped and car producer, formed in 2017 has been selling e-bikes for some years. E-bikes are also widely imported from China and used by students. Some companies are also already producing, importing electric buses for use in the big cities, including Vinfast. Vinfast is also starting to sell Electric Vehicles (EVs) in Viet Nam, the US and some European countries (late 2021 and 2022). The model they are promoting in the USA and possibly other markets is that they would sell the e-cars but rent out the batteries against a monthly fee which would make the purchase price of the cars very competitive with internal combustion engine cars a lower operating cost with reduced energy consumption over the lifetime of the car. Another Vietnam company, Thaco, is importing (assembling) Korean EVs. Luxury brands have been importing hybrids and plug-in e-cars into Vietnam for some years but only in very small numbers due to there not being a charging network in the country, having to rely on charging at homes.

Charging of EVs can take several forms: smart charging, fast charging, and dynamic charging. Vinfast has made an agreement with PetroLimex at their nationwide petrol station network. Several charging stations have been built by Vin Group for the

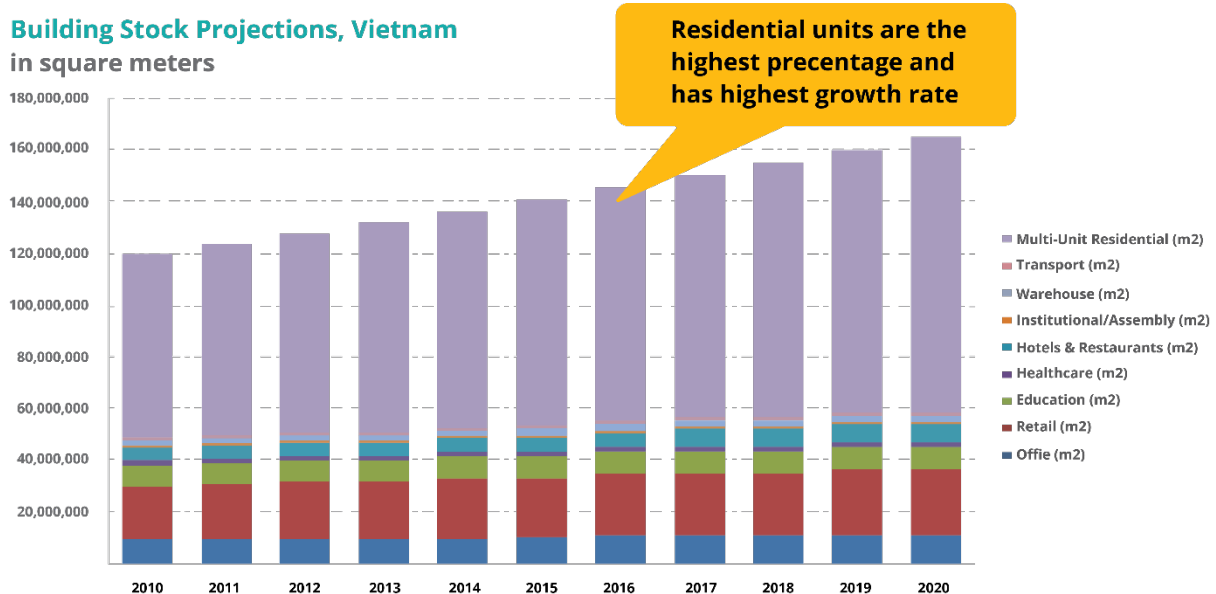
operation of Vinbus and are located in e-bus depots in Hanoi, Ho Chi Minh and Phu Quoc.

c. Buildings

Buildings consume 39% of Vietnam’s total power consumption in which ~34% was consumed by residential and administrative buildings and 5% by commercial, hotel and bank buildings. The electricity in commercial and residential buildings is subsidized with concessional tariffs. LED lighting is the main area for EE improvement with cooking and space cooling (efficient air conditioning) being the other main areas for energy savings.

The Vietnam construction sector is still booming with a 6% growth rate compared to 5.5% growth rate of the entire economy. Data on building stock in Viet Nam is dispersed among different agencies and organizations responsible at national and provincial levels making it very difficult to get reliable data. The most comprehensive available data comes from the revised 2013 Energy Efficiency Building Code (EEBC) which focused on large buildings and showed there was about 2.8 million m² of Office Buildings and 1.8 million m² of Shopping Centers. This is very outdated based on an important observation is that, in the last ten years, the number of buildings has increased by a factor of six. This increase in new buildings has obviously increased energy use demand and will in the future.

Figure 1. Building growth rate – Pike research



Source: Pike Research

A recently completed project of the Ministry of Construction (MOC) and UNDP “Energy Efficiency Improvement in Commercial and High-Rise Residential Buildings in Viet Nam 2021 (EECB)” showed that there is a very considerable amount of energy savings possible, which would have positive effects beyond reduced energy, for example the value of buildings, reduced operation and maintenance (O&M) costs and health benefits from improved indoor air quality. It applied 75 energy saving solutions in 23 new and existing high-rise buildings and concluded the resulting reduced energy consumption and GHG emissions and cost savings could be paid back in less than 4 years. The primary Energy Savings Measures (ESMs) were LED lighting, efficient air conditioning, water heating, reflective film on windows, and rooftop solar PV generation.

The LED lighting system has been used to replace fluorescent, compact fluorescent (CFL), halogen and high pressures sodium vapor (HPS) lamps, saving up to 60% of electricity with a payback period of 2 years. Efficient air conditioners with built-in inverter save up to 35% of electricity. Heat pump used for hot water system in replacement of resistor and boiler can save up to 60% of energy for heating water, and solar water heaters can bring 100% of energy savings with a payback period of 3 years. Application of heat resistant, double glazing to replace ordinary glazing can save 10% of energy for air conditioning, with co-benefit of noise reduction. Some grid-connected solar power systems can generate up to 3-4 kWhs of electricity per day with a payback of 5 years.

In residential buildings, efficient cooking, space cooling and lighting are the three main areas for EE improvements. Employment of efficient cookstoves and fuel switching to LPG and electric cooking stoves in rural households is significant to reallocate biomass resources from residential use to more efficient industrial CHPs or other central power plants. In addition, with the projected increase in the cooling demand, the introduction of efficient air conditioners plays a significant role in reducing energy consumption in the residential sector.

A list of the primary measures identified in Vietnam’s May 2020 NDC Technical Report that can reduce emissions and increase EE is provided in EXHIBIT A, along with the targeted 2030 savings and costs of each.

1.3 Energy and Carbon Emission Reductions under BAU Scenario

(See also EE target under VNEEP 3 and Carbon Emission target under NDC)

In 2017, The Ministry of Industry and Trade (MOIT) requested World Bank support to assist them in developing its energy sector emission reduction targets and pathways contributing to the national NDC targets. Under this support, a study was prepared containing the following 2 scenarios:

- a. **Business-As-Usual (BAU) Scenario** represents the baseline scenario in line with MONRE's revised NDC-2 BAU depiction⁸ of the power and other energy sector emission profiles, particularly with respect to sectoral emissions, generation mix, and electricity demand.
- b. **EE and RE Policy Scenario (EE & RE Policies)** reflects ambitious RE targets by 2030 (12 GW of solar PV and 6 GW of wind) set in GVN's latest Power Development Plan (PDP-7r) approved in March 2016 after the NDC submission, and the recently approved (in February 2019) Vietnam National Energy Efficiency Program (VNEEP 3) that set an EE target to reduce final energy consumption 8-10 % below BAU from 2021 to 2030. MOIT regards this scenario as conditional, as they expect international support to implement the PDP-7r and VNEEP 3.

The conclusion from that study is that the EE&RE Policies scenario, based on the VNEEP 3 and PDP-7r, could reduce energy consumption by 9.8% and GHG emissions by 17.8 % below BAU by 2030 for the entire energy sector, including power, industrial, residential, commercial and transport (assuming the medium mitigation scenario for Transport sector of 15 % below BAU by 2030).

In early November 2021, the Prime Minister announced at the UNFCCC that Viet Nam aims for net-zero emissions by 2050, contingent on international support. Viet Nam's leaders also announced a plan to "hardly develop new coal" by substituting coal-thermal power plants with LNG and phasing out coal power generation in the 2040s. The Prime Minister also announced that Viet Nam will increase its share of clean energy in the total primary energy supply to 20% by 2030 and 30% by 2045, which are the higher targets in the National Green Growth Strategy (NGGS). Some or all

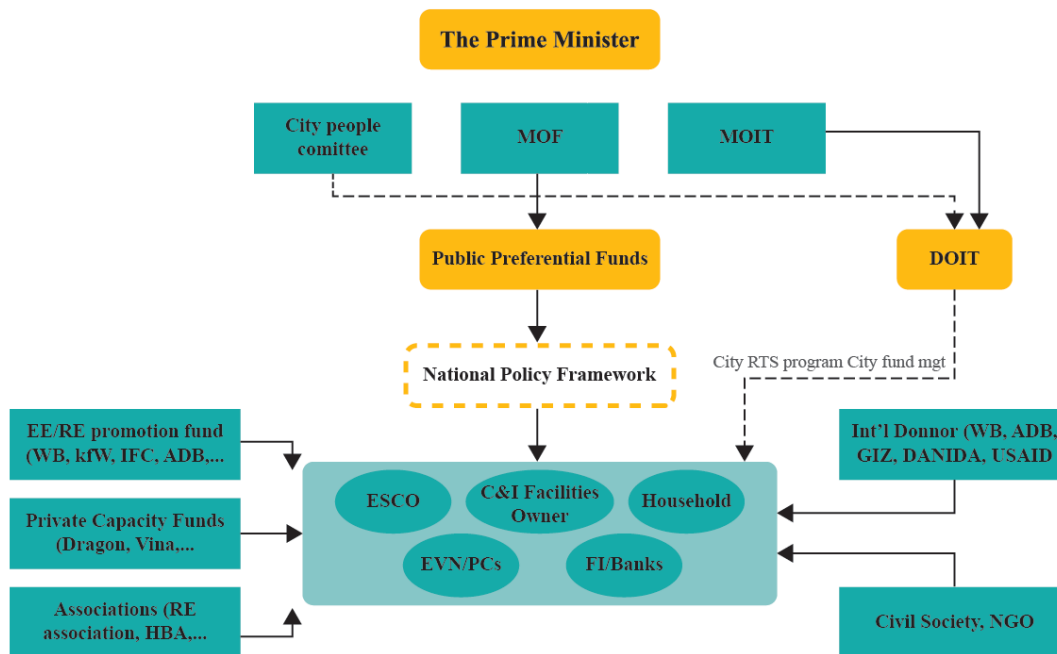
⁸ Review and Update of Viet Nam's Nationally Determined Contribution for Energy Sector, published by GIZ, 2017.

those targets are likely to be articulated in VNG’s forthcoming National Climate Change Strategy (NCCS).

1.4 EE Stakeholders

A mapping of all primary EE Stakeholders in Vietnam is shown below in Figure 1 followed by a brief description of each major one.

Figure 2. EE Stakeholder Mapping

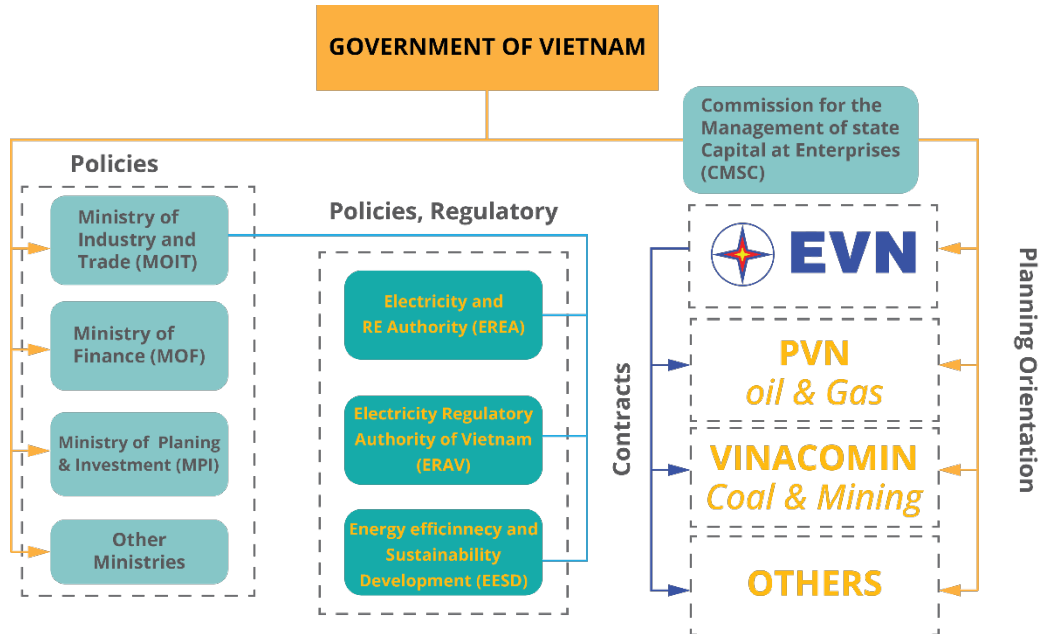


a. The Prime Minister

In February 2018, the Prime Minister (synonymous with the Government of Vietnam or “GVN”) established the Committee for Management of State Capital at Enterprises (CMSC) to oversee the financing of its 19 state-owned groups and corporations. The CMSC is responsible for managing those enterprises which are 100% owned by the GVN, as well as joint stock and limited liability companies in which it an investor with others. This includes companies in the energy sector such as EVN, PVN, VINACOMIN. However, the primary government agency responsible for EE and RE in Viet Nam is the Ministry of Industry and Trade (MOIT), which takes the lead of the other

stakeholders discussed below. The new 2018 structure of Vietnam energy sector is as follows:

Figure 3. 2018 Government and Energy Companies Structure



b. Ministry of Industry and Trade (MOIT)

Pursuant to Decree 98/2017/ND-CP, MOIT performs GVN management functions in the following areas: electricity, coal, oil and gas, new energy, renewable energy, industries management and industrial promotion; trade and promotion; public services its management. In particular, for the energy sector (electricity, coal, oil and gas, new energy, renewable energy and other energies; economic and efficient use of energy), MOIT manages the investment and construction of GVN energy projects, reports on status of production and business, publishes a list of energy work and projects under the planning of electricity development, coal, oil and gas industry, new and renewable energies to attract construction investment.

As an industry management agency, MOIT has implemented many EE solutions from policy, consulting, financial, technical and technological support to information promotion, propaganda and achieved particular results. Working with the World Bank on VNEEP 3, MOIT studied the possibility of allocating the national energy

savings target to localities in Vietnam, divided into seven groups with different energy saving goals based on similar characteristics of energy saving potential, economic structure, population characteristics, etc. On that basis, the MOIT and localities now determine annual and periodical goals for each province and city, attaching the responsibility of the local head for ensuring the implementation of the agreed upon defined targets.

c. Ministry of Finance (MOF)

The MOF is responsible for performing the GVN's management of the financial sector and setting the Public Preferential Fund budget, which supports RE and EE activities. This includes coordinating with the MOIT and other relevant agencies the development of the financial management and funding mechanisms to promote the economical and efficient use of energy.

MOF is also involved in the co-development of incentive/penalty scheme(s) and other financial mechanisms to support Energy, RE and EE. Therefore, MOF indirectly promotes GVN's energy goals and is a critical stakeholder in the broader landscape.

d. Provincial People Committee and DOIT

The Provincial (city level) People Committee decides on the important guidelines and measures to promote local potential socio-economic development and fulfill local obligations towards the whole country. As a part of its responsibilities, the Provincial People Committee authorizes the Department of Industrial and Trade (DOIT) to perform the GVN's management functions in the following fields: electricity, coal, oil and gas, new energy, renewable energy, industries management and industrial promotion; trade and promotion and public services in sectors and fields under its management authority.

Regarding electricity and energy field, DOIT will:

- Organize the implementation of power development planning and develop the application of new and renewable energies in the province.
- Organize the dissemination and training of legal knowledge on electricity activities and use for electricity units in the province.

- Organize the implementation of the province's electricity price plan after competent authorities' approval.
- Coordinate with competent GVN agencies to conduct specialized inspection and inspection of electricity according to law provisions.

e. Other Government Agencies

- Ministry of Planning and Investment (MPI) arranges the development of investment capital needed to implement Energy and EE in accordance with the current budget decentralization.
- CMSC is responsible to manage SOEs and other GVN investment companies.
- Ministry of Science and Technology (MOST) participates in developing policies and providing technical advice on EE standards for energy intensive appliances and equipment and the provision of technology transfer.

f. Utilities (EVN/PCS)

Vietnam Electricity (EVN), as the main state-owned enterprise (SOE) in the power sector, dominates the electricity market. EVN controls 46% of the power generation market, while in the wholesale market, EVN holds a monopoly as the single-buyer through its subsidiary National Power Transmission Corporation, and controls the distribution of more than 90% of the electricity in the retail market. The remainder is purchased by local utility providers.

EVN is organized as a corporation with a series of wholly-owned subsidiaries that include the 7 regional Power Companies (PCs), which oversee the distribution grid from 110 kV downwards. Other key entities under EVN's control include 4 Power Transmission Companies, 4 Power Engineering Consulting Companies, the National Load Dispatch Center, and several equipment manufacturing companies.

g. Commercial & Industrial (C&I) Facility Owners

Commercial and industrial facilities consist of commercial complexes, hotels, resources and industrial facilities. They are end-use consumers of large amounts of electricity and other forms of energy, and are the 'gate keepers' for making decisions on implementing the bulk EE targeted to be implemented in Vietnam by GVN. C&I Facility Owners have many business-model options for applying EE technologies.

h. Energy Services Companies (ESCOs)

An ESCO can be defined as a service-based commercial business that **turn-key** identifies, develops, implements and finances EE Projects in end-use energy consuming facilities on a 'performance' basis. The ESCO's primary performance requirement is that some or all of its payments are directly dependent on the savings from its implemented EEP being realized.

An ESCO's specialty is its ability to provide complete and comprehensive performance-based EE solutions to facility owners. ESCOs are sophisticated EEP developers who assume responsibility for an unusually wide spectrum of tasks which includes performing rigorous Measurement and Verification (M&V) on the energy savings over an EEP's financing repayment term in order to manage its risk for the savings to be sufficient to repay the investment.

While the ESCO business model is popular in many parts of the world, it is still not developed in Vietnam even though suppliers, manufacturers, public lighting companies, and local governments recognize its benefits. Decision 280 on VNEEP 3 sets a target on legalizing the ESCO model in Vietnam. The GVN (through MOIT, MOF, MPI, etc.) is now working to solve barriers that require international experience and support.

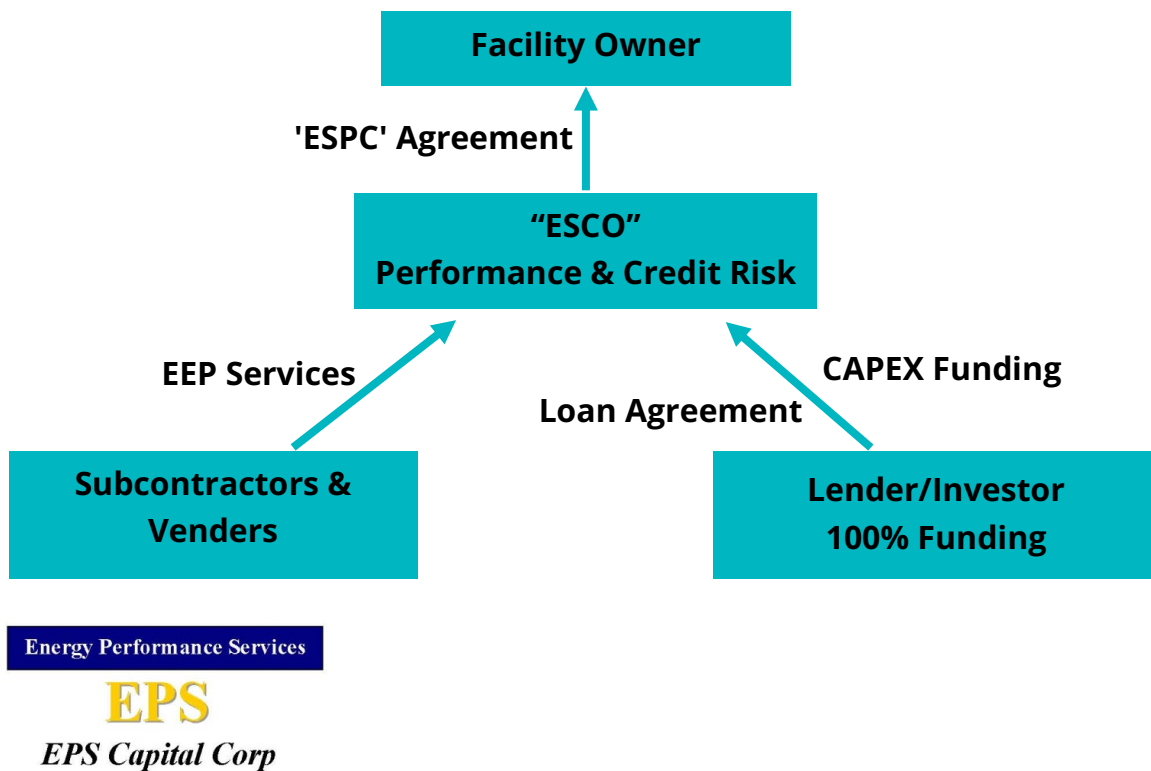
Two performance-based financing structures have emerged globally as the most common ones used by ESCOs: "***Shared Savings***" and "***Guaranteed Savings***". Guaranteed Savings is the predominate structure used in mature markets like the United States, China, Canada, Australia and the EU while Shared Savings is the predominant one used in most developing markets (like Vietnam). A brief description of each is provided below.

- 1) ***Shared Savings*** is an arrangement whereby the ESCO (as opposed to the Facility Owner) finances the total upfront CAPEX of the project and is totally responsible to repay the Lender. The Facility Owner pays a fixed percentage or amount of its realized savings from the project to the ESCO which is large enough for the ESCO to repay its debt service to the Lender, cover M&V costs, and compensation to ESCO for performing its ongoing EEP services. Under this structure (versus Guaranteed Savings), the Facility Owner has no contractual obligation to repay the Lender; but the ESCO does. It should be noted that this structure creates a lot more risk for the ESCO because it not only assumes the

project performance risk, but also Facility Owner credit risk. The Shared Savings approach typically requires an equity investment, which in combination with the higher risk assumed by the ESCO, carries a much higher CAPEX (interest rate) than the Guaranteed Savings structure (see the below diagram in Figure 4)⁹.

Figure 4. Shared Savings ESCO Structure

Shared Savings Structure



The Shared Savings Structure is a typical introductory structure for developing markets like Vietnam because Facility Owners, with low knowledge and confidence in EEPs and ESCOs, do not want to risk their core capital or credit capacity on EEP investments. ESCOs (mostly SMEs) are forced to try to raise substantial amounts of equity for their EEPs in order to grow, resulting in balance sheets that more resemble banks and leasing companies than what they are, service companies. However, it should be noted that even ESCOs with relatively large balance sheets (e.g. Siemens and Honeywell) are unwilling to assume the Facility Owner credit risk required in this

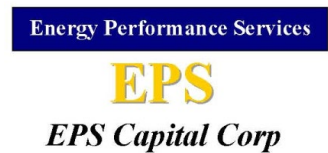
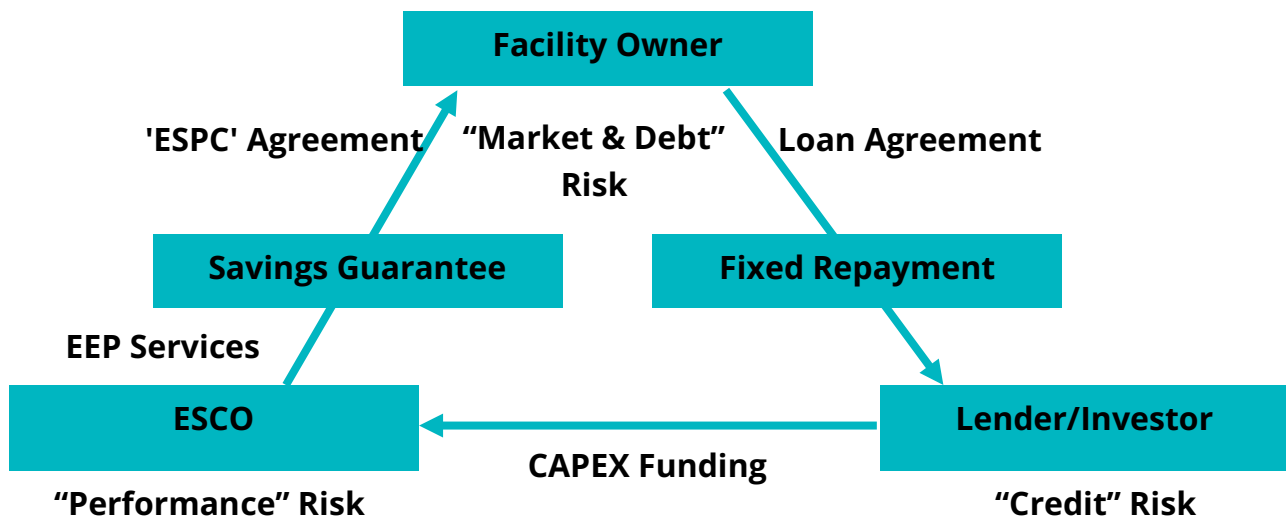
⁹ Thomas K. Dreessen Presentations

structure. Consequently, the Shared Savings Structure limits long-term market growth for ESCOs and LFIs.

- 2) **Guaranteed Savings** is an arrangement whereby the Facility Owner finances the EEP directly with a LFI or other type of third-party entity ("**Lender**") in exchange for the ESCO providing a guarantee to the Facility Owner it will realize sufficient savings to cover its debt service payments to the Lender. If the realized savings fall short of the debt service payments, the ESCO will reimburse the Facility Owner for the shortfall. If the realized savings exceed debt service, the ESCO typically shares a portion of the excess, usually expressed as a % share with the amount depending on the risk taken and the extent of ongoing services provided by the ESCO. It should be noted that under the Guaranteed Savings approach the ESCO bears no direct contractual obligation to repay the Lender, but that the Facility Owner does. In other words, the ESCO's guarantee is not a guarantee of payment to the Lender; but is a guarantee of energy savings to the Facility Owner (see the below diagram in Figure 5)³.

Figure 5. Guaranteed Savings ESCO Structure

Guaranteed Savings Structure



The Guaranteed Savings structure is typically viable only in countries with a high degree of familiarity and confidence with EE technologies, local implementation expertise and the availability of commercially attractive financing. The Guaranteed Savings concept is difficult to initiate in markets where EE is not well known or the ESCO concept is being introduced because it requires Facility Owners to assume investment repayment risk of the EEPs based on the savings performance of unknown EE technologies. This structure fosters the long-term growth of the ESCO and finance industries because it enables ESCOs, mostly small and medium sized enterprises (“SMEs”), with limited credit history and capital resources, to develop and implement savings based EEPs. Guaranteed Savings evolved in the U.S. from the initial Shared Savings structure in response to government Facility Owners, who could access low-cost, tax-exempt financing and desired to significantly reduce interest costs. It was embraced by smaller ESCOs and financial institutions to allow them to grow their respective industries. The primary benefit of this structure is that it reduces financing cost and enables a lot more investment in the EEPs to be made for the same debt service level. The public sector normally prefers this structure in order to maximize the amount of infrastructure investment made in its facilities that can be repaid from utility costs in its operating budget.

i. Households

Households in Vietnam often consume most of their energy for household activities in the evening such as cooking, lighting, pumping water, heating and cooling. Much propaganda and dissemination of actions for the safe and economical use of electricity have been implemented in Vietnam with good effect in raising people's awareness.

In the last ten years, newly-built homes have solar hot water systems and induction cookers installed; some rural areas still use coal, LNG and firewood for heating/cooking. In more recent years, most light bulbs have been converted to LED, a few still use compact fluorescent lights, and incandescent bulbs are only used for certain heating functions. Air conditioners are commonly used and EE is applied depending on the manufacturer's EE technology and price differences. It is more common for families in the South to install 5-10 kW Rooftop solar system (RTS) in their homes than in the North where RTS efficiency is less due to fewer hours of sunshine. They use the generated solar energy to eliminate household electricity purchased from the grid and/or sell excess solar-generated electricity to the grid.

j. Financial Institutions

Local banks and financial institutions (LFIs), private funds and asset managers can provide positive impacts on EE development by funding the project development and standardizing/upscaling the market through their investment grade criteria. To reduce the investment and project performance risks and enhance investment return, LFIs and funding entities tend to create disciplined steps to select/verify customers and EEPs, as well as set terms, conditions and obligations of each party, qualify and standardize installers/EPC contractors and their performance requirements.

The capital markets in Vietnam remain small and underdeveloped but are growing. As reported by the MOF at the end of 2016, the combined stock market and bond capitalization was 71 percent of GDP, compared to 56.5 percent in 2014. Capitalization remains low compared to other countries in the region, such as 106% in Thailand and 136% in Malaysia in 2014. Total GVN bond issuance volume in 2016 was estimated to reach VND 280 trillion (USD12 billion). Vietnam's formal market is highly retail in nature with more than 98% of accounts registered by individuals with the Vietnam Securities Depository.

Access to loans from commercial banking sector is not easy because banks lack the technical knowledge of energy saving and EE and thus perceive their financing of EEP as a high risk.

Low inflation and declining deposit rates may also motivate many retail depositors to switch to higher-yield investment channels such as stocks and properties. The State Bank of Vietnam (SBV) has used several monetary policy tools to lower lending rates, such as (i) requiring LFIs to reduce lending rates by cutting and managing their operating costs and (ii) keeping low discount rates, thereby encouraging low interbank rates. To date, Vietnamese Đồng lending rates to prioritized sectors are commonly set at 6-9% per annum (p.a.) for short-term loans, while medium to long-term rates charged by state-owned commercial banks remain in the 8-10% p.a. range. Lending rates to normal manufacturing and business sectors commonly range from 7-10% for short-term loans and 9-12% for long-term loans.

k. International Donors

International donors refer to foreign government-owned institutions and agencies that provide official development assistance (ODA) funds and support programs to promote developing countries' economic development and welfare. A summary of the many ODA entities available to Vietnam is attached as EXHIBIT B.

Such programs or donors like USAID, GIZ, WB, ADB, and DANIDA use their resources to support objectives such as the stability of macro economy; capacity of government agencies to implement responsible socio-economic policies; transparency and accountability in Vietnam's public finance; and reforms in its banking and financial systems to achieve environmentally and socially sustainable development.

With respect to energy and EE fields, international donors provide Technical Assistance (TA) to fund consultants to assist government agencies (both national and provincial level) in designing and implementing policies and legal frameworks and funding promotion programs and engaging private sector actors to achieve its strategic targets. For EE Sectors, international donors are currently supporting many programs such as developing specific energy consumption standards and policies, implementing Voluntary EE Programs for such things as financial incentives, EE investment, etc.

l. Associations

Associations represent and unite various types of private sector people and entities, who are their members, to promote business development, protect or advocate the legitimate rights and interests of its members, act as representatives to coordinate with relevant agencies within the framework of the law and support of each other to operate effectively in contributing to the socio-economic development of the country.

Associations also promote scientific and technical research, research in investment, science and technology transfer and commercial services; consulting, organizing and cooperating to organize conferences and seminars on branches and fields related to the association's activities according to law provisions. For EE, the association can help to organize awareness-raising events, training workshops, and providing technical expertise in industrial process and support the regulation compliance.

Recently, The Vietnam Chamber of Commerce and Industry (VCCI) has organized many seminars to support businesses to update information on policies, projects, tools and solutions to support business investment and implement RE and EE. Their seminars have contributed to new ideas and proposed solutions to contribute to the GVN on incentive mechanisms in the field of EE. From there, businesses can have a deeper access to opportunities to reduce costs and increase production and business efficiency, and at the same time create motivation for cooperation in the field of RE and EE.

In some exceptional cases, associations can sign a joint petition to send a petition to the Prime Minister, proposing measures to support and solve policy problems. Not only in the energy issue, in September 2021, when the Covid pandemic enters its second year, 14 business associations proposed strategies to prevent and control the Covid-19 epidemic and safely resume production and business in the context of the new anti-epidemic environment.

m. NGOs and Civil Society

Non-governmental organizations (NGOs) and civil society are independent of any government and typically act for non-commercial purposes. Such organizations are formed with many different purposes, usually to promote political and/or social goals. The objectives for power and RE could be to protect the natural environment, improve air quality, or promote RE development. NGOs can provide valuable comments on social and other impact assessments of EE initiatives.

Vietnam Business Council for Sustainable Development (VBCSD) is one of the most prominent NGOs in Vietnam. VBCSD's executive board consists of 21 presidents of large enterprises in Vietnam, so the Council's voice is very reputable in the business community. The official members can attend a meeting with the Deputy Prime Minister, Chairman of the National Council on Sustainable Development and Competitiveness Enhancement every six months to report on the Council's performance, proposing issues of sustainable development and competitiveness of enterprises and receiving directions from the GVN. VBCSD's primary objective is to be a forum for the business community to share knowledge, experience and good practices on sustainable development.

In September 2015, leaders from 193 UN member states formally adopted the 2030 Agenda with the focus on the 17 Sustainable Development Goals (SDGs) containing

goals directly related to EE such as: Clean and Sustainable Energy, Responsible Consumption and Production, Climate Action, Sustainable Cities and Communities, Industry & Infrastructure Innovation. VBCSD played a role in spreading and guiding the business community to implement the 17 SDGs in Vietnam by strengthening Business-Government-Society partnerships, communicating and disseminating policies and training to raise the awareness of businesses and society on SDGs, and create a premise for the implementation of the SDGs in Vietnam.

2. ENERGY AND EE POLICY

2.1 Overview

The policy landscape in Viet Nam has recently started to evolve regarding climate change and greenhouse gas (GHG) mitigation, particularly from the energy sector, encompassing national GHG emission reduction target for the period of 2020–2030, as part of the global effort to reach an agreement on post-2020 climate regime. In the landmark UNFCCC Paris Agreement in 2015, Vietnam committed to an 8% GHG emission reduction by 2030 compared to the BAU scenario in its Intended Nationally Determined Contribution (INDC) report submitted to the UNFCCC secretariat. It was agreed that this reduction would increase to 25% with international support.

Several strategic documents have been adopted, namely the National Strategy on Climate Change (NSCC) in 2011 and the National Green Growth Strategy (NGGS) in 2012. While the NSCC prioritizes climate change adaptation, the NGGS sets overall targets for GHG emissions and energy consumption reductions for period from 2012 to 2020 and 2030.

In December 2011, Viet Nam approved the National Climate Change Strategy (Decision 2139/QD-TTG dated 05 December 2011) in which energy saving and efficiency are clearly highlighted as the key area for GHG emission reduction to protect global climate system.

In Viet Nam, while some actions as stipulated in the Master Plan could trigger GHG emissions reductions, the Plan is a strategic document which only sets out government plans and aspirations; the actions have not been supported by legally binding obligations.

The Energy Efficiency and Conservation Law (in 2010) and the Law of Environmental Protection (2020) provide binding legal frameworks for environmental taxes and energy audits that could incentivize energy savings in the industrial and building sector and reduce greenhouse gas emissions.

In 2021, the Ministry of Natural Resources and Environment reviewed its content and reported to the GVN on the draft National Environmental Protection Strategy to 2030 to ensure consistency with the content of the Decree guiding the implementation of the Law on Environmental Protection 2020. The strategy aims to promote the application of clean technologies, cleaner production processes and the use of less polluting, more environmentally sound fuels and materials. By 2030, to prevent and reverse the trend of increasing pollution and environmental degradation, solve urgent environmental problems, and gradually improve and restore ecological quality; prevent the loss of biodiversity; capacity building, step by step proactively responding to climate change; ensure ecological security, build and develop a green, low-carbon economy, towards achieving the country's 2030 sustainable development goals.

On October 1, 2021, the Prime Minister issued Decision 1658/QĐ-TTg approving the National Strategy on Green Growth for the 2021-2030 period, with a vision to 2050. The overall goal of the Green Growth Strategy 2021 is to promote economic restructuring associated with growth model innovation to achieve economic prosperity, environmental sustainability, and social equity; towards a green, carbon-neutral economy and contribute to the goal of limiting global temperature rise.

MOIT is responsible for bringing policy into action, formulation, development and implementation of national level Energy Efficiency and Conservation (EE&C) policies and programs in Viet Nam. However, various other government agencies (GAs) have been involved in directing and implementing EE in different sectors, e.g., MOC for the building construction sector, the Ministry of Transport (MOT) for the transport sector, the Ministry of Natural Resources and Environment (MoNRE) for the environment sector, GHG emission reduction.

The Prime Minister approved the Viet Nam National Energy Efficient Program 3 (VNEEP 3) (2019-2030) on 13 March 2019, which is a policy (not a law) summarized as follows:

- Establish targets for reducing electricity losses, specific EE targets by sector, green building programs, industrial energy management systems, fuel economy for vehicles, etc.
- Establish a government steering committee for EE chaired by deputy prime minister for coordination and monitoring;
- Provide a legal framework to enhance legislative enforcement, promulgate EE standards, and create energy information systems;
- Develop a financing mechanism including public-private partnerships (PPP) and establish a dedicated EE fund, and
- Promote development of the Energy Service Company (ESCO) industry by supporting ESCO technical/financial capacity building programs.

In November 2021, Vietnam participated in many critical initiatives at COP 26, such as a commitment to build new coal power, forest protection and rational land use, and participation in the global climate change adaptation alliance. One of the highly appreciated statements at COP26 is Prime Minister Pham Minh Chinh's affirmation that Vietnam is strongly committed to achieving net emissions of "zero" by 2050. It also vowed to continue implementing its stated goals in the Paris Agreement.

2.2 EE Targets

Under the Vietnam National Energy Efficiency Program (VNEEP), the GVN set targets for energy savings through efficiency and conservation measures implementation of 3%–5% from 2006–2010, 5%–8% during 2011–2015 and 8%–10% from 2019-2030 (VNEEP 3), relative to BAU conditions.

Total funding for VNEEP 1 in the years 2007 to 2010 was VND 169 billion (USD 7.4 million) of which VND 124 billion (USD 5.4 million) was for non-business funding and VND 45 billion (USD 7.4 million) was for investment in projects. As a result, **VNEEP 1 achieved energy savings of 3.4%** (equivalent to 4.9 million TOE) for the period 2006-2010. The funding for VNEEP 2 in the years 2011 to 2015 was VND 349 billion (USD 15.2 million). As a result, the **VNEEP 2 achieved energy savings of 5.96%** (equivalent

to 11.88 million TOE) for the period 2012-2015.¹⁰ All two programs in the past met their targets.

The EE target set for each specific sector in VNEEP 3 is listed below:

- Reduce electricity loss to less than 6%
- Reducing the average energy consumption for industrial sub-sectors compared to the period of 2026-2030, specifically:
 - i. For steel, 5 to 16.5% depending on the type of product and production technology;
 - ii. For chemical, minimum 10.00%;
 - iii. For plastic, from 21.55 to 24.81%;
 - iv. For cement, minimum 10.89%;
 - v. For textile and garment, at least 6.8%;
 - vi. For the wine, beer and beverage, 4.6% to 8.44% depending on the type of product, production scale, and
 - vii. For paper, 9.90 to 18.48% depending on type of product and production scale.

2.3 NDC Targets and Climate Change Commitments

Vietnam is a rapidly growing lower-middle-income country experiencing increased pressure on its environmental, economic and energy resources and the negative impacts from rapidly growing GHG emissions. Its NDC estimates that without additional policies, national GHG emissions will triple by 2030 to 927.9 million tons of carbon dioxide equivalent (CO₂e) from 284 million tons of CO₂e in 2014

In the updated NDC published in July 2020, the national GHG emission reduction measures compared to the BAU scenario for the 2021-2030 period have been identified for energy, agriculture, LULUCF (Land use, Land use change and Forestry), waste, and IP sectors. In addition, the contributions to GHG emission reduction are

¹⁰ VNEEP performance evaluation report 2011-2015, MOIT

calculated for two scenarios: with domestic resources only and with international support through bilateral, multilateral cooperation and implementation of new mechanisms under the Paris Agreement.

Under the domestic scenario, the amount of GHG emissions reduction is estimated for each sector; however, in implementing the updated NDC, adjustments will be made to estimates to ensure they are in line with the actual situation and the national contribution objectives are met.

The updated NDC aligns with the country's national and sectoral socio-economic development strategies to 2050, in which all sectors development paths are towards a low carbon economy and decarbonization strategies. The energy sector is the pioneer in this path, with a clear target for renewable energy and changing energy production structures. The agriculture, forestry, building, and transport sectors are also initiating their action plans to contribute to the NDC and implement low carbon strategies. Other sectors are also intensively making the transition to a low carbon development path. The NDC also indicates the use of a Consumer Price Index (CPI) to enhance the ambition and effectiveness of GHG emission reduction efforts, especially in energy-consuming sub-sectors such as steel, cement, building, thermal energy production, etc. Appropriate CPIs will be used, following a specified roadmap, in various sectors with high potential for GHG emission reduction. It is also highly supported by the private sector as an effective way for NDC implementation and increasing private sectors efforts in technology advancement towards a low carbon development path.

2.4 Fiscal Incentives for Energy Efficiency

There are some existing economic instruments in Viet Nam that can be adjusted to support re-duction of GHG emissions in Viet Nam, namely the environmental protection tax and environmental protection fees. There are also on-going studies and pilots on carbon pricing initiatives such as bilateral carbon offsetting (JCM) or emission trading system (PMR). Each of the instruments has its own benefits and barriers in achieving CO₂ emission reductions. However, a more specific taxation such as a carbon tax would be more effective in supporting wider mitigation actions and investments.

There is no license and/or permit that is specifically applicable to EE transactions in industry. PFIs will be selected, upon the selection criteria agreed with the MOIT, MoF, and SBV, among those that already have required licenses as financial institutions.

Taxation incentives that could be relevant to industrial EE include:

- Loss Carryforwards in Enterprise income tax: Taxable income is defined as total revenue minus deductible expenses (depreciation, cost of goods sold, research and development costs, interest). Losses may be carried forward up to 5 years.
- Exemption of Value Added Tax (VAT): Applies to most goods, uses credit method. Exemptions include agricultural production, salt, some imported equipment, credit, business services, education.
- Selected exemptions and reductions of Import duties: Levied on CIF price, average tariff is about 8%. Some exemptions for aid, goods in transit, education, research, for export processing, and certain machinery & equipment. (Rates vary from 0% to 60%, with most in the 1%, 3%, 5%, 10%, 15% brackets)
- No EE Export duties: Levied on a few items only (Oil: 4%. Wood: 5-20%. Cashews: 4%).

There are tax incentives and other forms of support to be offered by law to manufacturers and producers of EE products and technologies. Article 41 of the Law on Energy Efficiency and Conservation prescribes that “Organizations and individuals that manufacture energy-saving products and invest in production lines or expand production with energy- saving technologies are entitled to incentives and supports” which include:

- Incentives on import and export duties and enterprise income tax under the tax law;
- Incentives under the land law;
- Concessional loans from various sources such as the development bank, the fund for science and technology development support, the national fund for technological renovation and the environment facility and supports from the national programs on hi-tech development and economical and efficient use of energy, and

- Other incentives under this Law and relevant laws.

Industrial enterprises investing in EE products and equipment are expected to benefit from the cost saving of the manufacturers and producers.

3. EE REGULATIONS

3.1 Legislative and Regulatory Framework

Since 2003, energy efficiency improvements and the rational energy use have been addressed as critical items of Vietnam’s energy development policy, initially with issuance of the Government Decree on Energy Conservation and Energy Efficiency. In 2006, the Prime Minister approved the Vietnam National Energy Efficiency Program (VNEEP) for 2005-2015, a first-ever comprehensive plan to institute measures for improving EE in all sectors of the Vietnamese economy. In 2010, The Law on Energy Efficiency and Conservation (LEEC) was released following several legal guidance documents, such as the Decree 21 on detailed requirements and measures to execute the LEEC and Decree 134 on sanctioning administrative violations in the power sector, dam security and EE&C. Under the LEEC, circulars have been issued to give concrete direction on critical issues such as planning and reporting on the implementation of EE&C plans (Circular 08); EE&C measures in the industrial sector (Circular 02); energy labeling for energy-consuming devices and equipment (Circular 07); preparing plans for economic and efficient use of energy and reports on the implementation thereof, and of energy audits (Circular 25/2020).

The following table briefly describes the regulatory frameworks in force (building code, standard and labeling, etc.), their status and implementation year.

Table 2. Legislative and Regulatory Framework

Laws & Regulations	Status	Year	Name of Law/ Regulation	Description
Law of EE	Adopted	2010	Law No. 50/2010/QH12 on Energy Efficiency and Conservation.	The Law sets forth the roles and responsibilities for all actors in government and society concerning energy efficiency: industry, residential, construction, transport, etc. The Law regulates the duties of key energy consumers to report and conduct energy audits regularly to the Department of Industry and Trade. According to this Law, MOIT shall be responsible for recommending which equipment should be

Laws & Regulations	Status	Year	Name of Law/ Regulation	Description
				subject to energy labeling and implementing the energy labeling procedure. Under the Law, many regulations and guidelines have been established to regulate energy efficiency issues.
	Adopted	2011	Decree 21/2011/ND-CP on Designated Energy Unit	Defines the DEU with annual energy consumption of more than 1000TOE for industrial and more than 500TOR for the commercial sector
	Adopted	2011	Decision 68/2011/QD-TTG on release a list of EE equipment for public procurement	List of equipment with EE label. All purchases using state funding should comply with this regulation. The list targets all public organizations to purchase energy efficient goods and equipment.
	Adopted	2011	Circular 39/2011/TT-BCT	Regulates training, certification of energy manager and energy auditors
	Adopted	2020	Decision 1577/QD-TTG	Releases the list of DEU based on energy consumption 2019
	Adopted	2020	Circular 25/2020/TT-BCT	Rules for preparing plans for economic and efficient use of energy and reports on the implementation thereof, implementation of energy audit
Building Code	Adopted	2013	Vietnam Energy Efficiency Building Code: QCVN 09:2013/BXD	VEEBC was released with the technical support of IFC, USAID, DEA. The code set up standards for building envelop, lighting system, air conditioning system, and other electricity consumer system in building with total floor space larger than 2,500sqm.
Standards and Labelling	Adopted	2011	Decree No. 21/2011/QD-CP on detailing the law on energy efficiency and conservation and measures for its implementation	There are four groups of equipment be affixed with an EE rating label and an applied minimum energy performance standard (MEPS) as follows: <ul style="list-style-type: none"> • Household appliance group including tube-type fluorescent lamps, compact fluorescent lamps, electronic and electromagnetic ballasts for fluorescent lights, air conditioners, refrigerators, washing machines, electric cookers, electric fans, television, solar water heater. • Office appliance group including photocopy machine, computer monitors, printers, commercial refrigerated cabinets. • Industrial equipment including boilers, distribution transformers and electric motors

Laws & Regulations	Status	Year	Name of Law/ Regulation	Description
				<ul style="list-style-type: none"> Transportation vehicles including cars (7 seats or less).
	Adopted	2014	Circular No. 07/2014/TT-BCT	Defines the procedures for energy labeling, EE product testing, label certification granting and the method of label sticking. Accordingly, an endorsement label is used for products that meet a high-efficiency performance standard (HEPS) issued by the Ministry of Industry and Trade (MoIT) in a certain period. Certificate of EE labeling is valid for a maximum period of 03 (three) years. Three months before the expiry of the certificate, the enterprise must apply for re-certification.
	Adopted	2008/2009	Vietnam Quality Standard No. TCVN 7896:2008 and TCVN 8249:2009 and TCVN 7897:2008	These quality standards set out the energy performance standard for compact fluorescent, fluorescent lamps and the electronic ballasts and magnetic ballasts in fluorescent lamps.
	Adopted	2010/2013	3 phases distribution transformer (Vietnamese Standard TCVN 8525:2010); Electrical Motor (Vietnamese Standard TCVN 7450-1:2013) Industrial boiler (Vietnamese Standard TCVN 8630:2010)	These quality standards set out the minimum energy performance and a method to determine the minimum energy performance for the 3 phases distribution transformer, Electrical Motor, Industrial boiler. Accordingly, and concerning the decision No 78/2013/QD-TTG, all equipment that have lower energy efficiency than the minimum energy performance should be phased out.
Agriculture sector	Adopted	2013	Circular 19/2013/BNNPT NT	Regulates EE solution in agriculture sector
Transport sector	Adopted	2014	Transportation vehicle under 7 seats	Regulates the minimum energy performance and EE labelling for car with under 7 seats
	Adopted	2011	Circular 64/2011/TT-BGTVT	Regulates EE solution in transportation sector
	Adopted	2013/2014	Car (Vietnamese standard TCVN 9854:2013	Regulates minimum fuel consumption for car and motor bikes

Laws & Regulations	Status	Year	Name of Law/ Regulation	Description
			Motorcycle (Vietnamese standards TCVN 7356:2014	
Regulation to phase-out of old technologies	Adopted	2011	Decision No. 78/2013/QD-TTG	The Decision No. 78/2013/QD-TTG indicates a list of energy consuming vehicles and equipment that needs to be eliminated if the energy efficiency is lower than indicated according to Vietnam Quality Standard.
Regulation to apply advanced technology	Adopted (with weak enforcement)	2011	Decision No 1488/QD-TTG	This is the Master Plan for cement sector requiring all cement plants with capacity greater than 2500 ton/day of clinker to install the Waste Heat Recover system before 2015. However, up to now, there are only 6 plants that already implemented this solution. The major barriers are lack of financing sources and difficult economic context.
Other industrial sector benchmarking/ specific energy consumption	In development	2017	Circulars shall be issued by the MOIT	Under CPEE Program, benchmarking studies have been conducted for intensive energy sectors. Circulars indicate the requiring the energy performance of the sectors to be issued for the industry. In 2016, the 3 circulars for steel, beer and beverage, plastic were issued and in 2017, 3 others for food processing, pulp and paper were issued.
	Adopted	2014	Circular 02/2014/TT-BCT	Regulate EE in Chemical industrial including SEC
	Adopted	2016	Circular 19/2016/TT-BCT	Regulate EE in beverage industry including SEC
	Adopted	2016	Circular 20/2016/TT-BCT	Regulate EE in steel industry including SEC
	Adopted	2016	Circular 38/2016/TT-BCT	Regulate EE in plastic industry including SEC
	Adopted	2017	Circular 24/2017/TT-BCT	Regulate EE in paper industry including SEC
	Adopted	2018	Circular 52/2018/TT-BCT	Regulate EE in seafood industry including SEC
	Adopted	2019	Circular 39/2019/TT-BCT	Regulate EE in sugar industry including SEC

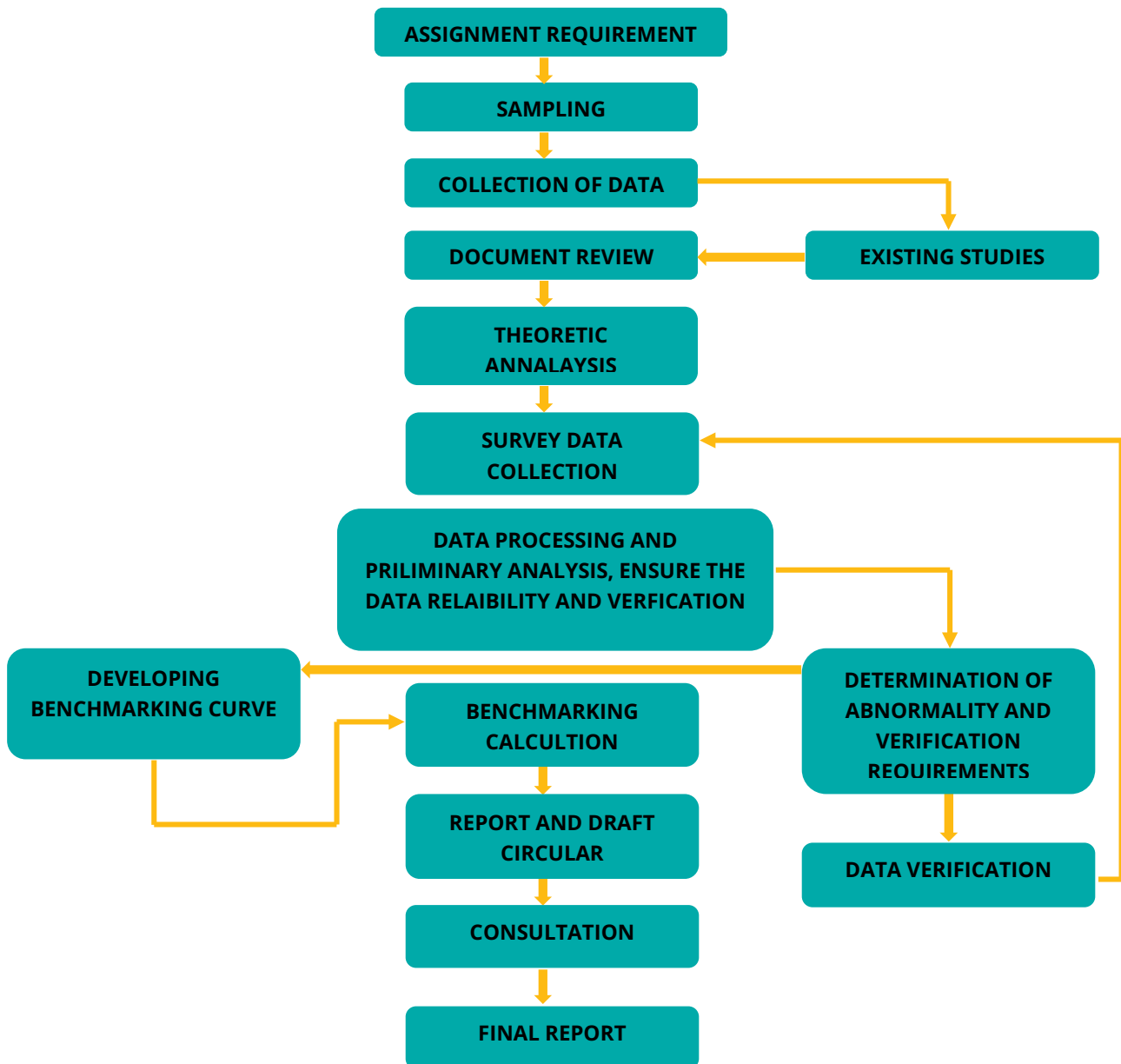
3.2 Energy Benchmarking Legislation

In Vietnam, benchmarking has been developed from various EE indicators on 7 industrial sectors and become valuable tools for both government and facilities to

manage energy consumption. The somewhat limited benchmarking results have been used by MOIT to formulate EE policies under circulars. The processes used to develop the energy benchmarking in Vietnam are show in the figure below.

Figure 6. Energy Benchmarking Approach for Industrial Sector

(Source: RCEE – NIRAS, 2020)



All energy benchmarking used the standard metric calculation method based on a relation between yearly energy consumption and a production unit. This method is used in the Article 25, Circular 02/2014/TT-BCT issued on January 01, 2014, which regulates the handling of MEPS by sector, technologies, production size, and other typical characteristics of industrial facilities over specified periods. The benchmarks developed were based on Vietnamese conditions, reflecting the typical output of the production industry, specialized products and converted to equivalent products.

The benchmarking will help the management authorities and enterprises easily control and manage energy use. It also helps the competent agencies to develop and plan energy policies suitable for the industry. The energy benchmarking approach is not regulated strictly in any legal framework. However, all energy benchmarking in Vietnam is a bottom-up approach based on data collected from sectoral facilities through a survey questionnaire and validated through double-check and energy audit. Standards have so far been developed for the following products:

- Chemicals: Circular No. 02/2014/TT-BCT of MOIT on regulating EE;
- Beer and beverages: Circular No. 19/2016/TT-BCT of MOIT on the SEC benchmarks;
- Steel: Circular No. 20/2016/TT-BCT of MOIT on the SEC benchmarks;
- Plastics: Circular No. 38/2016/TT-BCT of MOIT on the SEC benchmarks;
- Paper: Circular No. 24/2017/TT-BCT of MOIT on the SEC benchmarks;
- Fish and shrimps: Circular No. 52/2018/TT-BCT of MOIT on the SEC benchmarks;
- Sugar cane: Circular 39/2019/TT-BCT issued by MOIT for on the SEC benchmarks.

Table 3. List of Industrial Sub-Sectors Regulated by MEPS

Steel sector	Pulp and paper	Seafood processing	Chemical	Beers and beverages	Plastic	Sugar
<ul style="list-style-type: none"> • Coke oven • Sinter plant • Blast furnace • EAF • Long products • Flat product • Hot dipped galvanized steel sheet • Color sheet • ERW pipe • Galvanized steel pipe 	<ul style="list-style-type: none"> • Pulp • Kraft • Printing and writing paper • Newspaper • Tissue and joss paper 	<ul style="list-style-type: none"> • Catfish • Shrimp 	<ul style="list-style-type: none"> • Rubbery in primary form • NPK fertilizer • Paint 	<ul style="list-style-type: none"> • Beer • Beverages 	<ul style="list-style-type: none"> • Bags • Bottles • Packaging • Plastic building materials • Household plastics 	<ul style="list-style-type: none"> • Sugar mills

Normally MEPS circulars are proposed and regulated in two 5-year periods. The first period is generally implemented more easily, as it has less ambitious targets than the second one. MOIT established the first period to improve both companies' and provincial authorities' readiness for the implementation and compliance of the standards, so that the inspections and sanctions will be conducted with rigor by both MOIT and local DOITs. It is expected that regulated enterprises will strengthen compliance in the 2nd phase with the requirement to implement the measures identified in the plans, report the resulting SECs to DOIT/MOIT and – by the end of the period, and comply with the standards. Here it should be noted that the level of the MEPS established may not always sufficiently reflect the situation in the specific sector and may therefore not be achievable in some sectors. VNEEP3 aims to enhance policy enforcement by providing technical assistance and creating a more favorable environment for investments in energy efficiency.

The above circulars assign the Energy Efficiency and Sustainable Development (EESD) under MOIT to be the responsible body to:

- Assume the prime responsibility, and coordinate with the concerned agencies, in guiding, inspecting and supervising the implementation of the circulars' provisions;
- Coordinate with the local DOITs to check the implementation of the standards and the feasibility of plans to ensure the standards will be met as regulated per periods;
- Summarize and report to MOIT management on the implementation of the circulars and propose measures to handle cases of non-compliance in line with the provisions of the circulars.

The role of the provincial DOITs is to coordinate with MOIT to guide, promote and inspect the implementation of the provisions of the circulars, to conduct annual inspections of compliance with the standards and the feasibility of the plans to ensure future compliance (for non-compliant production facilities) and to summarize the compliance with the standards of local establishments and report to MOIT. MEPS compliance reported by enterprises is very important input for Vietnam Energy Information Security (VEIS) and also energy Monitoring-Reporting and Verification (MRV) in terms of sectoral energy consumption and its energy saving achievements, however it is unclear how VEIS will gather this input. Every year, MEPS regulated entities are responsible for reporting their implementation of energy performance on MEPS. There are reporting forms provided by respective Circulars on MEPS issued by the MOIT. Provincial DOITs are responsible for reporting on the implementation of the MEPS of the local regulated entities. The report shall be submitted to the MOIT Department of Energy Efficiency and Sustainable Development annually.

Under VNEEP 3, MOIT plans to conduct benchmarking and issue a series of MEPS for additional energy-intensive products as a measure to promote EE according to VNEEP 3's objectives.

3.3 VNEEP 3

On March 13, 2019, the Decision No. 280/QĐ-TTĐ on approval of the National Energy Efficiency Program (VNEEP) for the period of 2019-2030 was issued by the Prime

Minister. This VNEEP 3 implements activities in the field of economical and efficient use of energy, with commitments at all levels of government, associations, businesses, organizations, individuals to EE in particular and to climate change resilience and environmental protection in general. The overall objectives of VNEEP 3 are:

- To mobilize all the national and international resources for EE through the implementation of technical assistance, science and technology research and product development, market transition, human resource training and development, and international support for EE, and
- To increase awareness for EE and to reduce energy intensive in a variety of economic sectors and industries with EE becoming a regular activity in key energy users and key economic sectors aiming for green growth and sustainable development.

Specific objectives were set for energy savings from the total energy required for normal development of the country at 5-7% savings from 2019 – 2025, and 8-10% from 2026 – 2030.

VNEEP 3 also aims to:

- Establish a fund to promote EE:
 - Promote mechanisms, policies and legal provisions in support of the ESCO business model;
 - Provide technical and financial support for investments such as installing, renovating, replacing equipment, integrating EE and RE energy solutions in urban lighting systems, and
 - Provide funding for implementation of the whole program: State budget: 4,400 billion VND; Financial institutions: 3,800 billion VND; Private and other sectors.

3.4 MEPS and HEPS Product Regulations

Minimum Energy Performance Standards (MEPS) and High Energy Performance Standards (HEPS) regulations are mandatory in Vietnam for the following products: Refrigerators, Fans, Washing machines, Rice Cookers, TVs, Lighting equipment: CFLs,

TFLs, electronic ballasts, Air Conditioners, Three-phase Electric Motors and Transformers¹¹.

Compliance with MEPS is mandatory whereas labelling is, for the time being, implemented on a voluntary basis. EE labelling should gradually become mandatory in Vietnam. MEPS and labelling specifications are supposed to be reviewed every three to five years by the MOIT. MEPS have been gradually enforced since 2005 on targeted priority energy using products. MEPS for computer monitors, host computers and copiers are under development and MEPS for commercial refrigerated cabinets are under consideration for development.

MOIT has made great effort to improve EE performance and reduce energy intensity of the industrial sector by establishment of energy baseline consumption and sectorial benchmarks. EE benchmarks and MEPS indices have been established for chemical, beverage, plastic, steel, plastic, food processing and cement sectors as presented above.

The targets for the period 2015-2018 were to lower the average energy consumption for the following industrial subsectors compared to that in the period: (i) for steel: 3–10% depending on product type and production technology; (ii) For chemical: minimum 7%; (iii) For plastic manufacturing: 18–22; (iv) for cement: minimum 7.50%; (v) for textile and garment industry: minimum 5%; (vi) for alcohol, beer and beverage: 3–7% depending on product type and production scale; (vii) for paper: 8–16% depending on product type and production scale. However, there was no mentioned of any HEPS as well as no incentives, which should be a future priority.

3.5 EE Codes for New and Existing Buildings

On January 1, 2005, the Energy Efficiency Building Code (EEBC 09/2005/QD-BXD) came into effect. The code covers residential, commercial and public buildings with a gross floor area of 300 m² or more. The code applies to building envelopes, indoor and outdoor lighting systems, air conditioning and ventilation, as well as other power consuming and energy-managing equipment.

Three categories of building are defined according to gross floor area:

¹¹ Compendium of Energy Efficiency Policies of APEC Economies. 2016.
Link: https://aperc.iecej.or.jp/file/2016/4/28/Viet_Nam_Compendium_2015_Final.pdf

- Small buildings: from 300 m² up to 2,499 m²;
- Medium-sized buildings: from 2,500 m² up to 9,999 m²;
- Large buildings: over 10,000 m².

The code specifications are different for each category. However, according to the Online Code Environment and Advocacy Network, “few in the industry know about the code and the MOC does little to enforce it” (OCEAN’s website, 2012).

In addition, the Viet Nam Green Growth Strategy approved in September 2012 (Decision No. 1393/QD-TTg) specifies promulgation of compulsory application of green building measures in new and retrofitted building and green material technology in construction as solutions to achieve Green Growth and low carbon economy. On October 1, 2021, the Prime Minister issued Decision 1658/QD-TTg approving the National Strategy on Green Growth for the 2021-2030 period, with a vision to 2050. The overall objective of the Strategy is to promote economic restructuring in association with renewing the model of economic growth, environmental sustainability and social justice. In particular, the National Strategy also sets out the goal of greening lifestyles and promoting sustainable consumption by 2030

EEBC 09/2005 has been superseded by an improved EEBC 09:2013 issued by MOC in late 2013, which added a National Technical Code for Building Energy Efficiency. In order to enforce the EEBC, several projects have been supported by IFC, DANIDA, USAID such as EEBC building demonstrations, training on integrated energy building design and EEBC compliance, etc. Another revised EEBC 09:2017 was issued by MOC in December 2017 that provides mandatory technical standards to achieve EE in the design and construction or retrofit of buildings (office buildings, hotels, hospitals, schools, retails, department stores, residential buildings, among others), with gross floor area of 2,500 m² or larger.

3.6 Certification and Accreditation Schemes

ISO 50001:

Attention has been raised on energy management with the increase of ISO 50001 certifications issued to Vietnam enterprises from 16 in 2014 to 75 in 2018. However,

this number is still very low as compared to the number of industrial enterprises in Vietnam.

Table 4. Number of Enterprises ISO 50001 Certified in Vietnam

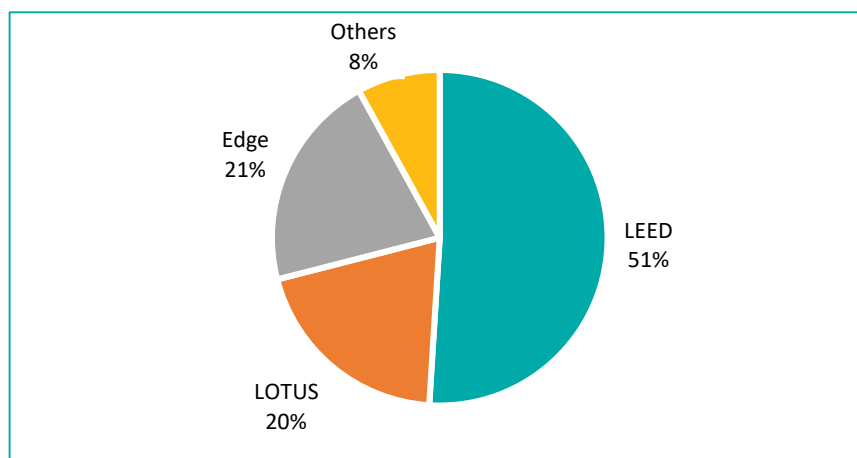
	2014	2015	2016	2018
Number of ISO 50001 certificates	16	45	60	75

Green Buildings:

By the end of 2018 Vietnam had 104 buildings with green certification, but the speed of green building development is still quite slow compared to Thailand, Malaysia and Singapore. Out of 104 green certifications, 53 have LEED certification (Council green program), 21 have LOTUS certification (Vietnam Green Building Council), 22 have EDGE certification (IFC, World Bank group), and 8 have other certifications (HQE-2, DGNB-1, BCA Green Mark-4, CTX Vacee-1).

The break-out of green building certifications is shown in Figure 6 below.

Figure 7. Green Building Certifications by Type



(IFC, Forbes: <https://forbesvietnam.com.vn/tin-cap-nhat/bat-dong-san-bi-thu-lua-truoc-cac-cong-trinh-xanh-5952.html>)

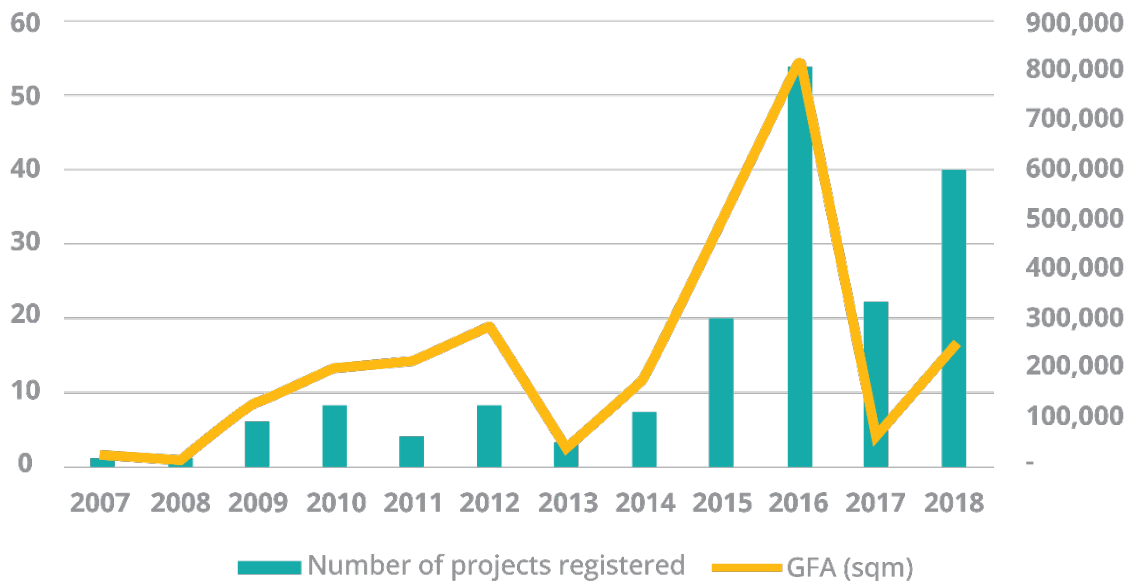
The number is low due to the main motivation in Vietnam comes from the "Social Responsibility Program" of large corporations, or a marketing strategy, product

image products and brands, as well as aim to reduce operating costs (e.g. Big C Vietnam Group (retail), Taekwang Vina company (footwear), Intel Corporation (technology), Coca Vietnam Cola (beverages), and Pou Chen Group (footwear). However, the Green Building market in Vietnam is still regarded with a lot of potential growth opportunities in the coming years¹².

The efforts from the GVN and state agencies also deserve recognition by the training activities of the National Regulations on Building Energy Use Efficiency (NTR 09: 2013 / BXD), or the preferential land use coefficient for the work-friendly environment in the city.

The number of ‘Registered’ LEED projects peaked at 54 in 2016 when run under LEED v3 registration before moving to LEED v4 in 2017 when they dropped to 20 in 2018, signaling that the market was familiar with the requirements of the new LEED version 4 - see Figure 7. It is forecasted that in the next 1-2 years, the number of new LEED registered projects in Vietnam will fluctuate in the range of 40-50 projects, the total new GFA registered about 300,000 m².

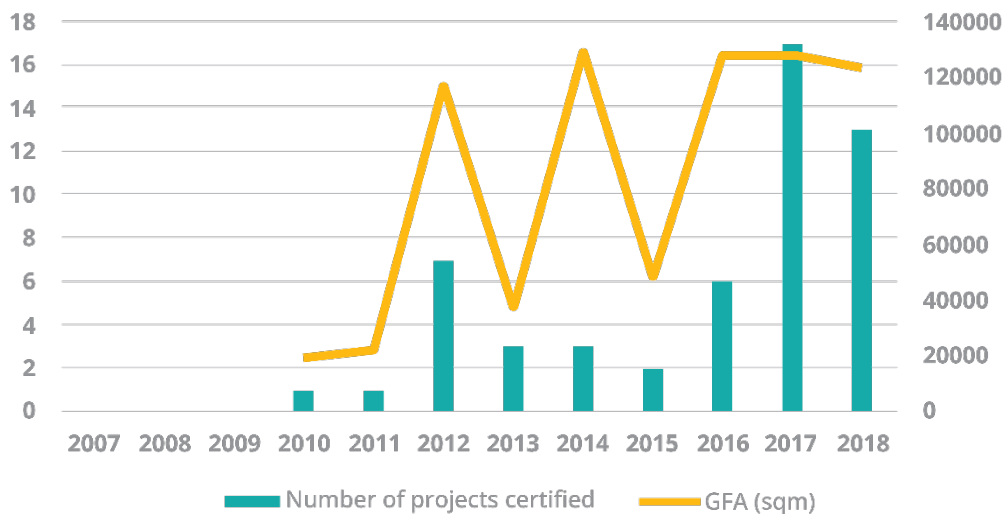
Figure 8. LEED Projects ‘Registered’ in Vietnam 2007-2018 (Vgbc)



¹²<http://www.ardorarch.com/news/detail-news/thi-truong-cong-trinh-xanh-tai-viet-nam-tiem-nang-va-co-hoi.html>

The number of ‘Certified’ LEED projects peaked at 18 in 2017. By the end of 2019, Vietnam had a total of 70 projects that had achieved LEED certification, of which industry accounted for the highest proportion (60%), followed by office block 23%, warehousing 6%, and are other industries

Figure 9. LEED Projects ‘Certified’ in Vietnam 2007-2018 (Vgbc)

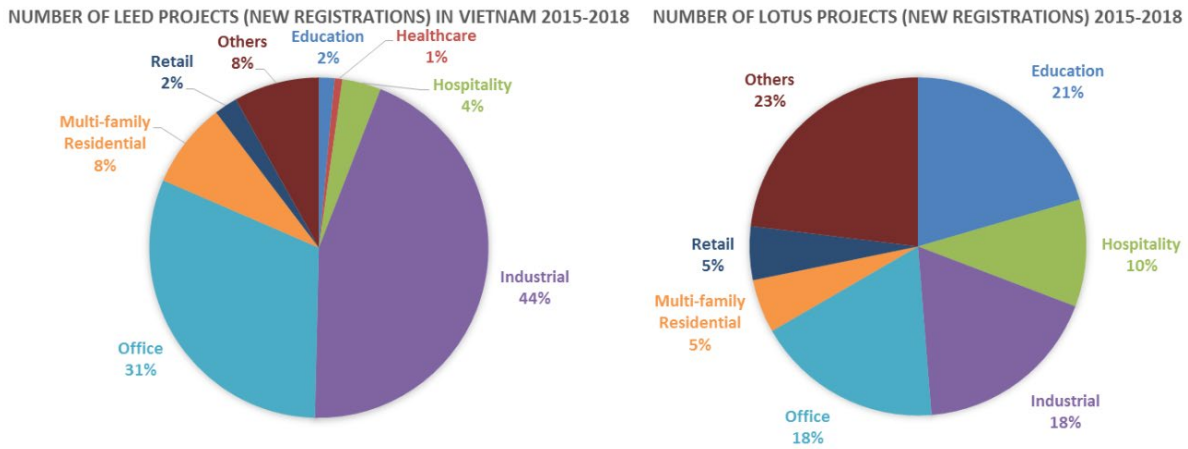


By contrast there were a total of 13 projects registered for evaluation for LOTUS Green Building certification in 2019, with a total floor area of 242,716 m².

Despite good growth in the past couple of years, LEED and LOTUS growth drivers may not be quite the same. Of the 135 LEED projects registered in Vietnam from 2015-2018, the industrial and office segments alone accounted for 75% of that number and 80% of the total floor area.

LEED is a global brand, often chosen by high-end office or factory projects that are highly demanded by European-American partners. For LOTUS, there is a more balanced distribution among segments (education, office, industry, apartments, etc. and it projects often target a balance between cost and real benefits from green buildings, while meeting social and environmental responsibility of businesses and organizations. Through LEED and LOTUS data, it can be seen that in the past 3 years green buildings have spread more widely in Vietnam's construction industry.

Figure 10. Proportion of Segments Registered for 2 Certificates (2015-2018)



When the number of projects is big enough and more investors have practical experience on green buildings, the green building movement in Vietnam will have a stronger foundation and soon a real green construction market. Demand now seems to be originating from internal supply and demand and is not only dependent on the requirements of foreign partners.¹³

3.7 Mandatory Energy Reduction Program

Under the Law on Energy Efficiency and Conservation, MOIT issued Decision No.09/2012/QĐ-BCT on 20 April 2012 on the promulgation of plans and a reporting scheme on energy consumption and energy efficiency & saving measures for industries. According to this Decision, Designated Energy Users (DEUs) must submit a report on energy consumption and energy efficiency & saving measures. DEUs are defined in Decree 21/2011/ND-CP as: (i) industrial¹⁴, agricultural and transport units with an annual energy use of more than 1,000 TOE and (ii) commercial and residential buildings¹⁵ which with an annual energy use of more than 500 TOE. DEUs are required to submit 5-year EE plans, report annually on energy performance, employ an energy manager, establish an energy management system, and carry out a mandatory energy audit every 3 years. In compliance with Circular No. 09/2012/TT-

¹³ Báo Xây dựng - Sumarize green building market 2018

¹⁴ Including energy industry, i.e. also electricity generation

¹⁵ Used as offices and houses; educational, medical, entertainment, physical training and sports establishments; hotels, supermarkets, restaurants and shops.

BCT all DEUs must submit energy reports to their local DOIT, which summarizes the information in a report to be submitted to MOIT.

3.8 Voluntary Energy Reduction Programs

Voluntary Agreements (VAs) negotiated between the GVN and industry can be a promising policy instrument to address industrial energy use (or greenhouse gas emissions). In Vietnam, a voluntary agreement program is planned using a 3-staged approach:

- Formulation of industrial sector strategies and action plans;
- Demonstration of the approach's feasibility by conducting some pilot voluntary agreements;
- Roll-out of a scaled up voluntary agreement, subject to successful completion of the pilot phase.

The pilot program started in 2015 at selected companies, before potentially rolling out the pilot across the country to the rest of the DEU enterprises in Vietnam. Commitment EE targets are negotiated and agreed to between MOIT and the participating voluntary enterprises. Specific energy consumption reduction is compared to a base line energy consumption. The VA participants are supposed to receive financial incentives and technical assistance from the pilot program. However, of the 5 participants in the pilot VA, none of them has received any financial incentives, but only technical assistance (audit, awareness raising).

Some Lessons learned from the Pilot VA include:

- There was a lack of clarity on the available incentives at the time of Pilot company selection and VA target negotiations
- There was a lack of agreement or understanding of the monitoring approach at the time of negotiating the targets and signing the Pilot agreement, which led to an inability to reliably monitor the project's performance;
- The timeframe was too short to establish a robust MRE system in the company and carry out capacity building for operating it;

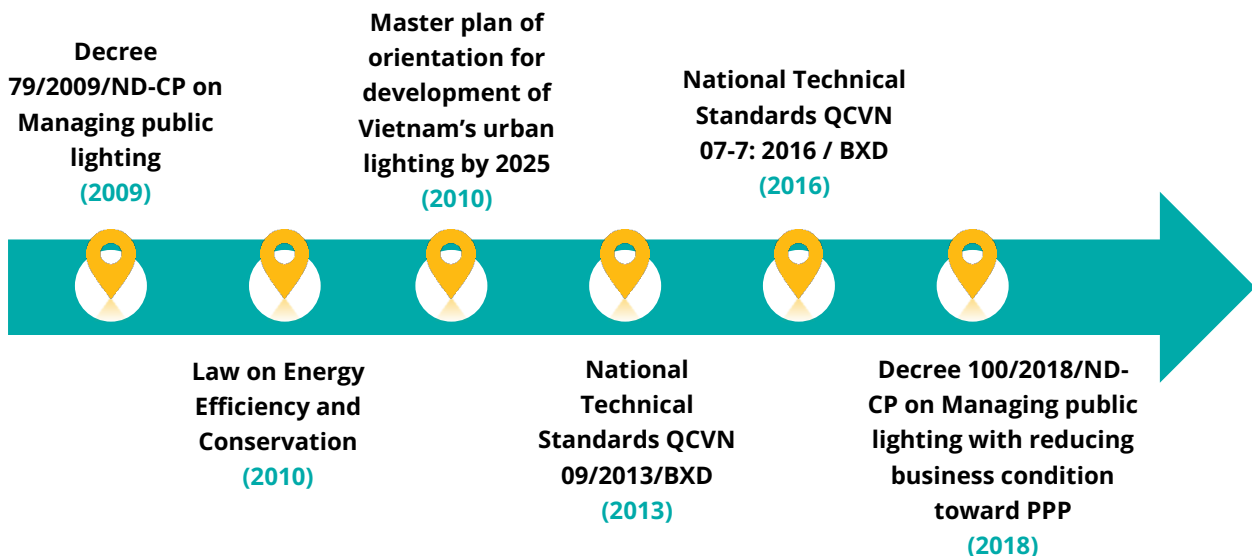
- The timeframe was too short to gather sufficient quality data or to allow for meaningful conclusions and lessons learned, and
- The VA program is not scalable since the pilot program was not implemented.

3.9 Public Lighting EE Policy Landscape

Urban public lighting is being managed by central GVN, ministerial and provincial stakeholders with the supported of a series of legislative EE regulations shown in the below figure.

Figure 11. Timeline of National EE in Public Lighting

Source: Vietnam Urban Energy Security – USAID/Vietnam 2020



Decree 79/2009/ND-CP was issued on September 28, 2009 by the Prime Minister on managing public lighting and was validated on November 19, 2009. This was later amended to enable the private sector to invest, manage and operate the public lighting sector by Decree 100/2018/ND-CP issued on September 15, 2018. This Decree clearly states that urban lighting systems must use electricity economically, effectively, safely, while protecting the environment and complying with technical regulations. In addition, the decree encourages organizations and individuals of all domestic and international economic sectors to invest in, produce and use high-performance, energy-efficient lighting products. At the same time, this Decree also stipulates that when repairing, replacing, or installing new light sources and lighting

equipment that use state budget capital, only products that have energy-saving certificates or labels granted by competent agencies may be used. Before Decree 100, public lighting was a state company that had less capacity to implement EE projects in the sector. With Decree 100, there is now a legislative foundation to encourage efficiency in the public lighting sector.

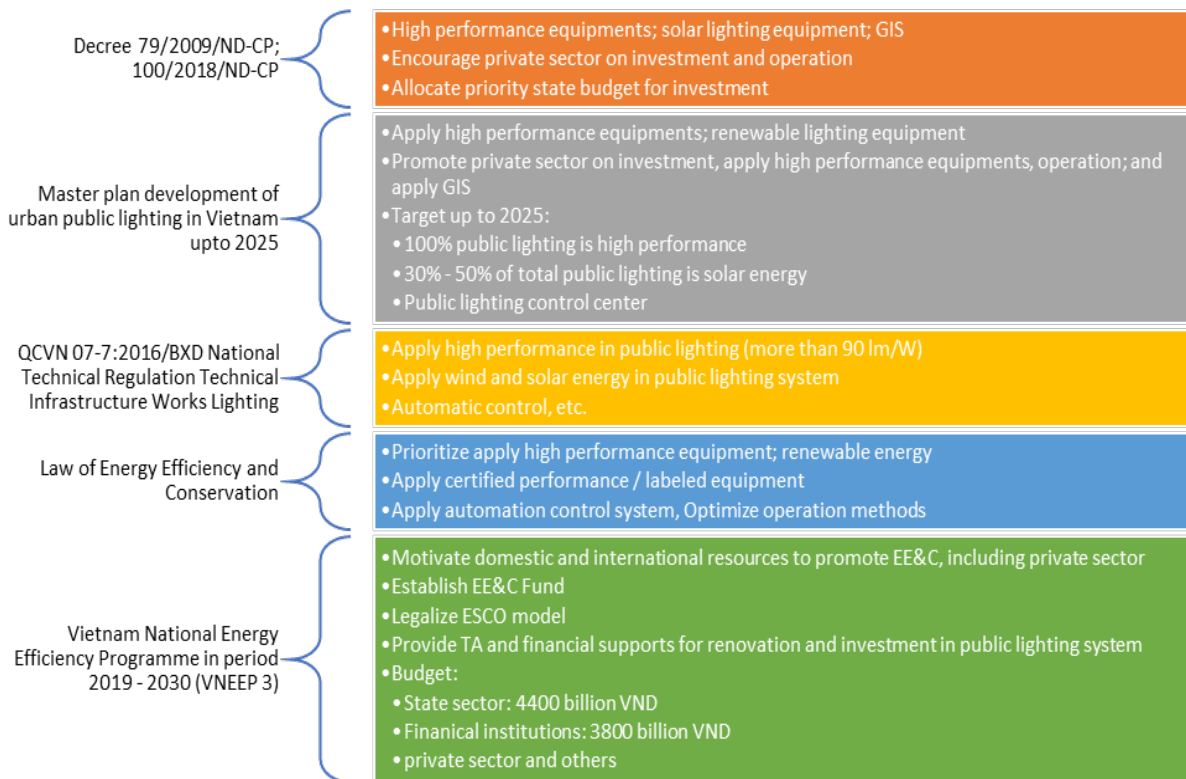
In the interest of gradually modernizing and improving the efficiency and quality of urban lighting and public lighting systems, the GVN has produced a master plan for the development of Vietnam's urban lighting by 2025 under Decision 1874/QD-TTG, dated October 11, 2010. Accordingly, the decision promotes the application of new technologies and renewable energy sources in urban lighting activities that increasing EE and environmental protection. It also encourages organizations and individuals of all domestic and international economic sectors (e.g. public sector, private sectors, ESCOs, etc.) to invest, produce and use high-efficiency lighting products and states the following goals for 2025:

- 100% of public lighting systems shall apply high performance and EE technologies;
- 30%-50% of systems shall apply renewable energy sources (e.g. solar and wind);
- Set up a Public Lighting Control center at provincial level;
- Financing:
 - Local governments should give priority to allocate budget for public lighting investments;
 - Private sector should be encouraged to use and invest in high-performance and RE bulbs, and operating systems based on Geographic Information System (GIS).

Although the master plan has set some specific technological goals at the national level, the city goals have not been determined yet which must be set by city individually. In addition, the master plan only mentions investment budgets should be prioritized, but the budgets are annually allocated budgets meant to manage and operate the current public lighting system and do not leave room for investing in new projects.

The GVN has issued a series of regulations shown in the below Figure 13 to manage/promote EE in public lighting including VNEEP 3, which identifies public lighting as an important component of provincial and national energy savings goals and also identifies the MOC’s Department of Construction at cities/provinces as the entity responsible to carry out the designated regulation.

Figure 12. Existing Landscape of National Public Lighting Policies



In order to unify the management, investment and operation of public lighting systems, the Ministry of Construction issued QCVN 07-7: 2016/BXD National Technical Regulation on Technical Infrastructure Works Lighting standard in May 2016. This regulation requires public lighting operators to apply EE measures in public lighting systems, to adopt minimum 90 lumen/Watt of luminous flux efficiency, and to use wind and solar energy, and deploy automatic controls for efficiency. However, compliance to this regulation has often only been applied to new roads while existing systems are only renovated annually with the limited local budget.

4. EE MARKET BARRIERS

Vietnam faces most of the same barriers as most countries in Southeast Asia and in other developing markets, plus a few additional ones that are unique to Vietnam (main one being low electric rates), which are summarized below.

4.1 Limited EE Knowledge and Demand

- a. Limited EE knowledge with most stakeholders in Vietnam, especially with owners of energy consuming facilities (**Facility Owners**) in the industrial, commercial and governmental sectors make it very challenging to implement more extensive EE solutions. From 2015 to now, the difficulties of the EE industry are mainly the lack of understanding, motivation and long-term investment resources in the business sector. So continuous efforts should be made to conduct effective awareness-raising campaigns as they can have a significant impact on EE. Different information materials and the website should be disseminated on the technical knowledge and best practices for replication.

The limited EE knowledge in Vietnam has led to the following major market barriers, which are described in more detail in this report:

- A general lack of understanding and confidence with Facility Owners, LFI and investors in the estimated future EE savings being achieved and verified, which has led to their unwillingness to implement/fund EEPs and thus a fundamental lack of EE market demand;
- Lack of project-based EEP development skills and technical capacity with local engineers, vendors, consultants and staff of ESCOs resulting in energy audits that only identify a rough estimate of EE opportunities which are not ready to implement and not 'bankable' due to their unreliable savings estimates caused by insufficient data, inaccurate energy baseline, and supporting calculations, plus no M&V plans;
- Lack of national regulations that mandate EE implementation and remove existing regulatory barriers for the governmental sector to be able to engage ESCOs to implement and finance EEPs on a paid-from-savings basis, and
- No commercially-attractive financing offered by LFIs.

- A major contributor to the reduced EE demand is the low electricity tariff in Vietnam because it does not motivate end users to effectively use energy or electric EE technologies due to the relatively low level of cost savings that can be realized. This results in unacceptably long paybacks and a low internal rate of return (**IRR**) on any such investments, especially for industrial facility owners. As of March 2021, the price of electricity in Vietnam is 0.083 USD per kWh for households and 0.078 USD for businesses, which includes all components of cost for the power, distribution and taxes. By comparison, the comparable average electric price of in the world is 0.135 USD per kWh for households and 0.124 U.S.D for businesses.¹⁶ There is need to determine reasonable energy and electricity prices that provide a reasonable profit for production and trading of energy and electricity, and also promote rational and economical use of energy and electricity.

4.2 Government Sector EE Regulatory Barriers

Government Agencies (GAs) who own and operate government facilities and energy consuming asset like public street lighting are unable to engage private sector ESCOs to implement EEPs on a commercially-viable basis. This is due to existing regulations not allowing or being compatible with how EEPs are developed, implemented and financed by ESCOs and the private sector. Existing regulations result in the same 3 common barriers in Vietnam that also exist in Indonesia, the Philippines and Thailand, which preclude GAs from being able to engage the private sector to commercially develop, implement and finance EE Projects in their government facilities on a paid-from-savings basis, summarized as follows:

- 1) **No Multi-Year Contracts.** GAs in Vietnam cannot commit to make payments beyond the current budget year, and consequently are unable to execute an enforceable ESPC with ESCOs that require them to make multi-year Savings payments.
- 2) **No Savings Retention.** Vietnam's budgeting of energy costs for its government-owned facilities is typical of most other governments around the world whereby energy budgets are based on the prior year's actual energy costs. So, when an EE project is implemented that reduces energy costs, the subsequent year's

¹⁶ https://www.globalpetrolprices.com/Vietnam/electricity_prices/

budget is lowered to the reduced energy amount, resulting in no funds being available to make future savings payments to ESCOs.

- 3) **Inapplicable Procurement Procedures.** Vietnam's procurement method that must be followed by all GAs requires them to procure (purchase) equipment and services by selecting the company with the lowest upfront cost bid, which is not applicable to selecting EEPs or ESCOs whose primary value is the net present value of future savings. In fact, the lowest upfront cost selection method typically results in much lower energy-efficient, lower quality and shorter life energy-consuming products and services having to be purchased. The procurement regulations also require all specifications and costs of the equipment and services being purchased to be identified and fixed upfront in very specific detail to make sure that all bids can be evaluated on the same basis. Unfortunately, this type of detail is not typically available for an EEP until after an IGA has been completed, which is relatively expensive and time-consuming because it contains all shovel-ready details (final design, etc.) needed for the EEP to be immediately implemented. Neither ESCOs nor any commercial is willing to perform an IGA at no cost until they have been selected due to the risk of them losing not only their cost to perform the IGA, but their design ideas to competitors. Therefore, different procurement procedures specific to EEPs and the ESCO's performance-based project development approach, all of which have been fully developed, adopted and are being widely used in many markets, need to be applied in order for ESCOs and other private-sector entities to be willing to submit proposals.

4.3 Limited Technical Capacity to Develop 'Bankable' EEPs

One of the most significant barriers to scaling up the implementation and financing of EE in Vietnam is the limited technical/financial experience and capabilities of most EE services providers (i.e. ESCOs and EE consultants) to prepare IGAs and perform other critical development tasks required for a **'Bankable'** EEP. There is also a clear gap in local energy auditors not knowing about the following requirements of IGAs and Measurement and Verification (M&V) plans:

- An IGA contains the core information needed for an EEP to be successfully implemented. It is a much more detailed energy audit that reflects one or more individual energy savings measures (technologies) at an energy consuming

facility, containing all critical assumptions, facility-based measurements and calculations supporting the estimated savings and CAPEX, and a M&V plan for each energy savings measure bundled into an EEP. It must contain all information required for a Facility Owner, developer, LFI and/or investor to be able to understand/evaluate the technical and economic feasibility of the proposed EEP.

- The M&V of energy savings from an EEP is critical to documenting the actual achieved savings and the resulting IRR of the investment. M&V is the meter of an EEP, and it should follow generally accepted and best-practice M&V principles contained in globally published documents like the International Performance Measurement and Verification Protocol (**IPMVP®**), owned by the Efficiency Valuation Organization (**EVO**) and available for free download at www.evo-world.org. In Vietnam, the number of EE experts who are trained and certified with IPMVP is very limited.

4.4 Small Scale, Complexity and Perceived High Risk of EEPs

The global average investment for bundled EEPs, with multiple EE technologies, is very small (less than USD 1 million), and they typically contain multiple energy savings measures each of which can require a separate M&V protocol to measure the savings return on its investment. These very small transactions and benefits, coupled with the perceived M&V complexities make it challenging for Facility Owners to want to focus on EE investments. They also create a perception with LFIs that the potential EE lending market is small, time consuming and will require high transaction costs, making them unwilling to invest the time and resources to develop the internal capacity needed to understand or assess the risks and benefits of lending to EEPs.

4.5 No Commercially-Viable EEP Financing

The main financial support for EE activities has been provided under the VNEEP plans, Vietnam Environment Protection Fund (VEPF) and several loan packages by development partners (WB, DANIDA etc.). The GVN also provides access to several international financing schemes supported by entities like the World Bank, but these are not as much dedicated to providing EE project-based financing as to providing capacity building. In addition, the Ministry of Industry and Trade (MOIT) recently provided funding for energy auditing, technical assistance, training, and the promotion for EE.

Often, LFIs classify EE lending as short-term lending (less than 1 year terms) and require guarantee assets and other collaterals for any long-term loans. One EE financing long-term loan option is the World Bank's Vietnam Energy Efficiency for Industrial Enterprises (VEEIEs), which has a key objective to improve EE in the industrial sector and achieve the GVN's EE and GHG reduction objectives. VEEIE has been operating since December 2017 and is scheduled to end on July 31, 2022. As of June 2021, the participating LFIs (BIDV and Vietcombank), in cooperation with the World Bank, have provided technical support to 101 potential EEPs of which only 16% (16 projects) resulted in bankable EEPs and only 8 projects were granted loans for such items as: technology upgrading, waste heat recovery, rooftop solar system and other clean energy projects.

The best EEP financing options for a private sector Facility Owner are through self-financing from an ESCO. The major consideration in choosing the financing type is based on the assumed risks and desired benefits of the Facility Owner. Generally, ESCOs are desired when the CAPEX investment costs for implementing EEPs are high and the technologies used are unknown to Facility Owners. Large companies with EE knowledge and financing capacity tend to finance their own EEP investments. On the other hand, small and medium-sized (**SME**) companies who mostly have limited financing and difficulties in getting loans, will tend to choose financing through an ESCO. The basis for choosing the ESCO financing model is not only based on a Facility Owner's needs but also on its access to EEP financing.

Irrespective of who finances an EEP, one of the most significant global barriers (gaps) that also exists in Vietnam is a lack of commercially-attractive EE financing, which needs to be 'project-based' in order to be '*attractive*'. This financing gap is not caused by a lack of available funds, but rather the inability of EEPs to access the existing funding capacity of LFIs under their current lending structure. There is a "disconnect" between the traditional lending practices of LFIs and the project-based financing structure needed by Facility Owners, ESCOs and other developers of EEPs. LFIs typically apply their traditional "asset-based" corporate lending approach for EEPs that limits the amount they will lend to a maximum of 70% to 80% of the EEP's CAPEX, but more critically requires full collateral on the entire loan amount. Unfortunately, there is very little collateral value in EE equipment after being retrofitted in a facility; rather, its value is limited to the ongoing cash flow that it can generate over its useful life of 10 to 25 years. The disconnect occurs from LFIs not recognizing the significant future cash flow generated from EEPs because they do not believe or are not

satisfactorily assured that such new future cash flow can be relied upon to repay the related loan. Consequently, LFIs generally assign no value to the future cash flow of EEPs, which requires borrowers (e.g. Facility Owners, ESCOs, etc.) to finance them from their existing credit capacity or secure them with marketable asset collateral or repayment guarantees, both of which are very unattractive to the borrower.

This disconnect results in LFIs not being willing to structure EE loans that consider the future EEP's cash flow as the primary source of loan repayment due in large part to LFIs:

- Not being familiar or comfortable with the future savings of EE technologies being generated or being reliably measured and verified;
- Not knowing how to properly evaluate the risks and benefits of EEPs, and
- Not knowing how to structure low-risk EEP loans that are attractive to Facility Owners, ESCOs and other project developers.

The current financing options in Vietnam do not apply a project-based lending approach for EEPs. Virtually all LFIs are reluctant to finance EEPs because of a perceived high risk, small transaction size, small market potential, high transaction costs and a lack of the internal evaluation capacity needed to assess the risks and cash flow benefits generated from EEPs. Given the questionable loan market size, LFIs are also reluctant to acquire new EE technical capacity and are unwilling to invest the time or resources to learn about EE on their own.

Since LFIs assign little or no value to the EEP's future cash flow and do not consider it as increased credit capacity from EEPs in their loan structures, Facility Owners interested in implementing an EEP are required to use their existing core business credit capacity and/or provide additional marketable collateral or guarantees to secure EE loans with LFIs. These requirements coupled with a lack of confidence in the EEP's future savings being achieved, has resulted in a significant barrier for Vietnam to tap into the huge EE opportunity of its industrial and commercial sectors. Most private companies have not even begun to look at or consider implementing EEPs in their facilities, which is why EE opportunities are so abundant for the most fundamental of EE technologies.

4.6 Limited Enforcement of Regulatory EE Mandates

There is lack of enforcement of the different Laws, Decrees, Circulars and Decisions issued by the Ministries and other agencies of the GVN. It has been observed that there are Designated Energy Units (**DEUs**) who do not follow the requirement of setting up an Energy Management System or providing the yearly reporting to the provincial DOIT.

- Monitoring, reporting and evaluation should be strengthened in terms of both human resources and institutional arrangement to ensure the implementation of energy efficiency and conservation from central to local level.
- MOIT is responsible to improve the energy reporting system and develop an online energy database to monitor and report the energy efficiency indicators for all economic sectors in Vietnam, including benchmarking data for energy intensive sectors.

4.7 Limited Implementation Capacity (Nascent ESCO Industry)

In the past few years, the ESCO industry has made strides with the participation of more and more companies providing energy services. More importantly, Vietnamese enterprises are no longer indifferent to the issue of energy conservation like before. According to a prominent ESCO representative, in the first six months of 2021, when the COVID-19 epidemic raged the most across the country, businesses were still receiving up to 300 investment proposals for solving problems. This can be considered a good signal for the future of the ESCO market. In addition, ESCO development gained momentum after the introduction of VNEEP3 due to the GVN recognizing the existence of 'ESCOs' to contribute to the achievement of its national EE target. The GVN started to help EE service providers to develop bankable projects and provided continued training and assistance on more comprehensive audits, performance contracting and financing options.

However, today, there are still only a few ESCOs who are engaging with a limited number of Facility Owners for their ESPC services. This is due to ESCOs facing the many EE market barriers previously identified plus the fact that most ESCOs are SMEs with limited credit history and insufficient capital resources needed to develop and implement savings-based EEPs on a scalable basis. Other barriers include:

- Lack of knowledge on how to develop, structure and finance performance-based EEPs;
- Lack of an adequate legal framework on business conditions, areas of business and service for ESCO activities, which is specifically needed in Vietnam, and
- Shortage of funds and financial institutions involved in ESCO activities.
- No access to government facilities, including by EVN power corporation, the largest electricity wholesaler in the Vietnam market with a number of large industrial customers. There is no mechanism for the operation and development of energy service companies (ESCO, lack of a mechanism for capital, handing over state assets to customers and how to do it). In addition, just like all other GAs, there is no mechanism for administrative agencies to use energy saving solutions provided by ESCO Company¹⁷.

5. CURRENT AND PAST DONOR EE INITIATIVES

5.1 Current Donor EE Programs

1) MOIT/GIZ Energy Support Program: 4E Project Phase II: 2018-2021

This GIZ program reflects a strong Vietnamese-German cooperation that began in 2013 with the creation of the MOIT/GIZ Energy Support Program. The Program aims to contribute to Viet Nam's emissions reduction and green growth strategy by improving the existing regulatory framework for RE and EE and increasing the professional and organizational capacities of key institutions and stakeholders.

All activities which are carried out are under one of three action areas: i) Legal and Regulatory Framework Conditions, ii) Capacity Development, and iii) Technology Cooperation. The main objectives of current 4E project's Phase II are to improve the preconditions for the utilization of RE and the increase of EE at key stakeholders of the government and private sector; and to provide support to the Technical Assistance for the Implementation of the EU - Viet Nam Energy Facility. For further information about the Facility. Website: <http://energyfacility.vn/>

¹⁷ The EU - VN Energy Facility 10/2020, VNEPG & GIZ Seminar ESCO market development to promote energy saving in Vietnam 2018, MOIT & WB

The Phase II focuses on the following RE and EE awareness and capacity building:

- **RE Capacity Building** for stakeholders strengthens the capacities of the Electricity and Renewable Energy Authority under MOIT and key energy companies to accelerate the deployment of new RE projects in Vietnam. Activities include the development of proposals for national steering mechanism for the expansion of new RE, studies and exchange between policy makers and international professionals and trainings on policy development and technical problem solving.
- **EE Capacity Building** for stakeholders supports capacity building for the Department of Energy Efficiency and Sustainable Development under Ministry of Industry and Trade, industrial consumers, Energy Service Providers, and Energy Service Companies (ESCOs) to enhance Energy Efficiency in Vietnam. Activities include support to the assessment of potential EE support mechanism in Viet Nam, further development of EE database and Energy Performance Indicators, capacity development for energy managers and access to international expertise on EE policies.
- **EE and RE Awareness Raising** activities include the organization of National Energy Efficiency Industry Award and support to MOIT in communicating success stories about RE and EE.

Website of the program: <http://gizenergy.org.vn/en/project/renewable-energy-and-energy-efficiency-phase-ii-4e>

2) Vietnam Energy Efficiency for Industry Project (VEEIE): 2018-2022

The World Bank is supporting this project through Vietnam's MOIT, Ministry of Finance (MOF) and two commercial banks, Bank for Investment and Development of Vietnam (BIDV) and Joint Stock Commercial Bank for Foreign Trade of Vietnam (VCB). A USD 100 million loan was provided from the International Bank for Reconstruction and Development (IBRD) to MOF who re-loaned USD 50 million each of the participating banks (BIDV and VCB). They are supposed to use the USD 100 million to fund EEPs with a total investment of about USD 156 million to be implemented within 10 years.

The participating banks may lend to industrial enterprises or ESCOs to implement energy saving projects. Industrial enterprises may borrow capital to invest in EEPs that meet the project's criteria prepare and submit loan applications to commercial

banks (BIDV/VCB). VEEIE is coordinated by MOIT and development partners since its inception in January 2018. The project is a convergence of resources and co-implementation between MOIT, the World Bank, LFI (BIDV and Vietcombank) and the business community (industrial manufacturing companies and ESCOs) with an aim to improve EE at industrial facilities.

The type of EEPs developed under this program include:

- Replacing inefficient industrial technologies with energy-saving technologies such as industrial boilers, furnaces and high-performance heat exchange systems;
- Recovery and utilization of by-products and waste heat;
- Installation of high-performance electrical and mechanical equipment, including motors, lighting, pumps, heat and ventilation equipment;
- Optimization of industrial systems to reduce energy use;
- Use of RE to save electricity or fuel in industrial enterprises (cogeneration system, solar water heating system);
- Other projects approved by the World Bank.

With about 25 industrial enterprises expected to participate, VEEIE hopes to create a breakthrough in the industrial EE market in Vietnam, from credit and technology to training management and developing human resources. The coordination mechanism between state management agencies, credit institutions, international development partners, industrial enterprises and ESCOs implemented in the operation of the VEEIE project may become a new model of effective EE operation deployment model.

3) VEPG (Viet Nam Energy Partnership Group): 2016 to Present

VEPG is a high-level energy policy and technical forum supported by the EU in cooperation with MOIT that aims to strengthen cooperation, dialogue and exchange of experiences and knowledge in the country's energy sector by providing a platform to:

- Have high-level policy and technical dialogues between GVN and Development Partners, as well as all stakeholders in the energy sector;

- Facilitate alignment of ODAs with Viet Nam's energy and climate change strategies, action plans, international commitments, and private investment in the energy sector;
- Facilitate implementation of development cooperation activities in the energy sector, and to reinforce coherence and effectiveness of international support while avoiding duplication and fragmentation of aid delivery, and
- Enhance learning through information sharing and communication between national and international participants.

4) **Smart Grids for RE and EE: 2017-2021**

This GIZ project supports experts of the Vietnamese power sector in developing a smart power supply system that will allow for the increased integration of RE and support greater EE. The project focuses on three main action areas that promote the participatory development of smart grid solutions, namely:

- a) **Legal and Regulatory Framework.** The objective of this action area is to provide the Electricity Regulatory Authority of Viet Nam (ERAV) with information on improving the regulatory framework for a Smart Grid, which facilitates Res and increases EE. Experts who update the Smart Grid Road Map (SGRM) and shape respective regulatory requirements receive support through training. Technically this means understanding the usefulness of internationally proven legal and regulatory requirements and adjusting them to the conditions in Viet Nam.
- b) **Human Capacity Development.** This action area aims to establish a Smart Grid knowledge hub, which helps Vietnamese experts and stakeholders to exchange knowledge about the development and management of Smart Grids, state-of-the-art technologies and international approaches. The exchanges also aim to promote awareness about Smart Grids between the government, policy makers, business, research institutes and civil society.
- c) **Technology Cooperation.** Through activities in this action area, power sector experts will be presented with and exchange on available technology solutions for an intelligent power supply system, which facilitates the integration of REs and increases EE. The experts will learn more about the technologies that are available on an international level and will get insights into the benefits these

technologies can have for the Vietnamese power sector. This will happen by evaluating the technologies theoretically, developing and testing pilot schemes and then testing and evaluating system configurations which integrate different technologies.

5) Southeast Asia Low Carbon Energy Programme (LCEP): 2020-2022 (March)

LCEP is a 3-year GBP 18 million TA program provided by the UK Prosperity fund to implement Green Finance and EE interventions in 6 southeast Asia countries (Philippines, Indonesia, Thailand, Vietnam, Malaysia and Myanmar) that ends in March 2022. The ongoing TA program in Vietnam includes the following interventions being implemented through MOIT:

- a) Support the creation of a market for ESCOs to implement paid-from-savings EE projects in government facilities. This intervention attempted to establish new regulatory procedures for GAs to follow in order to legally procure and contract with ESCOs to develop, implement and fund EE projects in government facilities and receive multi-year payments from reduced energy costs (Savings). It was pursued under two parallel and independent approaches: 1) creation of new government procurement, contract and budget regulations and 2) synchronization of existing Private Partnership (PPP) regulations that already contain the 'salient features' applicable to an ESCO entering into an Energy Savings Performance Contract (ESPC) with a Government Contracting Agency (GCA).

EPS Capital, member of the LCEP team, drafted new government procurement, contract and budget revisions that streamlined existing PPP regulations to accommodate paid-from-savings EEPs being implemented by ESCO and submitted them to GVN for inclusion in its June 2020 revision of PPP, but it was too late for their considerations. EPS Capital also conducted regulatory research and drafted/submitted to MOIT in late 2020 the key elements of a new national ESCO regulation to remove the government barriers, which MOIT supported but felt getting such ESCO regulation completed was well beyond LCEP's March 2022 program deadline.

- b) Support MOIT to deliver the VNEEP3 – still in progress.
 - c) Develop a pilot EE project implemented by a cement company that demonstrates a bankable IGA and project-based financing – still in progress.
 - d) Promote improved EE target setting and performance by food and beverage companies through the adoption of Energy Management Systems
 - e) Support MEPS and HEPS for electric motors – still in progress.
- 6) GCF EE for Industry Risk Sharing Facility (RSF): 2024 (Approved by GCF but not GVN)**

The World Bank is targeting this project to improve EE in Vietnam's industrial sector by encouraging private sector investment in EEPs and providing complementary technical assistance and capacity building to stakeholders in the EE market. The project will seek to contribute to:

- A paradigm shift in the nascent energy efficiency market, by providing know-how and experience, by strengthening capacity and by creating an enabling environment for local financial institutions and industrial enterprises to scale up investments in energy efficiency.
- Achieving the GVN's energy saving and greenhouse gas emission reduction objectives.

7) USAID – Vietnam Urban Energy Security: 2018-2033

This USAID project works closely with the GVN at the city, provincial, and national level to improve legislation related to clean energy, mobilizing investment and increasing the adoption and deployment of innovative energy solutions.

8) DANIDA – EE Program between Viet Nam and Denmark: 2020-205

DANIDA is coordinating with MOIT to try to develop low carbon in the industrial sector in order to further contribute to reducing Viet Nam's energy consumption and CO₂ emissions needed to meet VNG's National Determined Contribution (NDC) obligations in the Paris Agreement, its national energy development goals to 2030 (Resolution 55) and the EE goals and targets in VNEEP3.

9) GIZ – EU Vietnam Energy Facility: 2018-2021

The aim of this GIZ project is to enhance governance of the energy sector with a view to facilitate a shift to a more sustainable energy development path in Viet Nam. The Project will also contribute to the implementation of the regulatory framework needed to achieve Viet Nam’s commitment to reduce energy-related green gas emissions in the context of its NDCs.

The Facility is co-financed by the EU and the German Government.

5.2 Past Donor EE Programs

1) Southeast Asia Energy Sector Development, Investment Planning and Capacity Building Facility (2018-2021)

ADB The transaction technical assistance (TA) facility provided project preparatory assistance, technical support, policy advice, knowledge sharing, and capacity building to support the implementation of ongoing projects and strengthen due diligence and improve project readiness to Southeast Asian Developing Member Countries (DMCs) for a series of lending projects and programs identified in the country operations business plans, 2018-2020. The TA facility also provided technical knowledge services and capacity building support to ongoing projects, especially for renewable energy grid integration, battery storage system, ESCO development, LED street lighting, rooftop solar project, and other needs as arise.

In Viet Nam, the project had provided support for LED Street lighting project in some big cities such as Da Nang and Ho Chi Minh city.

2) Programme for Energy Efficiency in Building (PEEB) (2018-2020)

This ADEME/AFD/GIZ PEEB program was initiated jointly by the French and German Governments at the COP 22 in November 2016 and was catalyzed by the Global Alliance for Buildings and Construction (GABC). As such, PEEB supports the implementation of the GABC roadmap “towards low GHG and resilient buildings” as one of its first partner countries with Mexico, Morocco, Senegal, and Tunisia. The project promoted the creation of regulatory and normative framework conditions, which were a prerequisite for the transformation into a low-emission building sector and an important driver for the development of an EE market.

In addition, PEEB proposed a soft loan and EE incentive scheme to the NAMA facility to mobilize private sector investment in EE in buildings which was rejected by GVN.

PEEP also supported the MOC in developing a NDC roadmap for the building sector and in designing an EE housing program with funding planned from AFD). This enabled the MOC to submit a project application for a housing project (EUR 17.3 million) to the NAMA Facility. Lastly, PEEB developed a feasibility study for green financing program for Energy Efficiency and Low Emission Housing in Viet Nam.

3) Energy Efficiency Improvement in Commercial and High-Rise Residential Buildings in Viet Nam (EECB) (2016-2020)

UNDP cooperated through the Ministry of Construction (MOC) Project to have this project focus on reducing the intensity of GHG emissions from the building sector in Viet Nam. This project's specific objective was to improve the energy utilization performance of commercial and high-rise residential buildings in Ho Chi Minh and Hanoi by implementing the following three components:

- i. Improvement and Enforcement of Energy Efficiency Building Codes;
- ii. Building Market Development Support Initiatives, and
- iii. Building EE Technology Applications and Replications.

Each component comprised a number of complementary activities designed to remove barriers to the stringent enforcement of the revised EEBC, and to the greater uptake of building EE technologies, systems, and practices in commercial and residential buildings. At end of the project, the GEF investment catalyzed direct GHG emission reductions of about 37,680 tCO₂e. The cumulative direct reduction in GHG emissions over the lifetime of the project is envisioned to be 236,382 tCO₂e.

4) Vietnam Low Emission Energy Program (V-LEEP): 2016-2020

The United States Agency for International Development (USAID) program was coordinate through MOIT to support GVN's green growth and low-emission energy development in Vietnam by supporting the formulation of policies and mechanisms to encourage low emission development in the energy sector, and at the same time, attracting public-private investment in developing RE and EE. Among the objectives of the Project, Module 3 focused on implementing the goal of strengthening the energy-efficiency implementation capacity for energy-intensive industries and construction Vietnam. The results were summarized as follows:

- Performed a review 4 key sectors including steel, garments, cement, and sugarcane to support inspection Energy audit aims to identify the potential and effective energy use solutions;

- Coordinated with Vietnam Textile and Apparel Association to organize the workshop "Technical support for low emission technology application for the textile and garment industry" in 2017; with the participation of more than 80 enterprises and consulting units, international suppliers and organizations;
- In coordination with Vietnam Textile and Apparel Association, Vietnam Steel Association organized a training course to improve energy management capacity for industrial enterprises: Organizing workshops on cost optimization and improving energy efficiency for more than 50 attendees from industrial enterprises, ESCOs, credit institutions, professional associations, management agencies and international organization;
- Provided technical support for a number of ESCOs in Vietnam to promote ESCO projects in industrial enterprises;
- Working with credit agencies including Bank for Foreign Trade of Vietnam (VCB), Bank for Investment and Development of Vietnam (BIDV) to develop a coordination mechanism to provided technical assistance in reviewing proposals for loans for energy saving projects, and
- Coordinated with the Association of Energy Engineers (AEE) to organize the first training course on certification of Energy Efficiency and Evaluation (CMVP) projects in Vietnam. After the training, there were 18 experts who were recognized and certified by EVO with global value.

5) Promotion of Energy Efficiency Industrial Boiler adoption and operating practices in Vietnam: 2015-2019

UNIDO coordinated through MOIT to implement this program aimed at reducing energy consumption and GHG emissions through promoting the widespread adoption of EE boilers and best operation practices in industry.

6) Implementation of Eco-Industrial Park Initiative for Sustainable Industrial Zones in Viet Nam: 2014-2018

UNIDO in coordination with MPI implemented this program designed to increase the transfer, deployment and diffusion of clean and low-carbon technologies and practices for the minimization of GHG emissions, release of persistent organic pollutants (POPs) and water pollutants as well as improved water efficiency and the sound management of chemicals in Industrial Zones (IZ) of Vietnam.

7) UNIDO-UNEP Global Program on Resource Efficiency and Cleaner Production (RECP) in developing and transition countries (Vietnam component): 2013-2018

Through the Vietnam Cleaner Production Centre, this program supported the GVN to identify and fill gaps for the ratification of the Kigali Amendment to the Montreal Protocol and ensure the early compliance of the country vis a vis the new obligations. The primary activities included a Cost and Benefit Analysis required when Vietnam ratified the Kigali Amendment in September 2019 as well as reporting of HFC consumption.

8) Clean Production and Energy Efficiency Project: 2013 -2018

This World Bank program, coordinated through MOIT to attempt to define a strategy for GVN to develop ESCOs, develop an efficient EE framework for EE targets and Mandatory EE regime.

9) Promoting Investment Market for EE in Industrial Sector in Viet Nam: 2018-2019

The Korea International Cooperation Agency (KOICA) supported this project aimed at developing ESCOs and facilitating the implementation of EEPs by developing feasibility studies for EE projects in some coal-fired power and heavy process plants. While studies were completed it is not known if any has resulted in an implemented EEP to-date.

6. EE MARKET GAPS

The current regulatory, administrative and policy support from the government has been in large part not effective, and thus has not assisted in overcoming the EE Barriers in section 4. Furthermore, despite several donor programs having addressed some of the EE barriers, there are several major gaps that need to be filled in order for EE to be widely implemented throughout Vietnam, which are summarized below.

6.1 No Incentives or Mandates to Drive Private-Sector EE Demand

Financial incentives for EE products and services are needed to create interest and new demand for them from private sector Facility Owners. Current EE demand is currently very low due to their very limited knowledge/interest in EE, low return on

investment (i.e. low electric rates) and higher price of EE products. Incentives are needed that can be quickly realized into a financial benefit and are significant enough to get the attention of business Facility Owners and their Chief Financial Officers.

6.2 Government EE Barriers and Lack of Demand

The inability of ESCOs and other private sector entities to implement paid-from-savings EEPs in government facilities is one of the major EE market gaps for both GAs and ESCOs that needs to be overcome. Vietnam's ESCO industry is nascent with low capacity resulting from limited market awareness, credibility and customer demand, and financing access. Opening up the large Government sector will create national market demand, awareness, credibility, capacity building (i.e. templates, certifications, etc.) and low-risk financing options for the ESCO industry. Fact is that robust ESCO markets mostly only exist in countries where its governmental sector is a primary, if not the primary user of the ESCOs' paid-from-savings ESPC business model. The ESCO industry needs to be developed in the government sector by removing the previously-described 3 common barriers of GAs:

1. Not being able to commit to multi-year Savings Payments;
 2. Not being able to retain Savings in Budgets, and
 3. Being required to use **'lowest cost'** Procurement Procedures
- One potential solution is to enact New National ESCO Regulation that defines the procedures, guidelines regulatory framework for ESCOs to be able to implement paid-from-savings EE projects in governmental facilities.
 - A second potential solution is to streamline processes in existing Public Private Partnership (PPP) Regulation to allow ESCOs to turnkey develop, implement and fund EEPs on a 'paid-from-savings' basis in government facilities.
 - A third potential solution is to revise each existing government regulation related to procurement, budgeting and multi-year contracting, as needed to allow ESCOs to turnkey develop, implement and fund EEPs on a **'paid-from-savings'** basis in government facilities. This third option is very problematic due to the significant challenges and time required to obtain approval by the potentially many GAs that need to change their existing regulations.

6.3 No Commercially-Attractive EE Project Finance

EE Risk-Mitigation Financing Products are critically needed to overcome the huge collateral and confidence barriers of financing EE Projects by LFIs, facility owners, ESCOs and other EEPs developers. These are needed for LFIs to revise their traditional lending practices and starting offering project-based lending to EEPs

6.4 Insufficient EEP Development Capacity Building

There is a lot of project-based development capacity building needed for EEPs in Vietnam to provide the missing IGA and M&V skills through the training and certification of professionals of ESCOs and EE Service providers. This is critically-needed to have the market be able to develop 'bankable' IGAs on EEPs with reliable M&V Plans. Other Capacity Building needs include training LFIs on how to evaluate the benefits and risks of EE Projects and structure project-based financing that mitigates risks for financiers and yet is attractive to facility owners.

6.5 Limited ESCO Implementation Capability

The nascent ESCO industry lacks the performance-based project development knowledge and experience and is not aware of how to prepare 'bankable' IGAs and reliable M&V plans as well as financing EEPs on a paid-from-savings basis. Providing the above new capacity building programs for IGAs, M&V and ESCO project development and financing is critical to the growth of the ESCO industry.

7. RECOMMENDED INTERVENTIONS

The successful and cost-effective transition of the energy system requires both higher penetration of renewable energy and a reduction in energy consumption through EE and energy conservation measures. As this report shows, Vietnam has a large potential for EE to significantly reduce energy consumption, costs and GHG emissions. It also can reduce total energy system costs through investments in end-use EE devices (e.g. industry and residential sectors) by reducing the energy demand and need for additional power plant capacity investments. However, Vietnam is not able to exploit its full EE potential due to the institutional and financial barriers identified in this report.

Taking into consideration the EE Gaps identified in section 6 and eliminating those covered by Donor programs in section 5, to avoid duplication, the below EE interventions are recommended for Vietnam. They are prioritized from highest to lowest potential impact in being able to create EE demand and scale-up the implementation of EE in Vietnam, except for the creation of a government EE/ESCO market in section 7.7, which will require delayed implementation until MOIT determines it is a priority within VNEEP 3. It should be noted that MOIT, as the designated GA responsible for all EE in Vietnam, will likely be the lead counter-party agency with which all interventions are to be coordinated and approved.

7.1 Develop/Implement/Fund Private-Sector Demonstration EEPs

Demonstration projects are desperately needed to illustrate to all the EE stakeholders how to successfully apply global best-practices in the development, implementation and financing of EEPs in both private and governmental sector. Since the implementation of EEPs in government facilities will have to wait until the 3 existing regulatory barriers are removed in the section 7.7, it is recommended to pursue EEP demonstration projects in private energy-consuming facilities.

This intervention would include identifying/securing EEPs with private-sector facility owners for an international deeply-experienced EE team to develop, finance and manage the implementation of EEPs that (i) apply 'global best practices' and (ii) bundle multiple 'proven' technologies to maximize the level of EE savings and ensure targeted savings are achieved. The support would be turnkey in nature and include but not be limited to the following tasks for each Demonstration EEP:

- Prepare a 'bankable' IGA and the included M&V Plan;
- Implement the M&V plan by obtaining, analyzing data and performing initial M&V of savings;
- Prepare proposed EEP financing materials and presenting them to LFI for consideration of a project-based loan;
- Prepare performance-based procurement procedures and facilitate the selection of a local contractor or ESCO to implement the EEP, and
- Project manage the selected contractor or ESCO's implementation of the EEP.

This intervention would also include the establishment of a relatively small fund (~USD 10 million) that would fund the development and implementation of several EEPs in different industries to facilitate development of the private sector EE and ESCO market. This intervention is critically needed to create EE demand, especially in a market with low electric rates, by unlocking the current knowledge, technical and financial gaps on how to successfully develop, implement and finance an EEP in a cost-effective and low-risk manner.

7.2 Develop Cash Incentive Programs to Drive Private-Sector EE Demand

Develop two new EE Cash Incentive Programs to create private-sector EE market demand and scaled-up implementation, which are extremely low due to the lack of incentives mechanisms Vietnam's low electricity price. They will be designed to provide private end-use energy consumers with an attractive enough incentive to shift their behavior to purchasing more EE Products and implementing EE Projects. A brief summary of each one is as follows:

- a) **EE Product Incentives** that reflect a cash rebate paid to private purchasers of retail products that minimally offsets the higher cost for household consumers to buy the more expensive EE appliances instead of the less expensive inefficient ones.
- b) **EE Project Incentives** that reflect a cash payment to private Facility Owners, ESCOs and other developers who implement EEPs with the amount based on the actual kWh and thermal reductions calculated pursuant to generally accepted M&V principles like the IPMVP and verified by CESVs.

The potential positive impact of these cash incentives on creating a large EE demand in Vietnam is huge and critical to delivering GVN's EE targets. However, it will require a lot of effort and time to work with the many stakeholders to get EE Product and EE Project cash incentive products designed/accepted by the local market and to secure a funding scheme acceptable by GVN. Potential stakeholders would include not only GAs like MOIT, MOF, CMSC, MPI, EESD, ERAV, and EVA, but also key NGOs, VNEEP 3 participants, private sector EE vendors and service providers and potential international donors.

7.3 Deliver EEP Development Capacity Building

To create a pipeline of EEPs, it is necessary to create/implement a national EEP Development capacity building program that trains and certifies the competency of individual professionals working for EE consulting firms, ESCOs, vendors and other EE service providers on how to develop 'bankable' EEPs for implementation in public and private energy-consuming facilities in Vietnam. It also needs to train bankers how to evaluate and structure commercially-attractive EE project-based loans. It is important to certify the individuals (where the knowledge/skills reside) and not companies, and then require that those certified individuals to personally certify the results of a study/investigation.

Existing local and training and certification materials will be modified where possible to comply with the requirements of MOIT and other GAs. The EEP development capacity building program will also provide the new project-based EE knowledge/skills needed for the local professionals to learn how to prepare detailed IGAs containing reliable savings and capital expenditure (CAPEX) estimates and M&V plans. A brief summary of each proposed program is as follows:

- a) **Certified Energy Manager (CEM)**: Applies local existing training materials and certification process certifying those individuals who demonstrate their knowledge/ability to analyze energy consumption, identify significant energy users, and establish an energy management system according to ISO 50001.
- b) **Certified Energy Auditor (CEA)**: Applies local existing training materials and certification process, certifying those individuals who demonstrate their knowledge/ability to audit energy-consuming facilities and identify preliminary EE projects with estimated savings.
- c) **Certified Investment Grade Auditor (CIGA)**: Applies existing global IGA training materials and TÜV NORD's Exam. TÜV NORD will certify as CIGA those CEAs who demonstrate their competence to prepare IGAs in compliance with generally accepted EE engineering practices. The CIGA program teaches existing CEAs to prepare 'bankable' IGAs on EE Projects for 'Decision Makers' and addresses the current market gap for CEAs to be able to develop ready-to-implement EE projects with reliable estimated CAPEX and energy savings based on measurements, supporting calculations including a M&V plan. The 4-day curriculum includes an exam requiring candidates to prepare an actual IGA. The

CIGA exam will be conducted online according to international certification standards as outlined in TÜV NORD's procedures.

- d) **Certified Energy Saving Verifier (CESV):** Applies existing M&V training materials and Exam from Efficiency Valuation Organization (EVO). EVO will certify as CESVs those CIGAs who demonstrate their competence to certify an EE Project's estimated/achieved savings and M&V plans. The CESV program teaches existing CIGAs to prepare M&V plans that comply with generally accepted M&V principles and calculate the interdependency effect on estimated savings from bundling multiple technologies into a single EE project. CESVs will address Vietnam's current 'low confidence in EE savings' market gap by providing high-grade EE engineers with certified skills to verify estimated savings and M&V plans in IGA reports. The 7-day curriculum includes 3 days of teaching M&V fundamentals needed due to the market-wide M&V knowledge void and an exam requiring the evaluation of an existing IGA.
- e) **EE Project Finance Professional (EPPFP)** is a training workshop that teaches staff of financial Institutions and ESCOs how to evaluate the benefits and risks of EEPs and structure project-based financing that mitigates risks for financiers and yet is attractive to facility owners.
- f) **ESCO Project Development Professional** is a training workshop that teaches staff of current or prospective ESCOs how to develop, finance, implement and mitigate risks of EEPs under an ESPC.

This intervention addresses a critical EEP development gap that needs to be overcome in order for the development of bankable EEPs and meaningful pipeline that can be implemented to deliver GVN's EE targets. It will likely require a relatively large amount of effort and time to persuade MOIT to accept revisions to its current training and certification programs and accept new international-based programs. However, the belief is that MOIT will recognize that this intervention will fill the huge missing EE project development capability in the market place.

7.4 Develop EE Finance De-Risking Products

In order to enable LFI to be willing offer attractive project-based EE financing the following two new EE Finance De-Risking Products are critically needed to overcome

the huge collateral and confidence barriers experienced by LFIs, facility owners, ESCOs and other EEPs developers:

- a. **Energy Savings Insurance (ESI)** product mitigates the performance risk against any shortfalls in an EEP's savings versus its debt service payments to LFIs and/or investment returns to facility owners. It instills confidence with both facility owners and LFIs that the estimated future cash flow savings from an EEP will be realized. It also establishes energy savings as a reliable new future cash flow for LFIs to accept as a source of loan repayment, increased credit capacity and reduced collateral requirements of borrowers. The ESI product will be provided by a locally-respected insurance company (**Insurer**) that would pay the shortfall in an EEP's actual savings versus its related debt service payment to an LFI. Its design follows Chubb's 100% financial coverage successfully implemented in US 20+ years ago versus the partial product-warranty coverage of the Inter-American Development Bank's ESI program. The ESI will be structured as a "zero loss" insurance product with fees charged to the EEPs that cover the long-term losses in order to ensure sustainability. A first-loss fund of about USD 10 million will be included to share initial losses with the Insurer until such time as an experience ratio is determined.
- b. **Partial Credit Risk Guarantee (PCG)** product is a common product that mitigates the credit risk assumed by a lender that a borrower will not make its agreed loan payments. A locally-accepted financial institution will be identified to guarantee to LFIs that a significant portion (minimum 50%) of their EEP loans will be repaid by the borrower. This will reduce the amount of collateral required from borrowers by LFIs.

This intervention addresses a critical EEP financing gap that needs to be overcome in order for the scaled-up implementation of EEPs and meaningful pipeline that can be implemented to deliver GVN's EE targets. It will very likely require a large amount of effort and time to work with the many stakeholders to get PCG and ESI products designed/accepted by the local market and implemented with support of international donors and other entities. This would include but not be limited to MOIT, MOF, CMSC, MPI, bank regulators, insurance regulators and providers, LFIs, World Bank, key NGOs and private sector EE vendors and service providers, etc.

7.5 Develop an Industrial EE Benchmarking System

The current EE benchmarking for each industrial sector should be further developed and updated regularly. In addition, an annual consumption report needs to be designed for the relevant EE benchmarking methodology of each sector with a mandated submittal by each large industrial end-use energy consuming facility owner. This will allow EE benchmarking results to be shared among the enterprises to encourage their EE improvement. Such feedback reported by each enterprise could provide an enormous benefit, and a computer-generated brief report could be an option for implementation by GVN's energy data center.

This intervention is a priority because of the industrial sector being the largest EE savings opportunity in Vietnam, this intervention should be able to be implemented with relative ease since it will leverage and create benefit to the current industry EE benchmarking regulation and work.

7.6 Create/Deliver 'EE Product' Awareness and Promotion Programs

The creation and delivery of 'EE Product' awareness and promotion programs are needed to continuously promote the transformation of the EE market for:

- Household, industrial and commercial products, and energy efficiency labeling activities. The labeling and MEPS program should continue as it shows effectiveness in recent years. MOIT also considers participating in regional and other international harmonization of testing and certification of EE. This will have double effects in terms of EE equipment promotion as well as trade growth as a function under MOIT's responsibility.
- Industry on EE investment projects, EE technology, and energy management system and ISO 50001 should be developed. This can be done by regularly technical workshops for energy managers in facilities in the same sector, and
- Financial packages for EE and capable ESCOs/EESPs should be well introduced to the market. MOIT/GDE could consider the collaboration of this promotion program with industrial associations or provincial campaigns locally implemented by DOITs.

This intervention will create increased demand for EE products and should be able to be implemented with relative ease since it will leverage and create benefit to the current MEPS regulations.

7.7 Remove EE Regulatory Barriers for GAs

Since Decision 280 on VNEEP 3 sets a target on legalizing the ESCO model in Vietnam, and the GVN (through MOIT, MOF, MPI, etc.) is now working to solve barriers that require international experience and support, it is recommended to create an EE and ESCO market in GVN facilities by eliminating the inability of ESCOs and other private sector entities to implement paid-from-savings EEPs in government facilities. This intervention would create a legal framework (with concomitant procedures) for ESCOs to implement paid-from-savings EE projects in governmental facilities which currently does not exist due to the below three existing barriers.

Since PPP regulation is not a viable solution, it is recommended to work with MOIT to enact New National ESCO Regulation that leverages the extensive previous LCEP work already completed by EPS Capital Corp to remove the 3 aforementioned regulatory barriers:

- 1) GAs not being able to commit to multi-year Savings Payments;
- 2) GAs not being able to retain Savings in Budgets, and
- 3) GAs being required to use 'lowest cost' Procurement Procedures

This intervention entails introducing new ESCO-related procedures to be inserted into VNEEP 3's plan that will then have to be enacted into regulation which may require separate approval by each affected governmental agency (i.e. procurement, budgeting, etc.). Although the potential positive long-term impact of this intervention on the EE market is the one of greatest of all interventions, it is listed near the end because of the required delay to wait for MOIT and VNEEP 3 to make it a priority in their plans.

7.8 Create a Robust ESCO Association

Form a new ESCO association that plays a key role in creating market credibility by bridging collaboration between key stakeholders including government, private companies, ESCOs, financial institutions, donor agencies, and academics to

encourage the improvement of implemented energy efficiency projects’ portfolio under the ESCO scheme. The new ESCO association will have to hire competent staff so that it becomes a platform for discussion, development of EEPs and ESCO policy in Vietnam. The support needed should also include the establishment of a certification program similar to the 2-step process in the Philippines where ESCOs are first registered and then ‘certified’ after successfully implementing a few ESPC EEPs.

This intervention logically should not be vigorously pursued until sufficient demand is created for EE and ESCO services, which may not occur until many of the above interventions have been implemented.

EXHIBIT A: MEASURES THAT REDUCE EMISSIONS AND ENERGY CONSUMPTION

Table 5. Measures that Reduce Emissions and Energy Consumption.

Solution	Execution time	2030 Targeted Savings
E1. Use of household high efficiency air conditioners	2015-2030	By 2030, high-efficiency air conditioners will increase from 15% in 2014 to 75% of all households using air conditioners in urban areas and similarly from 8% to 55% in rural areas. High efficiency air-conditioning and refrigeration capacity cost about 30% more, but can save 30% in power consumption.
E2. Use a high efficiency refrigerator	2015-2030	By 2030, high efficiency refrigerators will increase from 15% in 2014 to 80% of all households using refrigerators in urban areas and similarly from 10% to 65% in rural areas. A high efficiency refrigerator with equivalent capacity costs about 15% more, but can save 30% in energy consumption.

Solution	Execution time	2030 Targeted Savings
E3. Use lights to save electricity	2015-2030	By 2030, use of energy saving lighting (LED) will increase from 17% in 2014 to 70% of total lights in 2030 to replace incandescent lamps (or other similar traditional lamps).
E4. Use a solar water heater	2015-2030	By 2030, solar water heaters will increase from 1% in 2014 to 30% of all urban households and similarly from 0.3% to 5% in rural areas.
E5. Using biogas instead of coal for household cooking in rural areas	2015-2030	By 2030, biogas equipment will increase from 0.7% in 2014 to 5% of all rural households to replace coal for cooking.
E6. Optimize clinker burning cycle	2015-2030	By 2030, combustion cycle optimization measures will be applied to production of about 50% of clinker production.
E7. Using vertical crusher in cement production	2015-2030	By 2030, the method of using a vertical mill will be applied to produce about 50% of the cement output.
E8. Applying innovative technology in brick production	2015-2030	By 2030, innovative technology measures to replace traditional technology will be applied to the production of about 70% of traditional brick production.
E9. Spray anthracite coal powder into blast furnace	2020-2030	By 2030, the method of spraying powdered anthracite coal into blast furnaces is applied to produce about 50% of the iron output.

Solution	Execution time	2030 Targeted Savings
E10. Preheat scrap steel before putting into electric arc furnace (EAF)	2015-2030	By 2030, the measure of preheating scrap steel before being put into electric arc furnaces will be applied to produce about 80% of steel output using arc furnace technology.
E11. Heat in steel rolling machine	2015-2030	By 2030, the heating method in steel rolling machines will be applied to produce about 80% of steel production using electric arc furnace technology.
E12. Recover heat from oxygen blower (BOF)	2015-2030	By 2030, gas heat recovery from an oxygen blast furnace (BOF) is applied to produce about 65% of steel production using blast furnace technology.
E13. Limits on fuel consumption for new imported and assembled motor vehicles	2022-2030	By 2030, the measure to apply fuel consumption norm will achieve: 100% of motorcycles sold reach the norm of 2.3 liters / 100km; 100% of cars sold meet the following standards: small cars (<1400cc) reach 4.7 liters / 100km, average cars (1400-2000cc) reach 5.3 liters / 100km; large car (> 2000cc) reached 6.4 liters / 100km.

Solution	Execution time	2030 Targeted Savings
E14. Change the mode of passenger transportation from using private vehicles to using public transport	2015-2030	By 2030, the transformation of means of transport from private to public will achieve the following results: To develop bus systems in 05 centrally-run cities (Hanoi, Ho Chi Minh City, Hai Phong, Da Nang and Can Tho); Newly operating 04 public passenger transport routes BRT in Hanoi, Da Nang & Ho Chi Minh City; Newly operating 03 public passenger transport routes by urban railway in Hanoi and Ho Chi Minh City
E15. Shifting the transport mode from road to inland waterways and coastal roads	2015-2030	By 2030, the volume of goods transported by inland waterways will increase from 127.8 billion tons-km to 128.8 billion tons-km (up from 20.6% to 20.8% of the total volume); rate of road transport decreased from 23.4% to 23.0%; The volume of freight transported by land converted to sea is assumed to be equal to the volume of freight transported from road to inland waterway during the same period.
E16. Using electric motorcycle	2015-2030	Newly sold electric scooters account for 07% of the total number of new motorcycles sold in the market annually.
E17. Encourage the use of biofuel	2015-2030	Average annual ethanol production is 145,000 m ³ used to produce biofuel E5 serving in Transport.

Solution	Execution time	2030 Targeted Savings
E18. Encourage use of CNG buses	2015-2030	By 2030, the total number of CNG buses is 623 cars, including 423 cars in Ho Chi Minh City and 200 cars in Hanoi.
E19. Using high efficiency electrical equipment in commercial service	2015-2030	By 2030, when using high-efficiency equipment, electricity demand will decrease by about 15% compared to BAU (WB-MOIT, 2019).
E20. Small hydropower development	2015-2030	The capacity of small hydroelectric plants could reach 3,800 MW by 2020; 4,900 MW in 2025 and 5,500 MW in 2030 to replace coal-fired power plants.
E21. Solar power development	2019-2030	Increase capacity from 4,464 MW in 2019 to 5,000 MW by 2020 (and maintain until 2030) to replace coal-fired power plants.
E22. Wind power development	2015-2030	Increase capacity from 304.6 MW in 2019 to 1,010 MW by 2020 (and maintain until 2030) to replace coal-fired power plants.
E23. Play electricity development - incineration	2020-2030	70 MW of waste electricity will be installed in 2020 and 210 MW and 350 MW will be installed in 2025 and 2030 to replace coal-fired power plants.
E24. Use cleaner fuels for rural cooking	2015-2030	By 2030, the number of rural households using LPG increases from 30% (in BAU) to 50% to replace coal for cooking.

Solution	Execution time	2030 Targeted Savings
E25. Improve energy efficiency in sub-sectors of industry (except for 3 sub-sectors of manufacturing brick, cement and iron and steel)	2015-2030	By 2030, measures to improve energy efficiency in industrial sub-sectors (excluding 03 manufacturing sub-sectors (brick, cement and iron and steel) through improving the efficiency of boilers, electric motors and electrical appliances can save up to 6.5% of energy demand.
E26. Use an electric car	2021-2030	By 2030, the number of new electric cars sold accounts for 30% of the total sales of cars on the market.
E27. Increase the load factor of trucks	2021-2030	By 2030, the freight load factor will improve from 56% to 60%
E28. Mode of transport from road to railway	2015-2030	By 2030, freight transport by railway will increase to 12.5% annually.
E29. Development of biomass thermal power	2015-2030	110 MW of biomass thermal power will be installed in 2020, 550 MW and 1,250 MW will be installed in 2025 and 2030 to replace coal-fired power plants.
E30. Development of electricity waste - landfill	2020-2030	10 MW of landfill power will be installed in 2020 and 30 MW and 50 MW will be installed in 2025 and 2030 to replace coal-fired power plants.

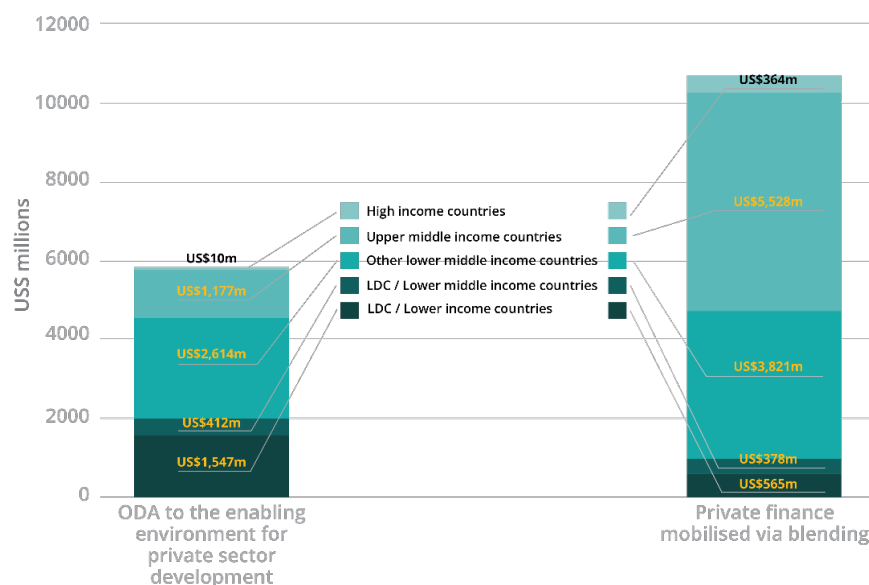
Solution	Execution time	2030 Targeted Savings
E31. Development of biogas electricity	2020-2030	10 MW of biogas power will be installed in 2020 and 30 MW will be installed by 2030 to replace coal-fired power plants.
E32. Development of supercritical thermal power technology	2015-2030	2,400 MW of supercritical thermal power will be installed in 2020, 10,800 MW and 27,600 MW will be installed in 2025 and 2030 to replace coal-fired power plants.
E33. Development of mixed gas turbines using LNG	2015-2030	LNG mixed gas turbines installed with 750 MW capacity in 2021, 3,000 MW and 12,750 MW will be installed in 2025 and 2030 to replace coal-fired power plants.
E16s. Using electric motorcycle	2015-2030	By 2030, electric motorbikes sold will account for 14% of the total number of new motorcycles sold in the market every year
E17s. Encourage the use of biofuel	2019-2030	E5 accounts for 40% of total gasoline sold; assuming no supply restrictions.
E21s. Solar power development	2021-2030	Increase capacity (increase from E21) to reach 9,500 MW in 2025 and 16,500 MW by 2030 to replace coal-fired power plants.
E22s. Wind power development	2021-2030	Capacity increase (increase compared to E22) to reach 3,500 MW in 2025 and 8,400 MW by 2030 to replace coal-fired power plants.

EXHIBIT B: OFFICIAL DEVELOPMENT ASSISTANCE (ODA) SOURCES

To develop a favorable EE environment, Vietnam needs financial development resources funding sources provided under Official Development Assistance (ODA). It is estimated that from 1993-2018 ODA provided USD 80 billion of funding for the development of favorable environmental programs and projects in Vietnam. These ODA sources are mainly used to finance institutional and policy reform development projects (employment reform, legal and regulatory reform, trade policy and facilitation, etc.). ODAs have made a significant positive contribution to the socio-economic promotion, improving the quality of infrastructure, and ensuring social security, especially in remote and mountainous areas. They also promote technology transfer, absorbing science and technology, advanced management experience and creation of jobs.

Viet Nam was the eighth country to receive the most ODAs. The 25% of ODAs capital is for energy and industry equal to about 19.8 billion USD. However, ODA funding represents only a fraction of the potential for private funding. As a lower-middle country, Vietnam could receive significant additional financing as indicated in Figure 13¹⁸.

Figure 13. Comparison of ODA Financing to Private Sector



¹⁸ Ibid.

Funds and banks represent essential sources of funding (in the form of loans, grants, and technical assistance) that can support Viet Nam's business sector in mainstreaming and implementing the National Energy Efficiency Program for both energy and climate change. Agencies representing potential sources of such funding are listed below followed by a brief overview of each.

Multilateral Climate Funds	Development banks and equivalent	Regional funds and facilities
<ul style="list-style-type: none"> • <i>The Global Environment Facility (GEF)</i> • <i>The Special Climate Change Fund (SCCF)</i> • <i>The Climate Investment Fund (CIF)</i> • <i>The Green Climate Fund (GCF)</i> 	<ul style="list-style-type: none"> • <i>ADB</i> • <i>AIIB</i> • <i>IFC</i> • <i>JICA</i> • <i>DEG</i> • <i>World Bank</i> • <i>EIB</i> • <i>Proparco</i> • <i>GIZ</i> 	<ul style="list-style-type: none"> • <i>OPEC Fund for International Development (OFID)</i> • <i>Leading Asia's Private Infrastructure Fund (LEAP)</i> • <i>China-ASEAN Investment Cooperation Fund (CAF)</i>

a. The Global Environment Facility (GEF)

The GEF was established in 1992 on the eve of the Rio Earth Summit to help member countries finance their environmental projects, either through grants or financial catalysts. It is the financial mechanism of the three Rio conventions including the UNFCCC.

Since its creation, the GEF has funded more than USD21.1 billion in grants and mobilized an additional USD114 billion in co-financing for over 5,000 projects in 170 countries¹⁹. It has notably participated in the sustainable management of more than 352 million hectares of productive landscapes and seascapes, as well as in reducing the climate vulnerability of more than 15 million people in 130 countries.²⁰

This multi-donor funding facility aims to long-term financing of national and regional activities by implementing partnerships with international institutions, CSOs and the

¹⁹ <http://www.thegef.org/about-us>

²⁰ <http://www.thegef.org/about-us>

private sector. It supports the position that the global significance of developing countries' eco-regions and their ecosystem services was, is, and will be the rationale for transfers between the international community and those responsible for maintaining ecological and cultural integrity.

The GEF work focuses on six main areas: Biodiversity, Chemicals and Waste, Climate Change, Forests, International Waters, Land Degradation. In the Climate Change area, the GEF works both on mitigation and adaptation. Indeed, according to the GEF8 Programming Directions report (2021), "The focus must now be on scaled up and coherent implementation of climate mitigation action that minimizes trade-offs and risks, and maximizes synergies with other government priorities, including post-pandemic recovery measures, and benefits for the people and the planet".

Since the publication of the GEF-6 program, private sector engagement in Climate Change has become even more important for the GEF in its programs that include:

- Climate Change Mitigation: efforts to engage the private sector are focused on performance-based instruments, risk reduction for clean energy and smart grid applications, as well as sustainability of supply chain and access to energy for all.
- Climate Change Adaptation: opportunities include supporting technologies and business models for the adoption of climate/weather services and drought tolerant techniques and crops. Working with agencies and developers to improve land-use planning could also be considered.

Furthermore, the GEF funded a project in 2018 (GEF-6 period) to establish and mobilize resources for the Climate Resilience and Adaptation Finance Technology Transfer Facility (CRAFT)²¹. This project aimed to **set up the first private sector climate resilience and adaptation investment fund and technical assistance facility for developing countries**, in line with the goals of the Paris Agreement²². The total cost of the project was USD 2 million, including USD 1 million from the GEF in grants and USD 1.4 million co-financed.

²¹ <https://www.thegef.org/project/structuring-and-launching-craft-first-private-sector-climate-resilience-adaptation-fund>

²² Ibid

In general, without considering the GEF-6 program, the fund has set five intervention areas to promote private sector engagement:

- Transform policy and regulatory environments (including feed-in tariffs for renewable energy, incentives that guarantee markets for new approaches and encourage long-term investments).
- Develop innovative financial instruments (including demonstrations and incremental financing for low-emission, climate-resilient investments, enabling private sector investment to flourish).
- Help multi-stakeholder alliances to develop, harmonise and implement sustainable practices.
- Strengthen institutional capacity and decision-making to enhance information, participation and accountability in public and private decisions.
- Demonstrate innovative approaches, including the validation of a technology, policy measure or approach to tackling environmental degradation that could lead to wider adoption²³.

The GEF also promotes private sector engagement through innovative financing models, with the Non-Grant Instrument Program. The fund has launched a USD 136 million program that offers attractive financial terms exclusively to the private sector:

- Flexible concessional interest rate.
- Minimum level of concession to avoid displacing other finance.
- First-loss position if justified.
- Maximum maturity of 20 years.
- Flexible exit date for equity investments.²⁴

²³ <https://www.thegef.org/topics/private-sector>

²⁴ <https://www.thegef.org/topics/non-grant-instruments>

These resources and benefits can only be used for projects that provide global environmental benefits in at least one of the GEF work areas, listed above. However, there is a funding gap for such projects, which is set at USD 15 million.

The project is more likely to obtain funding if it: (i) demonstrates innovative application of financial mechanisms, business models, partnerships and approaches that may be broadly adopted and can be scaled up; (ii) entails high levels of co-financing and focuses on areas other than climate change.²⁵ As of 7-Sept 2021, the total GEF fund balance was USD 5.5 billion.

b. The Special Climate Change Fund (SCCF)

The GEF also administers, among others, the SCCF which was established under the UNFCCC in the 2021 Convention at the COP-7 and began operating in 2006²⁶. The SCCF aims at supporting adaptation and transferring of climate-resilient technologies in all vulnerable developing countries.

It is a complementary entity to the Least Develop Countries Fund, which focuses solely on these group of countries. In addition to adaptation and the technology transfer areas, the SCCF also supports projects in the areas of energy, transport, industry, agriculture, forestry and waste management, as well as activities dedicated to economic diversification.

²⁵ <https://www.thegef.org/topics/non-grant-instruments>

²⁶ IBID

Table 6. Key Distinctions between GEF Trust Fund and SCCF²⁷

	GEF	SCCF
Projects must generate global benefits	Yes	No*
Projects must generate adaptation benefits	No	Yes*
Funding allocated according to Resource Allocation Framework or STAR	Yes	No
Projects financed according to the “incremental cost” principle	Yes	No*

*Technology Transfer for Mitigation projects are excluded

With regards to project eligibility, the SCCF only finances activities, programs and measures that are related to climate change and complementary to the resources allocated by the GEF within its climate change working area. Furthermore, the project or program must be country-driven, cost-effective and aligned with national poverty reduction and sustainable development strategies, as well as the country’s national communication or NAPAs (National Adaptation Programs of Action). Therefore, there is no specific restriction on the project size but it must focus on the “additional costs” caused by climate change in addition to basic development needs. The project application and project cycle for the SCCF are similar to that of the GEF Trust Fund²⁸ but some key distinctions on project characteristics can be noted, as illustrated in Table above Key distinctions between GEF Trust Fund and SCCF.

As of 7-Sept 2021, the total SCCF fund balance was about USD 58 million.

²⁷ Source spécifiée non valide

²⁸ For more details about the SCCF project cycle:

http://adaptasiapacific.org/sites/default/files/documents/SCCF_access_guide.pdf

c. *The Climate Investment Fund (CIF)*

The CIF was established in 2008 by the World Bank to enable developing and middle-income countries to urgently address the impacts of climate change and achieve their Sustainable Development Goals (**SDGs**). It is implemented by five Development Banks including the Inter-American Development Bank and the World Bank and is funded by a group of fourteen donors for a total of USD 8.5 billion as of November 2021. Furthermore, this pledge is expected to attract an additional USD 58 billion in co-financing for over 300 projects in 72 countries. The CIF has been investing in the private sector since 2009. Indeed, USD 2.3 billion have been allocated to private sector projects. Of all the other funds, the CIF has funded the most private sector projects in clean technology, climate resilience, sustainable forestry, and energy access programs in CIF countries²⁹.

The CIF provides technical advice to the private sector as well as various financial instruments such as equity, loans, guarantees, and local currency hedging to enable the private sector to engage more quickly and on a larger scale in the energy transition. The Fund helps to reduce the barriers to investment faced by businesses and reduce the risk associated with new low-carbon projects. These investments worldwide are expected to leverage over USD 18 billion in private sector co-financing³⁰.

CIF funds dedicated to the private sector are allocated through two different groups of programs, namely the Dedicated Private Sector programs and the Private Sector Set-Asides program. Development projects are listed in national or regional investment plans.

The Dedicated Private Sector Programs: (DPSD)

Created in 2013, these programs are funding windows of the CIF and aim to finance large-scale, high impact private sector projects in clean technologies, including “geothermal power, mini-grids, energy efficiency, and solar PV”.³¹ Their objective is to provide companies with risk-appropriate capital. These programs are used as a platform for the CIF and Multilateral Development Banks (MDBs) to work together and identify investment opportunities that could be deployed efficiently, quickly and

²⁹ PRIVATE SECTOR | Climate Investment Funds

³⁰ PRIVATE SECTOR | Climate Investment Funds

³¹ Dedicated Private Sector Programs | Climate Investment Funds

in large quantities in CIF target countries. These programs support 22 projects representing more than USD 420 million in investment. They include for instance utility-scale solar energy in Honduras, energy efficiency in Mexico as well as geothermal in Turkey³².

Private Sector Set-Asides (PSSAs)

The Private Sector Set-Asides assign concessional financing to private sector projects dedicated to forestry, climate resilience and to renewable energy with the objective of providing energy access in low-income countries. PSSAs aim to promote innovation and to allow flexible delivery of financing. The allocations provided amount to USD 106 million divided across 13 projects, including for instance a climate-smart hydropower plant in Tajikistan and water-efficient housing in Jamaica³³.

To be eligible for PSSAs, the project must be active in countries with an approved investment plan and must be implemented by private sector clients working through the private sector arms of the MDBs or by public sector entities working through the MDB public sector arms (so as to achieve, indirectly, an increase in private sector investment)³⁴.

Although Vietnamese private sector actors have not benefited from the DPSD and PSSA programs yet, the GVN has received almost USD 135 million from the CIF, more precisely from the Clean Technology Fund. It included USD 50 million for the “Ha Noi Sustainable Urban Transport Program - Project 1: Ha Noi Metro System Line 3 project”, USD 48.95 million for the same Transport Program – Project 2, and USD 30 million for the “Distribution Efficiency Project”.

d. The Green Climate Fund (GCF)

The GCF is a financial mechanism of the UNFCCC established at the COP-16 in Mexico in 2010³⁵ to support developing countries in their response to the negative impacts of climate change. The GCF emphasizes a balanced portfolio by ensuring an equal

³² Ibid.

³³ Ibid.

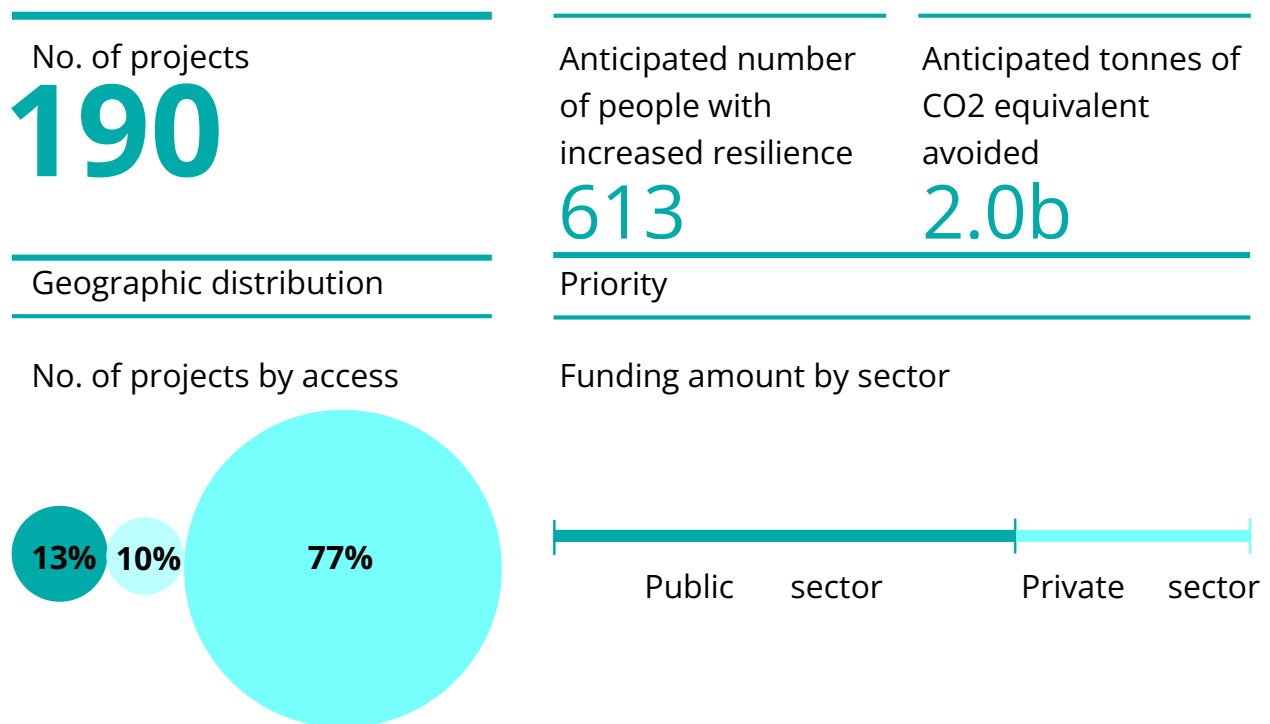
³⁴ https://www.climateinvestmentfunds.org/sites/cif_enc/files/meeting-documents/ctf-scf-13_inf_5_rev_1_a_review_of_the_private_sector_set_aside_scf_nocrossref_12_16_2014_0.pdf

³⁵ <http://www.greenclimate.fund/who-we-are/about-the-fund>

split between mitigation and adaptation investments and by allocating 50% of adaptation investments to the most vulnerable countries which are the LDCs, the SIDS and African states³⁶. The GCF has two strategic pillars: promoting the paradigm shift towards low-emission and climate-resilient development pathways and supporting the implementation of the Paris Agreement through climate finance.

The GCF seeks to engage public and private sectors in high-impact climate investments. Since the approval of the first project funding in 2015, GCF has made rapid progress in building a portfolio of over 100 projects with the public sector and 35 with the private sector, which represents a total funding of USD 3 billion.

Figure 14. GCF Portfolio Dashboard as of GCF³⁷



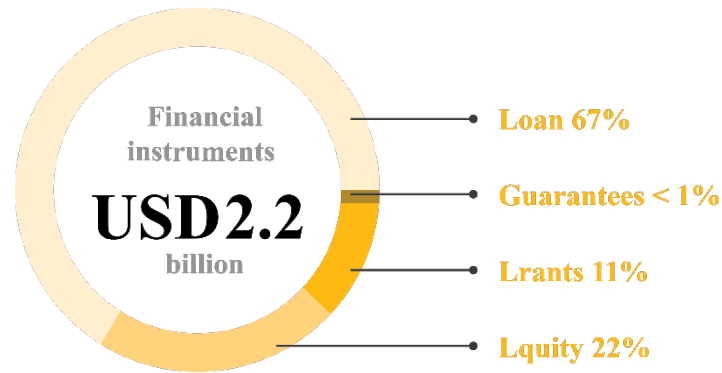
The Fund provides different flexible financial instruments that allow to respond to specific financial contexts and overcome conventional market barriers. The Fund acts to reduce financial risks by directing and securing private sector financial flows into low-emission and climate-resilient investments. To this end, the GCF has created the Private Sector Facility (PSF). This division finances and mobilizes the different types

³⁶ <http://www.greenclimate.fund/who-we-are/about-the-fund>

³⁷ Portfolio dashboard | Green Climate Fund

of private sector actors such as project sponsors, institutional investors, and financial institutions.

Figure 15. The Private Sector Project Map, 2019³⁸



The PSF supports and promotes private sector investment through a number of concessional instruments. These include for instance “low-interest and long-tenor project loans, lines of credit to banks and other financial institutions, equity investments and risk mitigators, such as guarantees, first-loss protection, and grant-based capacity-building programs”³⁹. To sort out these instruments, the PSF has defined different practices:

- **Financial Institutions:** enabling climate change considerations to be mainstreamed into the financial system.
- **Project Finance:** concessional finance to de-risk infrastructure projects targeting climate change.
- **Climate Funds:** sorting anchor investments into dedicated climate funds (equity/debt).
- **Structured Finance:** developing capital/carbon markets requiring tailored structuring solutions.
- **Climate Innovations:** scaling investments into high-impact climate innovations and technologies.

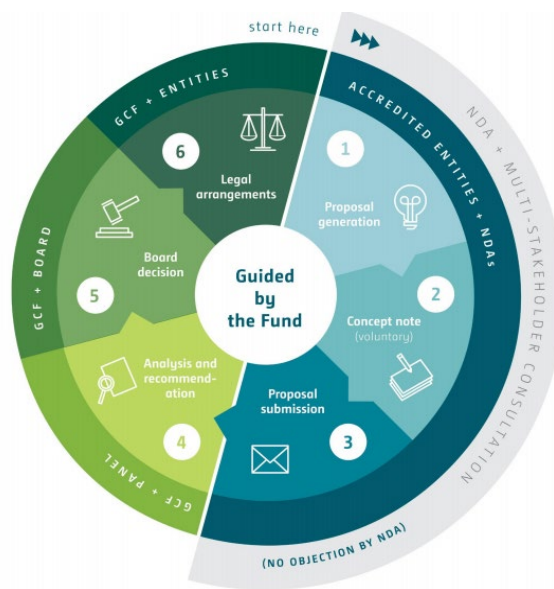
³⁸ Green Climate Fund's Private Sector Facility

³⁹ <https://www.greenclimate.fund/sectors/private>

The application for funding is made through a phased process. A concept note is first developed which allows accredited entities (AEs) to ask the GCF Secretariat whether their proposal matches the objectives and mandate of the Fund. The second phase is the submission of the funding proposal to the GCF by the AE. An AE can submit a financial proposal to the GCF Board in response to a call for proposal or on its own initiative. The consultation of the proposal then follows a six steps process, detailed in the Figure 17 GCF Proposal Approval 3 below⁴⁰. An AE carrying the project must specify the following elements:

- Financial adequacy and appropriateness of concessionally: each project must demonstrate that the proposed financial structure (amount of funding, financial instrument, tenor and duration) is adequate and reasonable, and that the structure provides appropriate concessionally.
- Amount of co-financing: the co-financing ratio (total amount of the GCF investment as a percentage of the project) must be indicated and detailed.
- Financial sustainability and other financial indicators: each project should also specify the economic rate of return (with and without project) and the financial rate of return (with and without GCF support).

Figure 16. GCF Proposal Approval⁴¹



⁴⁰ For more details about the approval process: <http://www.greenclimate.fund/how-we-work/funding-projects>

⁴¹ <http://www.greenclimate.fund/-/elements-01>

Viet Nam has enjoyed a preferential accreditation with the GCF since July 2021. Indeed, the Viet Nam Development Bank is registered as a Direct access Accredited Entity. This AED status allows for a better access to funding compared to that of AE.

Although private sector actors from Viet Nam have never received GCF financing, the GVN has already benefited from the GCF for two projects. Firstly, a mitigation project was launched in 2018: “Scaling Up Energy Efficiency for Industrial Enterprises in Viet Nam”. The GFC financed 17.4% of the project, which amounted to USD 11.3 million in grants and USD 75 million in guarantee⁴². Secondly, the project “Strengthening the resilience of smallholder agriculture to climate change-induced water insecurity in the Central Highlands and South-Central Coast regions of Viet Nam” was launched in 2020. The total project was USD 156.3 million including USD 30 million in grants of GCF funding and USD 126 million from co-financing partners⁴³.

e. Asian Development Bank (ADB)⁴⁴

The Asian Development Bank is a regional development bank which aims to support the socio-economic development of Asia. Established in 1966, the bank now counts 68 members, 49 of whom are from Asia and the Pacific. ADB, backed by its AAA credit rating, focuses on projects that help promote private investments that will have significant development impact and will lead to accelerated, sustainable, and inclusive growth. ADB provides non-sovereign operations to eligible private-sector recipients in developing member countries, including the provision of loans, guarantees, equity investments or other financing arrangements. Recipients may be private state-owned sub-sovereign entities with or without government guarantee.

In 2020, the total outstanding balances and commitments of non-sovereign transactions funded by the ADB’s own resource amounted to USD 14.3 billion. Moreover, ADB offers to mobilize co-financing from commercial and concessional sources. In 2020, ADB mobilized USD 1.9 billion of long-term project co-financing and USD 3.3 billion of co-financing through its Trade and Supply Chain Finance Program and Microfinance Program. ADB’s Trade and Supply Chain Finance Program and Microfinance Program offers guarantees and loans to banks in order to support trade.

⁴² <https://www.greenclimate.fund/project/fp071>

⁴³ <https://www.greenclimate.fund/project/fp125>

⁴⁴ <https://www.adb.org/>

In addition to financial products, ADB also provides technical assistance (TA) for public and private entities on a selective basis. This assistance can be composed of Transaction TA (TRTA) aiming to directly benefit a project or develop public-private partnership. TA also includes Knowledge and Support TA (KSTA) including all TAs other than TRTA, such as policy advice, research development and general institutional capacity building.

For private funding, ADB has five core sectors:

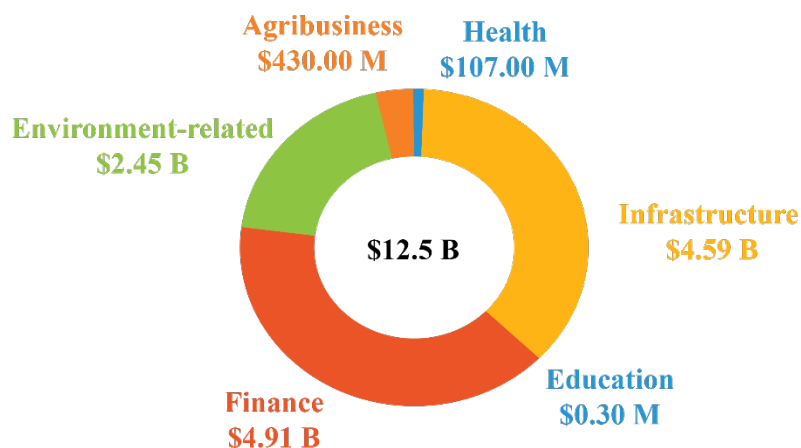
- Infrastructure sector
- Financial sector and capital market
- Agribusiness sector
- Health and education
- Business development

The following figure highlights the amount given to each sector:

Figure 17. ADB's Private Sector Operations Portfolio, by Sector⁴⁵

Private Sector Operations Portfolio, by Sector

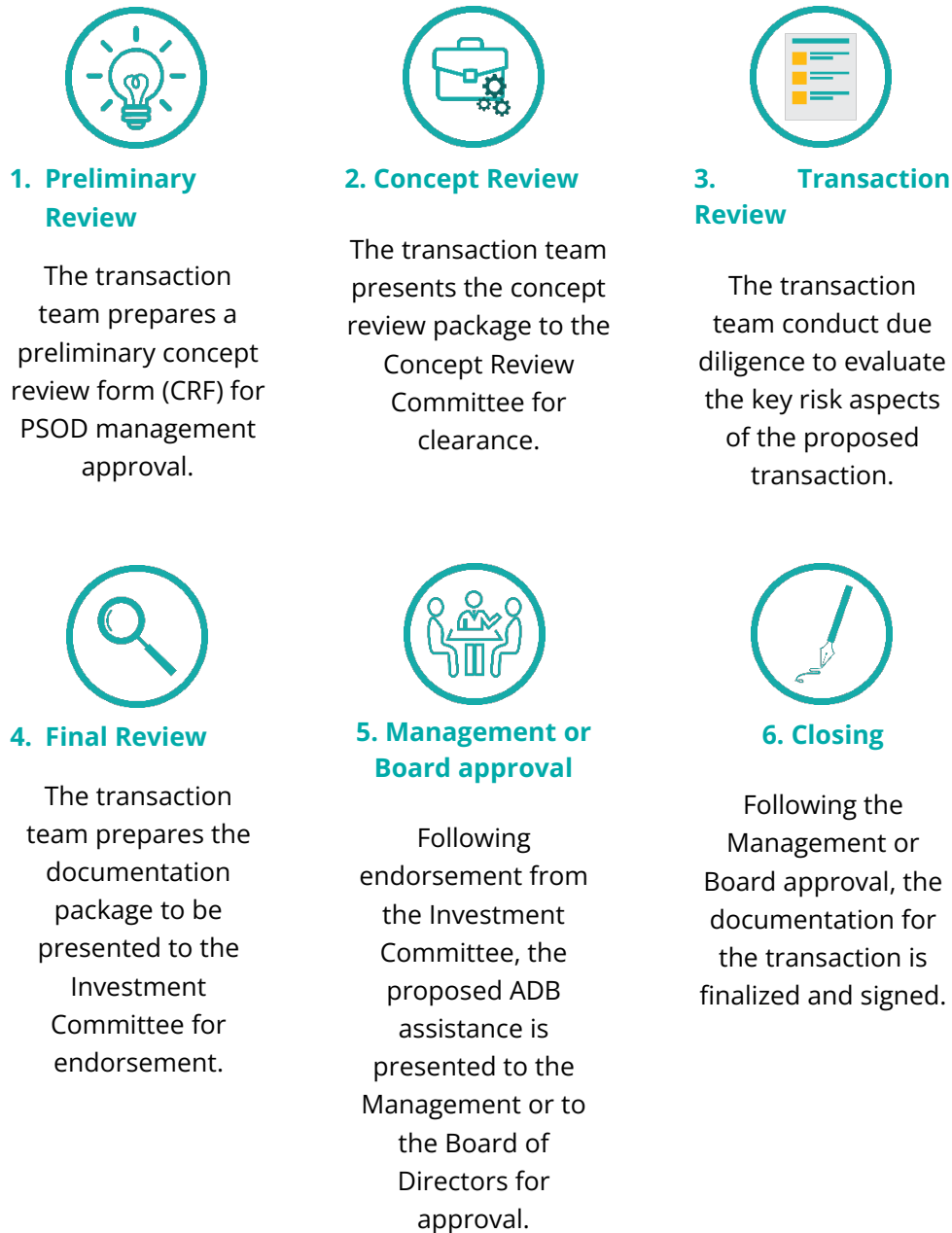
As of 31 December 2018



⁴⁵ <https://www.adb.org/what-we-do/private-sector-financing/projects>

The ADB project cycle is composed of the six following steps:

Figure 18. ADB's Project Cycle⁴⁶



⁴⁶ <https://www.adb.org/what-we-do/private-sector-financing/project-approval-process>

To support a private project, ADB does not provide a standardized form. However, the following information are typically required to obtain funding:

1. Executive summary
2. Project description
3. Feasibility study
4. Background on sponsor(s)
5. Project ownership structure
6. Project's implementation arrangements
7. Project operations
8. The market
9. Environmental and social aspects
10. Cost estimates
11. Financing plan
12. Financial model
13. Risk analysis
14. Permits and licenses

Regarding private sector development, ADB is very active in Viet Nam. In 2020, commitments from ADB's own funds amounted to USD 75.2 million. ADB provided support to a private equity fund, a water treatment expansion project, a pharmaceutical project and two renewable energy projects. The total balances and commitments of ADB's non-sovereign transactions in the country as at 31 December 2020 stood at USD 1 billion, or 7% of ADB's total non-sovereign portfolio.

f. Asian Infrastructure Investment Bank (AIIB)⁴⁷

Created in 2016, the Asian Infrastructure Investment Bank (AIIB) is a multilateral development bank focused on economic and social development in Asia. The bank is composed of 87 members including Viet Nam and 16 prospective members. The AIIB offers financing and equity investments, backed or not by sovereign states.

AIIB offers financial support to private enterprises or sub-sovereign entities such as political or administrative subdivisions of a public sector entity. To obtain financing, entities must operate in the territory of a member, be compliant with the environmental and social standards of both AIIB and the host country. The project must also demonstrate potential economic benefits. AIIB usually responds to a project financing application within 30 working days.

AIIB finances, but is not limited to, six strategic priority sectors:

- Sustainable Energy for Asia Strategy.
- Strategy for Mobilizing Private Capital for Infrastructure.
- Strategy on Financing Operations in Non-regional Members.
- Strategy on Investing in Equity.
- Transport Sector Strategy.
- Sustainable Cities Strategy.

Viet Nam's private sector has already received financing from the AIIB. Indeed, in 2020, the bank approved the project "VP Bank COVID-19 Response Facility" for a total non-sovereign funding of USD 100 million.

g. International Finance Corporation (IFC)⁴⁸

Founded in 1956, the International Finance Corporation is the largest global development institution focused on the private sector and operates in more than 100 countries. IFC provides investment, advice, and asset management services and received credit ratings of AAA. IFC provides multiple financial instruments such as

⁴⁷ <https://www.aiib.org/en/index.html>

⁴⁸ https://www.ifc.org/wps/wcm/connect/corp_ext_content/ifc_external_corporate_site/home

loans, equity and blended finance. In 2011, the IFC made USD 600 million in grants to IDA countries which include Viet Nam. In 2018, long term investment in the East-Asia and Pacific region reached USD 3.4 billion including USD 1.4 billion in funds from co-financing investors. Priorities areas in this region are: increasing opportunities for women, financial inclusion, reducing carbon footprint and global integration.

To be eligible for IFC funding, a project must meet a number of criteria. The project must:

- Be located in a developing country that is a member of IFC;
- Emanate from the private sector;
- Be technically sound;
- Have good prospects of being profitable;
- Benefit the local economy; and
- Be environmentally and socially sound, satisfying the IFC's environmental and social standards as well as those of the host country

Then, IFC identifies suitable projects and conducts an early review, a project appraisal and an investment review before starting the negotiations.

- h. IFC operates in Vietnam mainly through the Vietnam's Improvement Program (VIP) which was created in 2015 and aim to provide funding to enterprises to develop factory projects. 28 enterprises were selected to receive support in order to improve their resource efficiency and reduce operating costs⁴⁹. **Japan International Cooperation Agency (JICA)**

The Japan International Cooperation Agency is a governmental agency that provides Official Development Assistance for the government of Japan. JICA supports private sector and focuses on the following fields:

1. Developing policies and institutions for improving the business environment;
2. Promoting trade and investment;

⁴⁹ <https://pressroom.ifc.org/all/pages/PressDetail.aspx?ID=17452>

3. Improving the competitiveness of local companies; and
4. Promoting local economies and industries.

JICA offers various cooperation schemes including technical cooperation which is practical assistance to developing countries, ODA grants and ODA loans. To strengthen the development of the private sector, JICA implemented the Private-Sector Investment Finance (PSIF) which aims to provide loans and equity to private enterprises around the world with high development outcomes.

In 2002, JICA introduced a Partnership Program in Viet Nam to support the implementation of projects formulated by Japanese NGOs, Japanese local governments, and Japanese universities to utilize their accumulated knowledge and experience in assistance activities for developing countries.

Since 2002, JICA has implemented 123 projects in Viet Nam. As of May 2021, JICA supports 61 projects in Viet Nam including 28 projects by providing technical cooperation, 28 projects by offering loans and 5 projects by giving grant aid⁵⁰. In the country, JICA has three priority areas:

1. Economic growth and strengthening international competitiveness
2. Response to fragility
3. Good governance

JICA has already supported the Vietnamese private sector through multiple projects including the Policy advisor on SME development, the Reinforcement of the SME Technical Assistance Centre (TAC) and the Project for Strengthening Public Functions for Supporting Small and Medium Enterprises.⁵¹

i. Deutsche Investitions und Entwicklungsgesellschaft (DEG)⁵²

Formed in 1948, KfW is a German state-owned investment and development bank, based in Frankfurt. The headquarters are in Frankfurt, and they have two branches in Berlin and Bonn. It is the world's largest development bank. It is represented at

⁵⁰ https://www.jica.go.jp/Viet_Nam/english/activities/c8h0vm0000anjq56-att/ongoing_en.pdf

⁵¹ https://www.jica.go.jp/Viet_Nam/english/office/others/c8h0vm0000cydg8v-att/sector_01_03_en.pdf

⁵² <https://www.deginvest.de/International-financing/DEG/>

around 80 locations worldwide. It aims to improve economic, social and environmental living conditions. The bank offers bonds, equity investments and loans. In 2020, the bank provided a total of EUR 135.3 billion.

The branch providing private sector funding operating in developing markets is the Deutsche Investitions und Entwicklungsgesellschaft (DEG). DEG is one of the major development finance institutions for private companies, it provides financing to:

- Companies from the industry, agriculture and services sector;
- Private infrastructure companies in the energy, transport, utilities and telecommunications sectors;
- Financial institutions and private equity funds that provide reliable access to debt and equity financing, particularly to small and medium-sized enterprises on the ground.

DEG currently finances 700 companies around the world with approximately EUR 8.5 billion. They help the private sector to open up new markets, develop and compete successfully. In Viet Nam, DEG has financed the following 9 projects for a total of USD 168.3:

- USD 10 million long term senior secured loan for Anova Feed Joint Stock Company to strengthen the balance sheet structure.
- USD 30 million to the Ho Chi Minh City Development Joint Stock Commercial Bank to grow the bank and expand financing to SME customers.
- USD 30 million for the Viet Nam Prosperity Joint Stock Commercial Bank used for eligible climate-related projects.
- USD 25 million to Thanh Enova Cong Bien Hoa Joint Stock Company to re-finance the Company's short-term loans.
- USD 8.3 million to Tam Tri Medical JSC (TTMed) to support the expansion of the company.
- USD 20 million for the An Binh Commercial Joint Stock Bank (ABBANK) for on-lending to Vietnamese SME.

- USD 15 million to Kinh Bac Office and Factory Business one Member Company Limited to indirectly support Viet Nam attracting foreign direct investments.
- USD 10 million to FEM to expand business operations and increase the medical service reach.
- USD 20 million for Anova Feed Joint Stock Company to support the construction of two new production facilities.

j. World Bank⁵³

The World Bank (World Bank) was founded in 1944 and is one of the world's largest development banks. With 189 member countries and offices in more than 130 locations, the WBG works in partnership with governments, the private sector, CSOs, regional development banks and other international institutions to reduce poverty and promote sustainable development. By 2030, the Group has set two global objectives: End extreme poverty by decreasing the percentage of people living on less than D1.90 a day to no more than 3% and promote shared prosperity by fostering the income growth of the bottom 40% for every country⁵⁴. To do so, the WBG provides financial, institutional and technical support with low interest loans and credits and also grants to developing countries. In 2015, the Group made 302 commitments for a total of USD 60 billion.

The World Bank is composed of five institutions:

- The International Bank for Reconstruction and Development (IBRD);
- The International Development Association (IDA);
- The International Finance Corporation (IFC);
- The Multilateral Investment Guarantee Agency (MIGA) and
- The International Centre for Settlement of Investment Disputes (ICSID).

IBRD and IDA form what is commonly referred as the World Bank and provide financing, institutional and technical assistance to governments; while IBRD mainly

⁵³ (<http://www.worldbank.org/>)

⁵⁴ (<http://www.worldbank.org/en/about/what-we-do>)

focuses on middle income and solvable poor countries, IDA assists mainly the world's poorest countries. On the other hand, IFC, MIGA and ICSID focus on strengthening the private sector in developing countries.

In terms of private sector development, the World Bank works on four main focus areas:

- Creating markets and matching opportunities
- Building new markets for companies
- Promoting investment opportunities for investors and financial institutions
- Building relationships to advance common goals

As of March 22, 2021, the Bank has provided USD 24.94 billion in grants, credits, and concessional loans to Viet Nam through 209 operations. The current Country Partnership Framework for Viet Nam has four main objectives:

- Enable inclusive growth and private sector participation
- Invest in people and knowledge
- Ensure environmental sustainability and resilience
- Promote good governance

The CPF will introduce a strategic shift in the private sector by creating a comprehensive engagement to strengthen private sector development and participation across sector.⁵⁵

k. *European Investment Bank (EIB)*⁵⁶

The EIB is the European Union (EU)'s lending arm, through its European Investment Fund (EIF) and one of the largest providers of climate finance in the world. Its mission is to play a leading role among financial institutions in supporting the financing needed, both inside and outside the EU, to meet global commitments to limit global warming to 1.5°C. It aims to increase the capacity to adapt to the adverse effects of

⁵⁵ [https://www.worldbank.org/en/country/Viet Nam/overview#2](https://www.worldbank.org/en/country/Viet%20Nam/overview#2)

⁵⁶ <https://www.eib.org/en/>

climate change and enable the EU to become carbon neutral by 2050, through climate finance.

EIB provides loans, equity, guarantees and advisory services to the private sector. EIB loans for the private sector have five key benefits: i) attractive pricing thanks to EIB’s funding conditions, ii) long financing term to match the economic life of each project up to 10 years, iii) customized financing by providing secured or unsecured loans, iv) project support by offering financial and v) technical expertise to prepare the project and signaling effect by attracting additional investors.

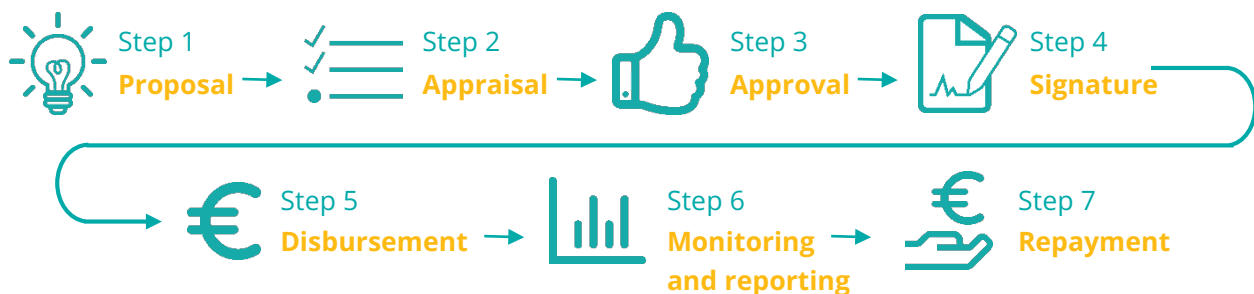
The EIB typically lends up to 50% of a project’s total cost, typically starting at €25 million but in certain cases the EIB will consider lower amounts. EIB offers four financing options:

- Corporate loans
- Growth finance for mid-caps
- Project finance loans
- Corporate hybrid debt

These financial instruments are focused on four main areas: innovation and skills, small businesses, infrastructure, climate and environment.

A project financed by EIB typically goes through seven following major stages:

Figure 19. EIB's Project Cycle⁵⁷



⁵⁷ <https://www.eib.org/en/projects/cycle/index.htm>

EIB has already offered support to the private sector in Viet Nam in the past. Indeed, in 2005, EIB provided a EUR 30 million loan to the Socialist Republic of Viet Nam to support investment by local companies, particularly SME investments undertaken by EU-owned companies, joint ventures or investments in which mutual interest is significant.

Furthermore, to promote investments in Asia, the EIB created the Asia Investment Facility (**AIF**) to mobilize loans and other support for those projects that struggle to raise the required funding on the market. The AIF has five priority sectors:

1. Energy
2. Water
3. Environment
4. Transport
5. Private sector development

Since its creation in 2010, the AIF has financed 39 projects, allocating EUR 241 million in grant resources and mobilizing in total EUR 5.6 billion. Between 2010 and 2018, Viet Nam received 13% of AIF financing for 6 projects representing EUR 31 million. Over the same period, the private sector received 10% of total AIF funding⁵⁸.

I. Proparco⁵⁹

Created in 1977, Proparco is the private sector financing arm of Agence Française de Développement Group (**AFD**), a public establishment that implements France's development and international solidarity policies. Proparco provides funding to business and financial institutions for developing countries. It focuses on four main sectors:

1. Infrastructure, mainly for renewable energies,
2. Agribusiness,

⁵⁸ https://ec.europa.eu/international-partnerships/system/files/ifca-aif-ifp-2017-18_en.pdf

⁵⁹ <https://www.proparco.fr/en>

3. Financial institutions,
4. Health and education

In order to contribute to the achievement of SDGs, Proparco finances companies contributing to creating jobs and providing essential goods and services and combating climate change.

Proparco provides a multi sectoral and geographical expertise and has the capacity to structure complex projects and offers risk management. In addition, the entity has an international network of clients and partners.

As of 2020, Proparco operates in 115 countries and has provided EUR 6.4 billion of financing. In Asia, Proparco financed at total EUR 802 million as of 2016. In 2020, an additional 2 billion of new operations was approved, mainly in loans, including EUR 433 million dedicated to Asia.

Proparco offers a wide range of financial instruments that include:

- Loans
- Equity
- Quasi-equity
- Investment funds
- Guarantees
- Technical assistance
- Delegated funds
- Concessional financing

Proparco has financed the following six private sector projects in Viet Nam⁶⁰:

1. In 2015, EUR 13 million to Quadria Capital Fund to develop the hospital and pharmaceutical sectors in South and Southeast Asia.

⁶⁰ <https://www.proparco.fr/en/page-region-pays/asia>

2. In 2017, EUR 15 million to Manuchar to develop logistics and manufacturing infrastructures in Brazil and Viet Nam.
3. In 2019, EUR 18 million to Quadria Capital Fund II to develop the hospital and pharmaceutical sectors in South and Southeast Asia.
4. In 2020, USD 15 million in the Mekong Enterprise Fund IV, Proparco to support SMEs and midcap companies operating in the health, education and financial inclusion sectors.
5. In 2020, USD 50 million to VPBank in order to finance green and energy efficiency projects and supporting SMEs.
6. In 2020, EUR 4.3 million to help ETG, an agricultural company operating mainly in Africa and Asia to optimize its financing structure by increasing short-term credit lines.

Proparco also operates via investment funds in order to fund the private sector. Investment funds allow Proparco to finance actors that they could not directly support such as microenterprises, SMEs and start-ups. One of investment fund's added value is to offer business support to companies in their portfolio such as providing strategic advice, environmental and social policy and a network of financial partner.

m. GIZ (Gesellschaft für Internationale Zusammenarbeit)⁶¹

GIZ is the German development agency which provides services in the field of international cooperation for sustainable development and international education work. It has been particularly involved in projects supporting the implementation of the Paris Agreement and related NDCs, throughout the world. In 2019, GIZ generated a business volume of around EUR 3.1 billion.

The priority areas of GIZ's work are:

- Vocational training
- Energy and climate

⁶¹ <https://www.giz.de/en/html/index.html>

- Health care
- Infrastructure / construction
- Water
- Good governance

GIZ supports the private sector by strengthening micro and small enterprises, promotes business relations and assists firms in the developing countries in complying with social and environmental standards. GIZ has a strong network of partners in more than 130 countries and can provide partnership opportunities and facilitate knowledge transfer to obtain funding. Moreover, from planning to evaluation of a project, GIZ assumes responsibility for project management. GIZ offers tailor-made solutions to the private sector that include:

- Corporate sustainability and responsibility
- Sustainable supply chains
- Market access
- Product development
- Capacity development
- Sectoral transformation

To improve dialogue between the private sector and international cooperation organizations and agencies, GIZ created the Private Sector Advisory Board.

GIZ has been working for more than 20 years in Viet Nam. It currently supports 51 projects in the country for a total of EUR 163.8 million⁶². Since the beginning of its operation in Viet Nam, GIZ supported a total of 242 projects in Viet Nam, one of which supports the private sector and is going-on. It is the “Strengthening regional small and medium enterprises (SME) support structures in the ASEAN region”, was created in 2018 and is supposed to be completed in 2022. It aims to develop SME promotion

⁶² <https://www.giz.de/projektdaten/region/2/countries/VN>

services within the framework of the ASEAN Economic Community. The total financial commitment is EUR 3.84 million.

n. OPEC Fund for International Development (OFID)

Established in 1976, OFID is a multilateral development finance institution composed of 12 Member Countries and 125 Partners Countries including Viet Nam. It finances projects that meet essential needs, such as food, energy, infrastructure, employment (particularly relating to MSMEs), clean water and sanitation, healthcare and education. The fund provides both private and public sector lending and subsidies.

For the private sector, beneficiary activities promote economic development through financing the establishment and/or growth of productive private enterprise and encouraging the development of local capital markets. OFID provides loans to companies for projects with developmental aims that are well defined, such as to improve industrial capacity and utilities, and strengthen infrastructure; direct equity investments or investments in private equity fund structures targeting the OPEC Fund's sectors of interest. Applications for OFID private sector financing must include project description and objective; outline of general market environment, the sectors concerned and future prospects; introduction to the organizational, ownership and managerial structures of the proposed project; background information on the economic environment and regulatory environment within which the proposed project will operate; and financial information on the proposed project, including level, type and justification of funding required.

OFID also offers grants. Under its grant program, OFID offers three types of grants:

- Grants for country-specific activities and projects;
- Grants for special development initiatives of global or regional scope; and
- Emergency aid grants in support of humanitarian relief operations.

The amount of OFID contributions varies according to the scope and the nature of the proposed grant activity or project. Eligible entities include government or non-government bodies, co-financing partners, private sector entities, research institutes, and international NGOs. However, and with the exception of emergency aid and small grants in amounts of up to USD100 000, OFID's contribution to a stand-alone project does not exceed 50% of the total costs of the project. Member Countries are

eligible for OFID's grant assistance. Partners that have been recently awarded an OPEC Fund grant for a project in the same country, which is still ongoing, should await its satisfactory completion before submitting a new grant application.

As of Mid-2021, OFID has provided USD 284.87 million to Viet Nam by supporting a total of 36 projects, mainly for transportation and agriculture. Currently, OFID has not yet supported the private sector in Viet Nam. However, OFID has supported the private sector in other Asian countries such as the project "Loan to Support MSMEs in Cambodia" for USD 20 million and the "Baynouna Solar Energy PSC in Jordan" for USD 17 million.

o. Leading Asia's Private Infrastructure Fund (LEAP)⁶³

Created in 2016, the LEAP is an infrastructure co-financing fund expected to leverage and complement ADB's existing non-sovereign platform to fill financing gaps and increase access to finance for infrastructure projects in the region. Japan International Cooperation Agency (JICA) has contributed USD 1.5 billion in equity and ADB is in charge to deploy and administer the fund.

The aim is to provide funding for non-sovereign projects at different stages of development. Projects must demonstrate a strong development impact and be aligned with both ADB's and JICA's principles. It also supports public private partnership (PPP), joint venture, private finance initiative projects, privatizations as well as traditional project finance. The fund provides loans, equity investments and mezzanine finance transactions.

To be eligible, projects must be located in an ADB developing member country and be eligible for JICA assistance. Typical project types include the following infrastructure subsectors:

- Energy
- Water and other urban infrastructure and services
- Transport
- Information and communication technology

⁶³ <https://www.adb.org/what-we-do/funds/leap>

- Health

LEAP has financed numerous projects in Asia including the below six projects in Viet Nam for a total of USD 84.14 million⁶⁴:

1. In 2018, USD 4.4 million for the Floating Solar Energy Project of the Da Mi Hydro Power Joint Stock Company.
2. In 2019, USD 10 million for the Tertiary Education Project implemented by Phinma Education Holdings.
3. In 2019, USD 7.6 million for the Gulf Solar Power Project developed by Gulf Energy Development Public Company Limited, TTC Energy Development Investment Joint Stock Company and Thanh Thanh Cong Group.
4. In 2019, USD 45 million for the Eastern Economic Corridor Independent Power Project developed by Gulf PD Company Limited
5. In 2020, USD 9.14 million for the B.Grimm Viet Nam Solar Power Project (Phu Yen Project) of the Phu Yen TTP Joint Stock Company.
6. In 2021, USD 8 million for the B.Grimm Viet Nam Solar Power Project (Dau Tieng Project) implemented by Dau Tieng Tay Ninh Energy Joint Stock Company.

p. China-ASEAN Investment Cooperation Fund (CAF)

Created in 2009, the CAF is a quasi-sovereign ~USD 1 billion equity fund sponsored by the Export-Import Bank of China and other institutional investors. The typical investment size is between USD 50 to 150 million with a preference for minority stake investments.

It targets sustainable equity-linked investments in ASEAN countries (including Vietnam) with a mandate to support commercially-viable infrastructure projects mainly in the following sectors:

⁶⁴ <https://www.adb.org/projects/country/vie?terms=Leading+Asia%27s+Private+Infrastructure+Fund>

Infrastructure:

- Toll Road
- Rail
- Container Port
- Airport
- Telecom
- Water / Wastewater
- Oil & Gas Pipeline
- Social Infrastructure

Energy/Power:

- Conventional
- Renewables

Natural Resources:

- Industrial metals: Ferrous and Non-Ferrous Metals
- Precious metals: Gold, Palladium, Platinum and Silver
- Plantation-related: palm oil, pulp and rubber