

VALUE-BASED INTERMEDIATION FINANCING AND INVESTMENT IMPACT ASSESSMENT FRAMEWORK (VBIAF) SECTORAL GUIDE: ENERGY EFFICIENCY

31 March 2021



Acknowledgments

This document is a collaborative effort by the Value-based Intermediation Community of Practitioners, regulators and relevant stakeholders.

Project Team:

Project manager	Norlymalis Jazzuir Kamarudin, Bank Muamalat Malaysia Berhad (BMMB)
Secretariat	Nurul Khairunissa Esman, Bank Negara Malaysia (BNM) Shahira Zaireen Johan Arief Jothi, BNM
Technical experts	Zulkiflee Umar, Energy Commission (EC) Kumareshan Mardappan, EC Norhasliza Mohd Mokhtar, Malaysian Green Technology and Climate Change Centre (MGTC) Nik Mohd Haikal Mohamad Shafie, MGTC Muhd Muhtazam Noordin, MGTC Anders Nordheim, World Wide Fund for Nature (WWF) Singapore Charmaine Chee, (formerly of) WWF Malaysia Wei Zhang, The World Bank Group
Sub-working group members	Idora Baharudin, BMMB Rohaiza Kaharuddin, BMMB Michelle Yong Chooi Chooi, CIMB Bank Berhad Noor Mohamed Amin Mohamed, CIMB Islamic Bank Berhad Haizal Hafiz b Hashim, Public Islamic Bank Berhad (PIBB) Amir Zulhaqem bin Zakaria, PIBB Roshan Jaffar, RHB Islamic Bank Berhad (RHB Islamic) Ahmad Nazri Ismail, RHB Islamic
Observers	Association of Islamic Banking and Financial Institutions Malaysia (AIBIM)

DISCLAIMER

This document only serves as a guidance to the user. Any views, findings, interpretations, conclusions or information provided in this document are a result of the collaboration between the institutions identified above and hence, do not necessarily represent the official policy of said institutions unless otherwise stated, nor do references to or citing of trade names or commercial processes, constitute endorsement, recommendation or preference by the said institutions.

CONTENTS

A. INTRODUCTION	6
B. DEFINITIONS AND SCOPE	10
C. COMMERCIAL PROPOSITIONS	13
D. IMPACT-BASED RISK MANAGEMENT	16
E. APPENDICES.....	37
F. ESSENTIAL READINGS	47

List of acronyms and abbreviations

ASEAN	Association of Southeast Asian Nations
BEI	Building Energy Intensity
BNM	Bank Negara Malaysia
CCPT	Climate Change and Principle-based Taxonomy
CO ₂	Carbon Dioxide
CO _{2e}	Carbon Dioxide equivalent
CVA	Completion Verification Assessment
EC	Suruhanjaya Tenaga (<i>Energy Commission</i>)
ECOS	Energy Commission Online System
EE	Energy Efficiency
EECA	Energy Efficiency and Conservation Act (<i>proposed</i>)
EEFIG	Energy Efficiency Financial Institutions Group
EEV	Energy Efficient Vehicle
EMEER	Efficient Management of Electrical Energy Regulation 2008
EPC	Energy Performance Contracting
ESCO	Energy Service Company
ESG	Environmental, Social and Governance
EV	Electric Vehicle
FIs	Financial institutions
GBI	Green Building Index
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GTFS	Green Technology Financing Scheme
GTMPM	Green Technology Master Plan Malaysia (2017 – 2030)
GWh	Gigawatt hours
IEA	International Energy Agency
ktCO _{2e}	Kilotonne carbon dioxide equivalent
kWh/ m ² / yr	Kilowatt per hour per meter square per year
M&V	Measurement and verification
MEPS	Minimum Energy Performance Standards
Mt	Million Tonnes
NC3BUR2	Malaysia 3 rd National Communication and 2 nd Biennial Update Report to UNFCCC
NEEAP	National Energy Efficiency Action Plan (2016 – 2025)
O&M	Operations and maintenance
PHEV	Plug-in Hybrid Electric Vehicles
RE	Renewable Energy
REEM	Registered Electrical Energy Manager
SEDA	Sustainable Energy Development Authority Malaysia
SME	Small and Medium Sized Enterprise
UNFCCC	United Nations Framework Convention on Climate Change
VBIAF	Value-based intermediation Financing and Investment Impact Assessment Framework – Guidance Document

Foreword

Chairman of VBIAF Sectoral Guide Working Group

In an increasingly interconnected and sophisticated world, and combined with rising expectations for enhanced corporate governance and transparency, the myriad of environmental and societal issues plaguing the world manifest the profound need for corporations and financial institutions to actively manage risks and opportunities related to emerging environmental and social trends. Amongst others, floods, climate change risks, pollution, waste management, water scarcity, deforestation, loss of biodiversity, wealth disparity, lack of access to finance, occupational safety and health deficiencies, poverty and labour abuse are calling for corporations and financial institutions to serve not only an economic, but an environment and social purpose.

The notion that the fiduciary duty of corporations and financial institutions is limited to the maximisation of shareholder value, gives rise to reluctance to integrate environmental, social and corporate governance (“ESG”) considerations in decision-making processes. But the tide has shifted as evidence has grown that ESG issues have financial implications, and could ultimately contribute to more stable economies, which is in the interest of all market players.

To financial institutions, it is abundantly clear that ESG challenges could lead to the customers’ inability to meet their financial obligations to the financial institutions or depreciation of the customers’ collateral. The success of financial institutions and their ability to remain profitable and relevant is intrinsically dependent on the long-term prosperity of the planet and societies which they serve.

Today, we are facing a global health crisis unlike any, with the COVID-19 attacking societies at their core. This unprecedented situation in recent history presents a new set of challenges with far-reaching ramifications for financial institutions. The current COVID-19 pandemic is a painful reminder that financial institutions are exposed to financial risks stemming from potential disruption to the global supply chain and customers’ operations. And unless financial institutions behave responsibly and participate in the efforts to alleviate the devastating impact to societies, financial institutions themselves could perish from this major health and economic crisis.

Islamic financial institutions stand in good stead to contribute towards a vibrant economy, which is underpinned by a healthy civil society and a sustainable planet. The inherent principles of fairness and social responsibility which are intrinsically linked to being Shariah compliant, are poised to support financial stability, sustainable ecosystem, efficient use of resources and innovation to create new market opportunities. Islamic financial institutions are able to better manage environmental and social impacts in a way that contributes to the sustainable development of the global society, which resonates with the increase in society’s consciousness and thus presents an enormous opportunity for Islamic finance.

Recognising the need to come to the fore, a number of Islamic banks in Malaysia under the auspices of Bank Negara Malaysia (“BNM”) are committed to promote the concept of Value-based Intermediation (“VBI”), which aims to deliver the intended outcomes of Shariah through practices, conduct and offerings that generate positive and sustainable impact to the environment, community, and economy, consistent with the shareholders’ sustainable returns and long-term interests. VBI promotes a more holistic observation of Shariah by ensuring that Islamic banking offerings and practices not only comply with Shariah requirements but also

achieve the intended outcomes of Shariah. More business opportunities could be created if the current paradigm could be shifted to extend beyond compliance, towards delivering value propositions not only to consumers, but to the wider stakeholders within the society and the economy at large. Together with BNM, these Islamic banks have formed the VBI Community of Practitioners (“COP”) to pool their resources and expertise to codify VBI via inter alia the VBI Strategy Paper, Implementation Guide for VBI, VBI Scorecard and VBI Financing and Investment Impact Assessment Framework (“VBIAF”) – Guidance Document.

To support the implementation of the VBIAF, the COP has established the VBIAF Sectoral Guide Working Group to develop sectoral guides on selected sectors and activities. The Sectoral Guides would facilitate financial institutions to implement an ESG impact-based risk assessment framework, by recommending key impact-based risk factors of the sector or activity which can typically generate significant risks if not well managed, but could present opportunities if the risks are proactively addressed. They also provide examples of measurement metrics across the entire risk impact-based assessment process.

Energy efficiency was selected to be in the first cohort of the VBIAF Sectoral Guides because it is one of the key activities to reduce greenhouse gas (“GHG”) emissions and tackle climate change risks. This first edition of the energy efficiency guide covers the final energy users (categorised by cluster and project life cycle) and will be enhanced at subsequent stages to cover additional parts of the various energy efficiency activities.

The VBIAF Sectoral Guides provide the parameters which facilitate a financial institution to overlay its credit or investment decisions with an ESG risk score, so that the financial institution is able to derive final outcomes which incorporate the ESG impact of its financing and investment decisions. In addition, the VBIAF Sectoral Guides are intended to provide transparency to customers and investors in relation to financial institutions’ ESG assessment considerations in arriving at their final financing and investment decisions.

I wish to take the opportunity to express my gratitude to BNM, the COP, the project manager, industry experts and members of the working group for their tireless dedication and cooperation, without which the VBIAF Sectoral Guide for Energy Efficiency would not be a reality.

Thank you.

EQHWAN MOKHZANEE
Chief Executive Officer
AmBank Islamic Berhad

A. INTRODUCTION

Objective

1. This document presents further guidance on implementing impact-based assessments of EE activities. This document should be read together with the overarching framework described in the VBIAF.
2. This document also serves as complementary guidance to facilitate the classification of economic activities of financing and/ or investments as per the classification system outlined in the CCPT issued by BNM.

Approach

3. The guidance provided is developed in reference to applicable policy documents issued by BNM, Malaysian laws and regulations, standards and guidance issued by international/ multi stakeholder organisations and initiatives and publicly available information on best practices adopted by relevant institutions and practitioners.

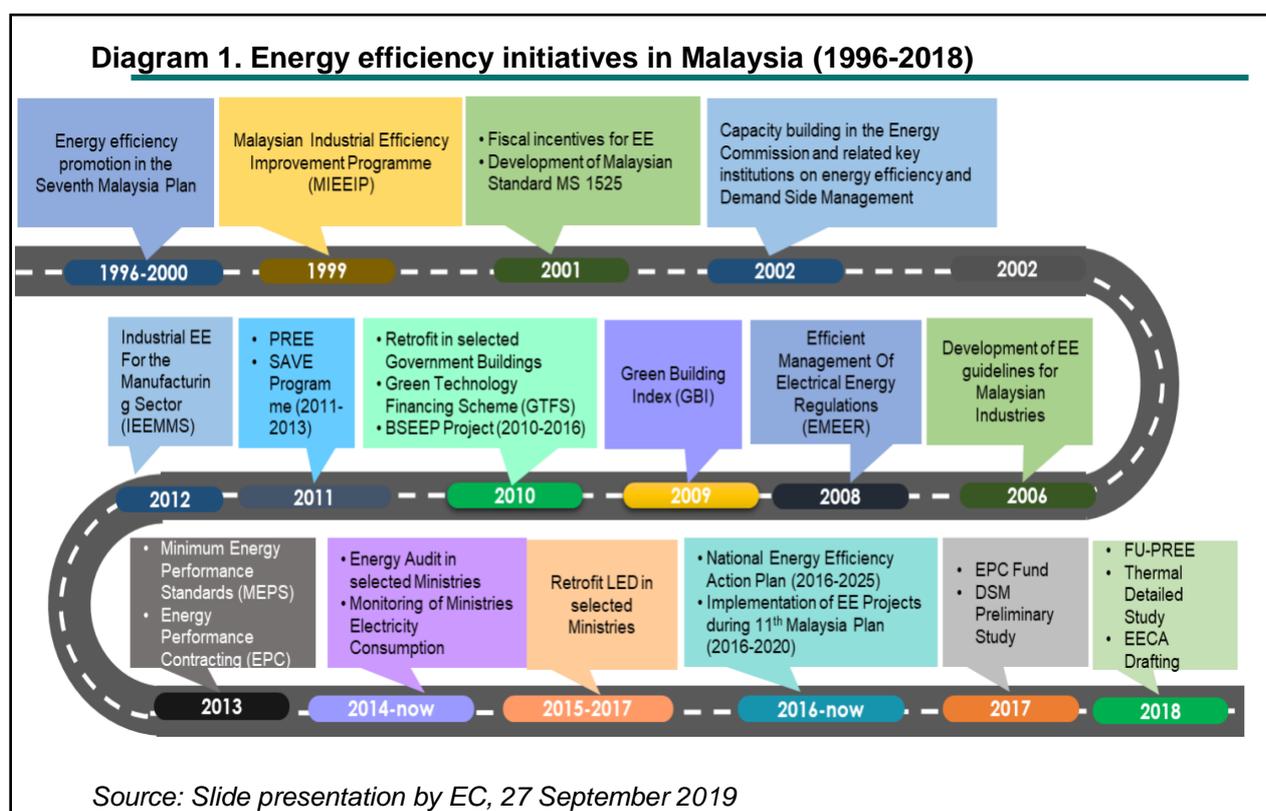
Applicability

4. This guidance is intended for FIs. Counterparties of the FIs (e.g. customers, investors) may refer to this guidance to obtain a general perspective on areas/ criteria considered in financing and investment assessments. However, final decision making is subject to the policies and procedures of the respective FIs.

The rest of this page has been intentionally left blank.

Activity context

5. EE is regarded as one of the key activities to reduce GHG emissions and tackle climate change^{1, 2}. In Malaysia, EE initiatives and programmes have begun since 1996, focusing on demand-side management (Diagram 1). The NEEAP noted that energy intensity (calculated as energy/ GDP) in Malaysia has been rising since 2000 based on prevailing conditions, and recommended strategies to advance EE. In addition, the use of electricity in buildings represents 40% of total electricity use in Malaysia, which gives rise to vast potential for EE related improvements and cost savings^{3, 4}.
6. As a signatory to the 2015 Paris Agreement, Malaysia has committed to reduce its GHG emissions intensity to GDP by 45% by 2030 relative to GHG emissions intensity in 2005, a commitment that provides significant financing and investments opportunities⁵, including towards EE projects and activities.



¹ EEFIG Underwriting Toolkit (2017).

² Further context related to climate change matters can be found in Discussion Paper on Climate Change and Principle-based Taxonomy issued by BNM in December 2019, and the subsequent updates.

³ <https://www.thestar.com.my/news/nation/2018/11/01/yeo-malaysia-can-save-at-least-rm47bil-over-15-years>

⁴ According to National Energy Balance 2017, the share of total electricity use from commercial buildings is 29.8% and residential buildings is 20.7%.

⁵ Globally, in order to deliver the optimal energy efficient scenario, the International Energy Agency (IEA) indicates that EE investment levels globally need to increase to USD580 billion by 2025 and thereafter (between 2026 and 2050) further increasing to USD1.2 trillion.

7. The key government strategies and policies on EE are as follows :-
 (i) **Efficient Management of Electrical Energy Regulation 2008 (EMEER)**
 Requires an REEM to be appointed for any installations that consume or generate electrical energy of at least 3 million kWh for 6 consecutive months which is subject to semi-annual reporting to EC.

(ii) **National Energy Efficiency Action Plan (2016 – 2025) (NEEAP)**
 Describes implementation strategies to improve electrical EE in the industrial, commercial and residential sectors, confined to electricity usage, which will be able to save 52,233 GWh (corresponds to an 8% reduction in electricity demand growth at the end of the plan) of electricity over 10-year period, with the expected total direct monetary saving of RM18.5 billion and a projected cumulative reduction in CO₂ emissions of 34,886 ktCO_{2e}. Key initiatives highlighted in the NEEAP:-

Initiative 1	Promotion of 5-star rated appliances
Initiative 2	MEPS for lighting and highly efficient motors
Initiative 3	Energy audits and energy management in buildings and industries
Initiative 4	Promotion of co-generation
Initiative 5	Energy efficient building design

(iii) **National Automotive Policy 2014/2019 and National Automotive Policy 2020 (NAP)**
 Aims to develop Malaysia as the regional automotive hub in EEV. The NAP 2014 targets an improvement in fuel efficiency of vehicles manufactured and increase in the use of alternative fuels including compressed natural gas⁶. The NAP 2020 is enhancement of NAP 2014, aims for the local automotive industry to continue to be aligned with the latest global technological trends through the application of Industrial Revolution 4.0 technologies towards moving into connected mobility phase of development in Malaysia.

(iv) **National Green Technology Master Plan 2017 – 2030**
 Identifies 6 initial key sectors with high potential to facilitate the growth of green technology in the energy, building, manufacturing, transport, water and waste sectors. The plan sets out targets for the respective sectors as follows:-
 a) Energy – reduction in electricity consumption (residential and commercial) of 10% and 15% by 2025 and 2030 respectively.
 b) Transport – a target of 85% of total industry volume for private vehicles to be EEV by 2020⁷ (with a target reduction in CO₂ emissions of 199.7 ktCO_{2e}) and 100% by 2030.

⁶ NC3BUR2.

⁷ In 2015, 32.6% total industry volume was EEV.

- c) Building – 550 green buildings (inclusive of green buildings certified by various agencies and organisations such as MyCREST, Green Building Index, GreenRE etc.) by 2020 and 1,750 by 2030.
- d) Manufacturing – increase the percentage and number of green (including improved EE) manufacturing SMEs by 30% (10,200) and 50% (17,000) by 2025 and 2030 respectively.

(v) **Energy Efficiency and Conservation Act (EECA) (proposed)**

The proposed legislation will prescribe the comprehensive measures to promote efficient utilisation of energy, electricity and thermal, across all key sectors. Currently, existing regulations on EE only regulate electricity use (regulated under EMEER)⁸ and MEPS (regulated under Electricity (Amendment) Regulations 2013 P.U.(A)151).

(vi) **Eleventh Malaysia Plan (2016-2020) EE targets**

- 700 registered electrical energy managers
- Extend EPC to other government buildings
- Adopt energy efficient designs to new government building
- Retrofit 100 government buildings
- Register 70 Energy Service Companies

Table 1: Targets under various initiatives⁹

Initiative	Targets		
	2020	2025	2030
NEEAP – Projected electricity savings	3,783.17 GWh	12,386.97 GWh	17,622.81 GWh
Green Building Rating Scheme – Projected electricity savings ¹⁰	363,419 MWh	508,152 MWh	652,886 MWh
EEV vehicles – projected number of vehicles on the road ¹¹			
• Hybrid	108,098	201,484	322,532
• EV	443	963	1,683

The rest of this page has been intentionally left blank.

⁸ <http://upc.mpc.gov.my/csp/sys/bi/%25cspapp.bi.work.nc.custom.regulation.cls?regId=38&ext=1>

⁹ NC3BUR2.

¹⁰ From completion and verification assessments (CVAs) and Design Assessments (DA) of green buildings.

¹¹ Number of vehicles on the road, as at Aug 2020 – EV: 2,355; PHEV: 27, 314 (Raw data by JPJ, analysed by MGTC).

B. DEFINITIONS AND SCOPE

Definitions

8. EE is the ratio of output of performance, service, goods or energy, to an input of energy¹². EE simply means using less/ same energy to perform the same task or achieve the same/ higher level of output (i.e. eliminating energy waste^{13,14}). EE is not the same as energy conservation which is the act of saving energy by reducing a service. In other words, conserving energy involves cutting back on energy usage^{15,16}.
9. EE activities by final energy users can be broadly categorised into the following clusters (Table 2):-
 - (i) buildings¹⁷ (residential and commercial, but excluding industrial facilities) – improvements in energy consumption for heating/ cooling such as through enhancing building codes (e.g. using low carbon materials and requiring buildings to be resource efficient), new building design, building retrofit and renovation, energy saving technologies, EE standards and certifications;
 - (ii) industrial facilities (including commercial appliances) – making industrial processes more energy efficient throughout the lifecycle including improvements in energy savings such as through energy management systems, industrial equipment standards;
 - (iii) transportation¹⁸ – transports that meet better emissions performance level and fuel consumption¹⁹ and may encompass fuel-efficient vehicles, hybrid EV, full EV and alternative fuel vehicles; and
 - (iv) domestic/ consumer appliances – ready-to-use/ standalone appliances that meet EE standards and certifications.

The rest of this page has been intentionally left blank.

¹² Understanding EE, European Parliamentary Research Service (2015) and ISO/IEC 13273-1, Energy efficiency and renewable energy sources – Common international terminology – Part 1: Energy efficiency.

¹³ Environmental and Energy Study Institute <https://www.eesi.org/topics/energy-efficiency/description>

¹⁴ Percentage of total energy input to a machine or equipment that is consumed in useful work and not wasted as useless heat. (SIRIM, Seminar Perundangan Penggalakkan Penggunaan Tenaga Elektrik Secara Cekap)

¹⁵ <https://www.eia.gov/energyexplained/use-of-energy/efficiency-and-conservation.php>

¹⁶ <https://www.ucsiuniversity.edu.my/energy-conservation-and-energy-efficiency>

¹⁷ Identified as critical in the building sector in Global Energy Transformation – A Roadmap to 2050 (2018).

¹⁸ National Technology Master Plan Malaysia 2017 – 2030.

¹⁹ EEV is defined as vehicles that meet a defined specification in terms of carbon emission level (g/km) and fuel consumption (l/100 km). EEV includes fuel efficient vehicles, hybrids, EVs and alternatively-fuelled vehicles, e.g. CNG, LPG, biodiesel, ethanol, hydrogen and fuel cell. (Malaysia Automotive Robotics and IoT Institute (MARII)). In NAP 2020, target fuel consumption is 5.3L/100km, in line with target outlines in the ASEAN Fuel Economy Roadmap - an improvement in average fuel economy to around 5.3 LGe/100km by 2025, from an estimated 7.2 LGe/100km in 2015.

Table 2: EE activity by cluster and project life cycle

Project life cycle	Cluster			
	Building (excluding industrial facilities)	Industrial facilities (including commercial appliances)	Transportation	Domestic/ consumer appliances
Design and planning	Activity involves development of design for energy strategies and technologies including preparation of a comprehensive energy analysis of the design/ technology concepts. This will allow comparison between estimated/ target energy use and final energy use when in operation (i.e. end users).			Not applicable as this involves ready-to-use/ standalone products.
Installation and construction/ manufacturing	Activity involves :- (i) on-site installation and/ or construction of EE design/ appliance/ technology; and (ii) manufacturing of EE products e.g. equipment, vehicle, appliances. This also includes EE considerations in the performance/ execution of the installation, construction and manufacturing activities.			
Operations/ End users	<ul style="list-style-type: none"> • Residential building owners and tenants. • Commercial building owners and tenants. 	<ul style="list-style-type: none"> • Industrial facility owners and tenants (e.g. factory, warehouse). • SMEs using commercial appliances (e.g. food producers, printing companies, garment producers). 	<ul style="list-style-type: none"> • Commercial/ road freight vehicles (e.g. trucks). • Other freights (e.g. rail, ships, airplane). • Private/ road passenger vehicles (e.g. cars, motorcycles, vans). • Commercial/ road passenger vehicles (e.g. buses, vans). • Other commercial passenger vehicles including mass transit (e.g. trains, ships, airplanes). 	Household users only.
Ancillary service providers	<ul style="list-style-type: none"> • Project design and planning • Metering and monitoring services • Energy performance contracting • Energy consultants 			

The rest of this page has been intentionally left blank.

Scope

10. The first edition of this guidance will focus on the following final energy users in respect of the above clusters :-
 - (i) owners and tenants of buildings (residential and commercial, but excluding industrial facilities);
 - (ii) owners and tenants of industrial facilities and users of commercial appliances;
 - (iii) owners of on road private/ passenger and commercial/ freight vehicles;
 - (iv) consumer of domestic/ consumer appliances; and
 - (v) ancillary service providers.

11. This guidance **does not** address non-EE impact-based risk considerations such as ESG criteria related to the general construction or manufacturing of buildings, industrial facilities, transportation and domestic/ consumer appliances. These impacts will be addressed in subsequent guidance documents on the respective sectors.

The rest of this page has been intentionally left blank.

C. COMMERCIAL PROPOSITIONS

12. EE activities offer business opportunities to FIs as the energy sector is one of four key pillars in the National Green Technology Policy and among the sector catalyst to create a low carbon and resource efficient economy in the National Green Technology Master Plan Malaysia 2017 – 2030.

Box 1. Examples of EE improvements/ activities

Buildings

- Wall and roof insulation
- Green façade and roofs
- Glazing
- Window U-factor (rate of heat transfer through window)
- Zoning (positioning air-conditioned spaces in a building strategically such that wastage of conditioned air is minimised)
- Infiltration control and air-tightness/ sealing (keeping outdoor air from entering air-conditioned space) and ventilation

Lighting efficiency

- Daylight harvesting
- Switching to energy efficient lighting
- Optimising lighting performance (e.g. motion sensors)

Industrial facilities

- Combined heat and power (co-generation)
- Air compressor efficiency
- New efficient automated process controls and utilities and process optimisation
- Automated energy management systems
- Process equipment upgrades and other changes to increase efficiency
- Waste heat recovery from process air and water
- Water recycling and recovery of methane from waste water treatment
- High efficiency motors, pumps and fans
- Infrared assessment (using infrared tool to identify issues relating to energy loss)

Transportation (private vehicles)

- Improving vehicle fuel efficiency and carbon emission rating for internal combustion engine vehicle, and increasing adoption of EV²⁰. EEV includes fuel-efficient internal combustion engine vehicles, hybrid vehicles, EV and alternative-fuelled vehicles (e.g. compressed natural gas) that meet a set of specifications in terms of fuel consumption and emissions
- Lightweight material
- Fuel-cell technology

Domestic/ consumer appliances

- 5-star EE-rated appliances campaigns (e.g. refrigerators, air-conditioners, ceiling and stand fans and televisions)

²⁰ Electrifying transportation but also bearing in mind that the power grid needs to be decarbonised.

Government programmes/ initiatives

General

13. The Green Technology Incentive package is extended until end of 2023 to further strengthen the development of green technology in the form of investment tax allowance for green projects and the purchase of green technology assets, and income tax exemption for companies which undertake green technology services activities.

Specific

14. Buildings – The Building Sector Energy Efficiency Project (BSEEP)²¹, a project supported by United Nations Development Programme (UNDP) and funded by Global Environment Facility (GEF), aims at improving the energy utilisation efficiency of buildings in Malaysia. In particular, the project promotes energy conserving design of new buildings and improves energy utilisation efficiency in the operation of existing buildings. This project is in line with the GEF's climate change strategic programme on Promoting Energy Efficiency in residential and commercial buildings²². The project officially ended in 2018 and has been taken over by Public Works Department of Malaysia for further implementation.
15. Industrial facilities – Currently, there is no specific government EE initiatives for industrial facilities²³ beyond Initiative 3 (Energy audits and energy management in buildings and industries) under the NEEAP. The Energy Audit Conditional Grant is a programme which provides grants to selected industries to perform energy audit that facilitated implementation of energy saving measures.
16. Transportation – Under the National Electric Mobility Blueprint (2015-2030), the Government of Malaysia targets to have 100,000 electric cars, 100,000 electric motorcycles and 2,000 electric buses on the road by 2030. Low Carbon Mobility Blueprint (LCMB), complemented with Electric Vehicle Roadmap as to chart the path for EV adoption are currently being drafted, which among others include specific targets on EEV by 2030.
17. Domestic/ consumer appliances – Energy rating and labelling of household appliances to facilitate end users' decision making during the initial purchase particularly on operational cost for electricity. Mandatory labelling has been introduced for refrigerators, air-conditioners, ceiling and stand fans and televisions.

²¹ A national project to reduce the annual growth rate of GHG emissions from the building sector in Malaysia.

²² <http://bseep.gov.my/about-us/>

²³ In 1999, the Government of Malaysia initiated Malaysian Industrial Energy Efficiency Improvement Project (MIEEIP) to improve the rational use of energy in the industrial sector. The MIEEIP was supported and funded by UNDP-GEF as well as the Government of Malaysia and private sector. Final Evaluation Report: MIEEIP, January 2008 can be found here <https://eartheval.org/evaluation/malaysian-industrial-energy-efficiency-improvement-project>

Financing

18. GTFS 2.0 provides financial support through participating FIs for producer, user and ESCOs (to finance investments or assets related to EE project and EPC). It offers a rebate of 2% on interest/ profit rate charged by FIs and 60% government guarantee on financing provided by FIs. GTFS 2.0 aims to accelerate the expansion of green investments with a total funding of up to RM2 billion²⁴.
19. FIs should take a nurturing approach in developing financial products and services to facilitate their customers' implementation of EE projects. A list of financial products and services that are offered globally is provided in the Appendix.

Box 2. EEFIG suggests actions that FIs can take

- Assess the market potential for EE in key markets addressed by the FI.
- Assess current legislative and regulatory environment for EE.
- Assess availability of support mechanisms – either government grants or financial instruments such as guarantee mechanisms.
- Assign senior team to drive product development.
- Ensure that product and programme design is proactive and systematic rather than just the provision of capital.
- Ensure EE financing/ investments are tagged to enable future measurement of risk and environmental impact.
- Ensure everyday financing or investment operations identify opportunities for EE.
- Ensure EE products are based on best practice technical assistance including use of internationally recognised standards such as the Investor Confidence Project.
- Assess potential for improving EE within own property portfolio and using it to develop products and build capacity.

Source: Excerpt from EEFIG Underwriting Toolkit (2017) pp. 10-11

20. The “Manual of Financing Mechanisms and Business Models for Energy Efficiency”, a report by Basel Agency for Sustainable Energy (BASE) for UN Environment, provides an overview of financing mechanisms, business models and risk mitigation instruments for EE. Link to the document is included in Essential Readings.

The rest of this page has been intentionally left blank.

²⁴ <https://www.gtfs.my/news/introduction-green-technology-financing-scheme-20-gtfs-20>.

GTFS 3.0 with a fund size of RM2 billion was announced during the tabling of the Budget 2021. Further details can be found on the website of MGTC (currently is being finalised by MGTC).

D. IMPACT-BASED RISK MANAGEMENT

Policy statement

21. FIs need to set a clear commitment in support of EE activities. This may include :-
- (i) allocating a specified amount of funds for EE projects;
 - (ii) nurturing counterparties by offering advisory services to identify and take on cost effective EE projects including improvements/ refurbishments²⁵;
 - (iii) agreeing with counterparties on EE targets that are measurable and can be monitored effectively; and/ or
 - (iv) incentivising counterparties by offering innovative financial products and services to purchase/ invest in EE products and services.
22. FIs need to take a nurturing approach to facilitate compliance with such laws, regulations and standards. This requires FIs to obtain commitment from their counterparties, agree on a time-bound action plan and adequately monitor progress.

I. Impact-based risk identification

(a) Key impact assessment

23. FIs should identify positive (benefits) and negative (risks) impacts related to EE activities. From an FI perspective, the main impact of EE activities that can be captured at the transactional level is energy and cost savings experienced by their counterparties²⁶.
24. Table 3 provides a brief description of key impact-based risk categories/ themes of EE activities. The impact categories/ themes are adapted from the EEFIG Underwriting Toolkit (2017). The identified categories can typically generate significant risks if not well managed but could present significant opportunities to add value if the risks are proactively addressed.

Table 3. Key impact-based risk categories/ themes

Category/ Theme	Risk transmission
Performance risk	<ul style="list-style-type: none">• EE project does not produce the forecasted energy savings, leading to negative performance gap. Where financing rates are linked to performance, negative performance gap (i.e. under-performance) may also impact repayment ability (i.e. credit risk).

²⁵ FIs and counterparties may leverage on free technical assistance provided by Private Finance Advisory Network (PFAN).

²⁶ Other non-energy benefits include increased asset value, reduced operations and maintenance costs, improved productivity and improved health and well-being of employees or building occupants (EEFIG Underwriting Toolkit, p.44). However, these non-energy benefits are not considered in this guidance.

Category/ Theme	Risk transmission
Energy price risk	<ul style="list-style-type: none"> Volatility in energy prices negatively impacting energy cost savings.
Construction risk	<ul style="list-style-type: none"> Poor execution of EE projects by contractors/ installers leading to delays/ disruptions in occupancy/ production, additional costs and impaired EE performance.
O&M risk ²⁷	<ul style="list-style-type: none"> Improper O&M may negatively impact long term EE performance.
M&V risk	<ul style="list-style-type: none"> Poor M&V methodology and not adhering to recognised M&V standards resulting in uncertain outcome of whether energy savings are over or under stated.

25. The above risk categories may have different impact (in terms of magnitude) at different stages of the project life cycle. Table 4 identifies the applicability of the risk categories against the project life cycle of the different clusters.

Table 4. Risk category mapping against project life cycle

Project life cycle	Building				Industrial facilities			Trans.		Dom/ cons appl.
	New		Refurb.		New	Refurb.	Com appl.	Pri.	Com.	HH
	Res.	Com.	Res.	Com.						
Design planning and	P	P	P	P	P	P	n/a	n/a	n/a	n/a
Installation and construction/ manufacturing	C	C	C	C	C	C	C	n/a	n/a	n/a
Operations/ End users	P	P	P	P	P	P	P	P	P	P
	E	E	E	E	E	E	E	E	E	E
	O	O	O	O	O	O	O	O	O	O
	M	M	M	M	M	M	M	M	M	M
Ancillary service providers	Risk category of service follows the respective project life cycle and cluster.									

Trans. = Transportation, Dom/cons appl. = Domestic/ consumer appliance, Refurb. = Refurbishment/ renovation, Res. = Residential buildings (e.g. landed properties, low and high rise buildings), Com. = Commercial, Com appl. = Commercial appliance, Pri. = Private, HH = Household

P = performance risk, E = energy price risk, C = construction risk, O = O&M risk, M = M&V risk

26. A list of applicable laws and standards that are relevant to EE activities is provided in the Appendix.

(b) Customer on-boarding checklist

27. FIs need to develop an appropriate customer on-boarding checklist based on the key impact categories and potential risk transmission channels identified above.

²⁷ According to ENERGY STAR, building owners can save 5% to 20% annually on their energy bills by implementing O&M best practices.

28. Table 5 suggests the information required for the initial on-boarding assessment to determine transaction-level risk as described in the next section :-

Table 5. Initial on-boarding checklist

Category	Building				Industrial facilities			Trans.		Dom/ cons appl.
	New		Refurb.		New	Refurb.	Com appl.	Pri.	Com.	HH
	Res.	Com.	Res.	Com.						
Performance risk										
Energy management system ²⁸ .	n/a	✓	n/a	✓	✓	✓	✓	n/a	✓	n/a
Accredited EE design of premise, including project implementation plan.	✓	✓	✓	✓	✓	✓	n/a	n/a	n/a	n/a
Accredited EE technology.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Accredited EE performance report/certification/ rating. (post-implementation).	n/a	✓	n/a	✓	✓	✓	✓	n/a	✓	n/a
Energy price risk										
Energy consumption measure – electricity bill.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Use of specialised/ energy intensive equipment.	n/a	✓	n/a	✓	✓	✓	✓	n/a	✓	n/a
Determination of high energy consumption sector.	n/a	✓	n/a	✓	✓	✓	✓	n/a	✓	n/a
Construction risk										
Project implementation plan ²⁹ .	n/a	✓	n/a	✓	✓	✓	✓	n/a	n/a	n/a
Certification of installation by suitably qualified contractors.	✓	✓	✓	✓	✓	✓	✓	n/a	n/a	n/a
O&M risk										
Availability of operational manual, internal expertise (human resource).	n/a	✓	n/a	✓	✓	✓	✓	n/a	✓	n/a

²⁸ A comprehensive energy management system includes clear commitment, strategy, policies and procedures e.g. monitoring mechanism, transparency and disclosure.

²⁹ Including identifying mitigation plans to minimise disruptions/ delays, assigning penalties/ warranties if applicable.

Category	Building				Industrial facilities			Trans.		Dom/cons appl.
	New		Refurb.		New	Refurb.	Com appl.	Pri.	Com.	HH
	Res.	Com.	Res.	Com.						
Scheduled maintenance arrangement.	✓	✓	✓	✓	✓	✓	✓	✓	✓	n/a
M&V risk										
Credible standard M&V and protocols.	✓	✓	✓	✓	✓	✓	✓	✓	✓	n/a
Credible periodic M&V report.	n/a	✓	n/a	✓	✓	✓	✓	n/a	✓	n/a

– Initial on-boarding should be conducted at the customer and transaction-levels for new and/ or existing counterparties depending on the FI's implementation approach (refer to scope in VBIAF pp. 3-4).

29. FIs should update the above assessment at least annually and/ or when renewing/ reviewing financing facility/ investment (e.g. by requiring the counterparty to provide at least an annual report).

30. Examples of customer on-boarding checklists are provided in the Appendix.

(c) Exclusion list

31. FIs should develop an exclusion list which would serve as a baseline risk appetite. The exclusion list may reflect the type of activities undertaken by their counterparties that would go against FIs' commitments to support more EE projects. In determining the specific activities that should be avoided, FIs should consider the following factors :-

- (i) strategic direction by relevant regulatory authorities and implementation of national standards and laws (e.g. stricter enforcement for non-compliance, restricted activities, recalled technology);
- (ii) availability of EE technology and/ or alternative(s) to energy intensive equipment/ product;
- (iii) mitigation plan including adoption of renewable energy sources; and
- (iv) committed transition plan towards improved EE solutions/ practices.

32. In addition, when financing/ investing in EE projects, FIs should consider avoiding contracting with counterparties that are not registered with the EC. The ECOS³⁰ provides the following registry :-

- (i) registered electrical contractors;
- (ii) registered electrical competent persons; and
- (iii) registered REEM.

³⁰ <https://ecos.st.gov.my/ms/senarai-orang-kompeten-berdaftar-elektrik->

II. Impact-based risk measurement

(a) Key impact measures/ indicators

33. FIs should develop different impact metrics/ indicators for different counterparties (e.g. corporate/ commercial/ retail customer) which are based on the type of EE activities in the different clusters (i.e. buildings, industrial facilities, transportation and domestic/ consumer appliances).

The main metric is referred to as the EE indicator³¹. An EE indicator is a ratio to measure energy use against a unit of output. For instance, in the industrial sector, the measures are normally energy use per Ringgit Malaysia of production or energy per physical unit of production. In the building sector, EE is expressed in terms of energy per square metre of floor space, whilst in the transport sector, EE is measured in terms of energy use per passenger-km or energy use per ton-km³².

Energy efficiency indicator = Energy consumption/ Activity data³³

Energy efficiency indicators are computed at the end-use or sub-sectoral level, or at an even more disaggregated level, the unit energy consumption level. For example, within the residential sector, space heating energy consumption per floor area is an energy efficiency indicator at the end-use level, and energy consumption per unit of appliance is an energy efficiency indicator at the unit consumption level.

34. FIs need to assign the appropriate risk score/ level for each of the impact metric/ indicator. As stated in VBIAF, FIs would need to consider factors such as materiality and consideration of stakeholders' interest and/ or national priorities/ targets. The assessment should include, where relevant, an analysis of the capacity, commitment and track record of the customer in managing such risk. Transactions with higher risk should be subjected to in-depth due diligence, which may include site visits and independent review by energy risk specialists.
35. Table 6 provides the examples of transaction-level risk metrics and risk score for each of the risk categories identified :-

³¹ This data should be collected in an energy management system which can be accessed by FIs.)

³² NEEAP, p.47.

³³ Energy Efficiency Indicators: Fundamentals on Statistics (IEA).

Table 6. Transaction-level risk metrics and risk score

Risk Category	Project life cycle	Inherent risk level	Risk metric	Mitigation	Risk score/ level ³⁴
Performance risk					
Accredited EE design of premise, including project implementation plan.	Design and planning	High/ Medium	Accreditation/ rating provided by relevant certification body (where local/ national standards are unavailable, FIs may refer to relevant global standards). Anticipated energy versus guaranteed energy savings.	Not applicable.	<p>Example of risk metric for building: BEI government building design/ GBI :-</p> <ul style="list-style-type: none"> - High – 1-star - Medium – 2-3 star - Low – 4-5 star <p>Example of risk metric for industrial facility: ENERGY STAR Energy Performance Indicators :-</p> <ul style="list-style-type: none"> - High – score 1-50 - Medium – score 50-75 - Low – score 75-100
Accredited EE technology.					<p>Example of risk metric for building: Central air conditioner for commercial building :-</p> <ul style="list-style-type: none"> - High – no certification - Low – ENERGY STAR certified <p>Example of risk metric for transportation: Private vehicles with EEV-certification. The certification may take into account, among others, EEV specifications, light weight material technology :-</p> <ul style="list-style-type: none"> - High – No - Low – Yes

³⁴ The risk score/level provided is an example. FIs can use either a numeric score (1-5) or categorisation (High, Medium, Low) according to their respective internal risk methodologies. FIs should determine the appropriate risk score/ level based on their respective risk appetites. Examples for some of the risk scores/ levels are intentionally not provided as they depend on the respective project/ transaction baselines.

Risk Category	Project life cycle	Inherent risk level	Risk metric	Mitigation	Risk score/ level ³⁴
					Greenhouse Gas Emissions Model (GEM) ³⁵ for commercial vehicles ³⁶ :- - High – - Medium – - Low –
Accredited EE performance report/certification/ rating.	Operations/ End users	High/ Medium	<ul style="list-style-type: none"> • Accreditation/ rating provided by relevant certification body (where local/ national standards are unavailable, FIs may refer to relevant global standards). • Reduction in GHG emissions. • Annual energy saving/ energy intensity measure. 	<ul style="list-style-type: none"> • Effective energy management system[†]. 	<p>Example of risk metric for building: BEI government building design/ GBI :-</p> <ul style="list-style-type: none"> - High – 1-star - Medium – 2-3 star - Low – 4-5 star <p>Example of risk metric for transportation: Commercial vehicles using GEM :-</p> <ul style="list-style-type: none"> - High – fuel consumption per l/km is higher than the expected level of consumption - Low - fuel consumption per l/km is lower (better) than the expected level of consumption <p>Example of risk metric for building, industrial facility and transportation: Reduction in GHG emissions :-</p> <ul style="list-style-type: none"> - High – - Medium – - Low –

³⁵ GEM is a free, desktop computer application that estimates the greenhouse gas (GHG) emissions and fuel efficiency performance of specific aspects of heavy-duty vehicles (HDV). The tool provided by the United States Environmental Protection Agency (EPA) can be accessed from <https://www.epa.gov/regulations-emissions-vehicles-and-engines/greenhouse-gas-emissions-model-gem-medium-and-heavy-duty>

³⁶ Malaysia does not currently have its own HDV efficiency standard.

Risk Category	Project life cycle	Inherent risk level	Risk metric	Mitigation	Risk score/ level ³⁴
					Metering reading/ energy intensity ³⁷ :- - High – No improvement in energy intensity - Medium – 0-5% improvement in energy intensity - Low – 6-10% of improvement in energy intensity
Energy price risk					
Energy consumption measure.	Design and planning, Operations/ End users	High/ Medium	<ul style="list-style-type: none"> • Identification of specialised/ energy intensive equipment. • Identification of high energy consumption sector by relevant authority. • Annual energy saving/ energy intensity measure. 	<ul style="list-style-type: none"> • Effective energy management system[†]. • Install RE systems. 	<p>Example of risk metric for building and industrial facility: Use of specialised/ energy intensive equipment :-</p> <ul style="list-style-type: none"> - High – Yes - Low – No <p>High energy consumption sector :-</p> <ul style="list-style-type: none"> - High – Yes - Low – No <p>Metering reading/ energy intensity³⁸ :-</p> <ul style="list-style-type: none"> - High – No improvement in energy intensity - Medium – 0-5% improvement in energy intensity - Low – 6-10% of improvement in energy intensity

³⁷ Improvements in energy intensity are industry/ sector specific.

³⁸ Improvements in energy intensity are industry/ sector specific.

Risk Category	Project life cycle	Inherent risk level	Risk metric	Mitigation	Risk score/ level ³⁴
					Example of risk metric for building: BEI measure (pre and post EE project) for government buildings :- - High – >250 kWh/m2/yr - Medium – 220-250 kWh/m2/yr - Low – <220 kWh/m2/yr
Construction risk					
Project implementation plan.	Installation and construction	High/ Medium	Availability of comprehensive project implementation plan with clear timelines and mitigations.	Not applicable.	Example of risk metric for building and industrial facility :- - High – Do not include penalties/ warranties for disruption/ delays - Medium – - Low – Comprehensive plan with assigned penalties/ warranties
Qualified contractors/ installers			<ul style="list-style-type: none"> Registered contractors/ experts with EC Good track record 		Example of risk metric for building and industrial facility :- - High – Contractors not registered with EC - Medium – Registered contractors, inconsistent track record - Low – Registered contractors, good track record
O&M risk					
Internal expertise	Operations/ End users	High/ Medium	<ul style="list-style-type: none"> Number of internal expertise Adequate outsourcing arrangement 	Effective energy management system [†] .	Example of risk metric for building, industrial facility and transportation: Appropriate human resource :- - High – No expertise, ad-hoc arrangement, poor track record - Medium – outsourcing arrangements with minimal disruption - Low – adequate in-house expertise/ outsourcing arrangements with good track record

Risk Category	Project life cycle	Inherent risk level	Risk metric	Mitigation	Risk score/ level ³⁴
Schedule maintenance arrangement	Operations/ End users	High/ Medium	<ul style="list-style-type: none"> Contractual scheduled maintenance arrangement with reputable contractors Energy audit report by certified energy auditors. 	Effective energy management system [†] .	<p>Example of risk metric for building, industrial facility and transportation: Scheduled maintenance report :-</p> <ul style="list-style-type: none"> High – No scheduled maintenance Medium – Regular scheduled maintenance, minimal exception Low – contractual scheduled maintenance, good report <p>Energy audit :-</p> <ul style="list-style-type: none"> High – No energy audit Medium – Irregular energy audit Low – Regular energy audit, clean report
M&V risk					
Credible M&V standard.	Operations/ End users	High/ Medium	<ul style="list-style-type: none"> M&V developed and certified by M&V specialist. Accreditation/ rating provided by relevant certification body. Energy audit report by certified energy auditors. 	Effective energy management system [†]	<p>Example of risk metric for building, industrial facility and transportation: Accredited EE performance report/ audit :-</p> <ul style="list-style-type: none"> High – No regular report, no energy audit report Medium – alternative certification (may require further validation) Low – Nationally recognised standard (certification is current, clean energy audit report)
Credible periodic M&V report.					

36. †Effective management is evidenced by amongst others, clear and comprehensive policy and procedures, adequate reporting and monitoring, appropriate grievance/ complaints mechanism and sufficient rectification planning. When making an assessment regarding the effectiveness of such policies/ programmes, FIs should consider independent information obtained either internally or externally such as audit/ surveillance reports, compliance reports, reports/ filings/ checks with regulatory authorities and/ or civil societies (if available), and news reports. FIs should, as part of its due diligence process, assess and monitor the counterparty’s commitment, capacity and track record in environmental and social risks management.
37. The risk score/ levels provided are for illustrative purposes only. FIs could use either a numeric score (e.g. 1-5) or categorisation (e.g. High, Medium, Low) according to their respective internal risk methodologies. FIs should determine the appropriate risk score/ level based on their respective risk appetites.
38. FIs need to determine a decision making rule based on the aggregate risk score/ level of the impact-based metrics/ indicators above. An example of the description of customer-level risks is provided in Table 8 of VBIAF p.33. Table 7 suggests a description of transaction-level risks and decision making rule specific to this activity:

Table 7. Example of decision making rule

High risk	Scores “High” for the majority of key impact categories/ themes but has satisfactory mitigation strategy. Approval must be subject to strict compliance conditions/ covenants.
Medium risk	Scores “Medium” or “Low” in the majority and exhibit evidence of effective mitigation strategy. Approval can be subject to additional compliance conditions/ covenants.
Low risk	Scores “Low” for all impact categories and exhibit evidence of effective mitigation strategy. Approval can be subject to standard compliance conditions/ covenants.

(b) Certifications

39. As stated in paragraph 56 of VBIAF, FIs may deem a counterparty that is certified with an established certification standard, such as a nationally mandated certification to have sufficiently managed the key impact-categories/ themes. FIs need to ensure that the certifications are current and valid. FIs may assign a “Medium”/ “Low” risk score/ level for some or all of the impact-based categories/ themes required to calibrate the minimum scoring criteria.
40. FIs may rely on the risk reports/ assessments provided by the certifications listed according to the clusters below (refer paragraph 43 – 53).
41. However, as further clarified in VBIAF, any reliance on a particular certification standard should only be made if the certification matches FIs’ impact-based risk appetite for the particular sector and jurisdiction that the counterparty is operating

in. In such instance, FIs may not need to conduct further due diligence on the counterparty's operations, capacity and track record. If the certification standard is inadequate, FIs should review the reports/ assessments including any available audit/ surveillance reports in detail to identify impact-risks that are not adequately addressed by the respective certifications.

42. FIs need to be aware of the differences in the methodology of the various certification schemes and the impact on FIs' impact-risk scoring.

Cluster: Building

43. Green building rating plays a vital role in supporting a transition towards promoting energy efficiency in buildings. Green building rating tools that are used locally include³⁹ :-

- (i) Malaysian Carbon Reduction and Environmental Sustainability Tool (MyCREST)⁴⁰ is developed by the Construction Industry Development Board (CIDB) as a compulsory certificate for all government projects valued at RM50 million and above.

Three (3) basic tools of MyCREST are :-

- design tool;
- construction tool; and
- operation and management tool.

Projects can earn a star based on execution of specific criteria outlined for every stage of development that include a scorecard, a reference guide and a carbon calculator which measures the carbon emissions during a specific stage of construction. Then, the project will get its overall star rating. The criteria considered include :-

- energy performance impact;
- social and cultural sustainability; and
- sustainability facility management.

- (ii) Penarafan Hijau JKR (PH JKR) is used to measure the level of sustainability for government buildings/ projects valued RM20 million ≤ value < RM50 million, based on the following criteria :-

- sustainable site planning and management
- EE
- quality management of internal environment
- resource and materials management
- water use efficiency
- innovation

³⁹ See Appendix for comparison of national green building standards and codes in ASEAN countries.

⁴⁰ Sustainable Building Initiatives with MCREST, BINA MAMPAN, CIDB Malaysia, Volume 3, 2018.

- (iii) BEI Labelling is a label implemented by the EC that provides information on the energy performance of a government building. BEI is a benchmarking tool in monitoring building energy performance by indicating the intensity of energy used per meter square area of a building. It is the ratio of annual energy consumption of a building and net floor area of the building⁴¹.
 - (iv) GBI (2009) is developed by the Malaysian Institute of Architects (PAM) and the Association of Consulting Engineers Malaysia (ACEM). It is a rating system used to evaluate environment design and performance of buildings (residential, non-residential, township, industrial, data centre, hotel, resort) based on energy efficiency, indoor environmental quality, sustainable site planning and management, material and resources, water inefficiency and innovation⁴².
 - (v) GreenRE (2013) was set up by Real Estate and Housing Developers' Association. It provides assessment and certification for buildings, townships and infrastructure projects, which covers from an initial pre-assessment procedure up to site verification assessment upon satisfactory and sufficient execution of the initial pre-assessment procedure. The key considerations for the certification are EE, natural ventilation, daylighting, water efficiency, environmental protection, indoor air quality, carbon assessment and enhanced construction practices⁴³.
 - (vi) Energy Management Gold Standard (EMGS) is a certification system introduced under the ASEAN Energy Management Scheme (AEMAS) where MGTC is the certification body in Malaysia. It is a regional certification introduced by the ASEAN Centre for Energy (ACE) which is also implemented in 7 other ASEAN member states, namely Cambodia, Indonesia, Laos, Myanmar, Philippines, Thailand and Vietnam.
 - (vii) ISO50001 Energy Management System is designed to support organisations in all sectors. It provides a practical way to improve energy use, through the development of an energy management system (EnMS).
44. Global ratings that may be referred to include the following :-
- (i) Leadership in Energy and Environment Design (LEED) is a set of rating systems for the design, construction, operation, and maintenance of green buildings developed by the US Green Building Council.
 - (ii) BCA Green Mark is Singapore's initiative to encourage construction industry towards more environment-friendly buildings, from project conceptualisation and design and during construction.

⁴¹ https://www.st.gov.my/contents/files/download/97/20190207_Pamphlet_BEI_Labelling2.pdf

⁴² <https://new.greenbuildingindex.org/how/tools>

⁴³ <https://greenre.org/assessment-process.html>

- (iii) BREEAM (BRE Environmental Assessment Method) is an environmental assessment method for buildings and communities which is developed in the UK; and
- (iv) ENERGY STAR is an EE symbol backed by the Government of the United States of America through the United States Environmental Protection Agency. The certification encompasses a wide variety of EE products including appliances and commercial equipment, homes, buildings and plants. A list of tools provided by the ENERGY STAR is in the Appendix.

Cluster: Industrial facilities

- 45. Machinery equipment or industrial facilities bearing SIRIM certification indicate that these equipment undergo an effective system of testing, supervision and control which improve production efficiency and wastage reduction/ rejection⁴⁴.
- 46. The European Committee of Manufacturers of Electrical Machines and Power Electronics (CEMEP) outlines motor efficiency standard and classify motor efficiency for different speeds and kilowatt rating.
- 47. The International Electrical Commission (IEC) developed efficiency classification IEC 60034-30 to regulate the efficiency classes and legal requirements placed upon the energy efficiency of low-voltage three-phase motors in a uniform manner.
- 48. The ENERGY STAR Energy Performance Indicators (EPIs) help to benchmark industrial plant energy performance. EPIs are external, industry-specific benchmarking tools that score a plant's energy performance and compare it to that of similar plants in its industry within the United States.
- 49. ISO50001 Energy Management System, as stated in paragraph 43 (vii), is designed to support organisations in all sectors and provides a practical way to improve energy use.

Cluster: Transportation

- 50. An EEV is a vehicle that meets the carbon emissions and fuel consumption standards issued by the Malaysia Automotive Robotics and IoT Institute (MARII)⁴⁵ under NAP. To qualify as an EEV, the vehicle must meet (achieve or exceed) a pre-determined fuel consumption rate, expressed in litres per 100 km (L/100km) and CO₂ emissions, expressed in grams per km (g/km) (measured according to the United Nations Economic Commission for Europe R101 standard) vis-à-vis its kerb weight. The Road Transport Department Malaysia (JPJ) will conduct an EEV verification test and issue an EEV certificate. The fuel

⁴⁴ <https://www.sirim-qas.com.my/our-services/product-certification/product-certification-scheme/>

⁴⁵ Previously known as the Malaysia Automotive Institute (MAI)

consumption and CO₂ emissions specifications for passenger and commercial vehicles under the NAP are available on the JPJ's website⁴⁶ (Tables 8 and 9).

Table 8. EEV classification for 4-wheelers

SEGMENT	DESCRIPTION	CURB WEIGHT (KG)	FUEL EFFICIENCY (L/100KM)
A	Micro Car	< 800	4.5
	City Car	801 – 1,000	5.0
B	Super Mini Car	1,001 – 1,250	6.0
C	Small Family Car	1,251 – 1,400	6.5
D	Large Family Car	1,401 – 1,550	7.0
	Compact Executive Car		
E	Executive Car	1,550 – 1,800	9.5
F	Luxury Car	1,801 – 2,050	11.0
J	Large 4x4	2,051 – 2,350	11.5
Others	Others	2,351 – 2,500	12.0

Table 9. EEV classification for 2-wheelers

ENGINE SIZE (CC)	FUEL EFFICIENCY (L/100KM)
50 – 100	2.0
101 – 150	2.2
151 – 200	2.5
201 - 250	3.0

51. Malaysia does not have a vehicle fuel economy labelling (VFEL) programme (Across ASEAN, only Singapore, Thailand and Vietnam have mandatory VFEL schemes. The Philippines' VFEL programme will be mandatory starting January 2021⁴⁷).

Cluster: Domestic/ Consumer appliances

52. EE label is based on a star rating, with five-stars rating connotes the most efficient appliances. The amendment made in 2013 to the Electricity Regulations 1994 incorporates the standards and requirements to implement the MEPS for 6 domestic electrical equipment⁴⁸ :-
- (i) refrigerator;
 - (ii) air conditioner;
 - (iii) television;
 - (iv) domestic fans;

⁴⁶ https://www.jpj.gov.my/en/web/main-site/teknikal-kenderaan-en/-/knowledge_base/technical/kenderaan-cekap-tenaga-eev-

⁴⁷ A Review and Evaluation of Vehicle Fuel Efficiency Labelling and Consumer Information Programs, APEC Energy Working Group, Nov 2015.

⁴⁸ EE criteria for electrical equipment to qualify for the MEPS Star Rating is provided on EC's website.

- (v) lighting (fluorescent, CFL, LED and incandescent); and
- (vi) washing machine.

53. MyHIJAU Mark and Directory was introduced as part of the effort to promote the sourcing and purchasing of green products and services in Malaysia. Registered green products and services will be listed in the MyHIJAU Directory that serves as a reference for green procurement (including Government Green Procurement (GGP) and Green Private Purchasing (GPP)), green incentives including Green Investment Tax Allowance (GITA) and Green Income Tax Exemption (GITE) and related green technology initiatives⁴⁹.

(c) GHG calculator

54. For the purpose of calculating GHG emissions of the activities of the FIs' counterparties, the following methodologies are recommended :-

- (i) GHG methodology by ISCC⁵⁰;
- (ii) GHG Protocol as recommended by TCFD;
- (iii) Intergovernmental Panel on Climate Change guidelines 2006; and
- (iv) ISO 14064.

55. In addition, the above information may be used by FIs to disclose Scope 3 GHG emissions or financed emissions and the related risks of their counterparties in line with TCFD recommendations.

56. For retail customers, the use of detailed GHG methodology may not be practical. In these cases, FIs should consider a portfolio approach to compute GHG emissions.

(d) Financial risk assessment (TCFD)

57. As stated in paragraph 34 of VBIAF, impact-based risks can also result in financial impact that can impair the FIs' safety and soundness. Hence, FIs need to understand the financial vulnerabilities that may arise in this sector as a result of these impact-based risk factors⁵¹. Impact-based risks identified above mainly relate to the impact of the counterparties' activities on the environment and society (the effects of which will have impacts on the counterparties). However, TCFD recommendations mainly focus on the impacts of climate-related risks and opportunities on the counterparties (reverse perspective).

⁴⁹ <https://www.myhijau.my/about/>

⁵⁰ https://www.iscc-system.org/wp-content/uploads/2017/02/ISCC_DE_205_GHG-emission-calculation-methodology.pdf

⁵¹ Paragraph 50 of VBIAF states the use of impact-based metrics to improve FI's risk prediction models for stress testing purposes.

58. Table 10 maps examples of physical and transition risks⁵² arising from environmental triggers in this activity against established financial risks taxonomy⁵³ :-

Table 10. Example of physical, transition and financial risk

Physical risk	Transition risk	Financial risk
<ul style="list-style-type: none"> • Damage to buildings and infrastructure <p>Note: High initial outlay expensed on assets for EE improvements without adequate adaptation strategies (for example adopting more RE sources) will still subject the asset to the same physical risks as non-EE assets.</p>	<ul style="list-style-type: none"> • Buildings and industrial facilities that fail to meet standards imposed by regulatory authorities may be ceased from operations/ abandoned/ decommissioned. • Mandates on, and regulation of, existing products and services. • Substitution of existing products and services with higher EE options. • Unsuccessful investment in new technologies. • Rapid change in EE technologies may require frequent upgrades. 	<ul style="list-style-type: none"> • Actual energy savings from EE improvements may not fully materialise to cover investments made to transition to high EE technologies. • Increase in the probability of loan default due to loss in asset value/ income-generating capability of vehicle or property with poor EE performance.

59. FIs may rely on the assumptions presented in the NC3BUR2 and technical supplement⁵⁴ prepared by TCFD in conducting scenario analysis relating to climate-related risks and opportunities. As for other environmental risks, FIs may consider referring to “Exploring Natural Capital Opportunities, Risks and Exposure”⁵⁵ as a guide in assessing the financial impacts⁵⁶ of natural capital risk on their operations.

III. Impact-based risk management and mitigation

60. FIs need to include clear and comprehensive terms and conditions in the contractual agreements with the counterparties (applicable to new or renewal contracts) :-
- (i) Identify applicable laws/ standards/ certification related to EE and require the counterparties to obtain relevant certifications (e.g. ISO50001) or comply with relevant regulatory requirements (e.g. EMEER 2008).
 - (ii) Identify, encourage and/ or require specific commitments from counterparties to strive towards adopting local/ international regulatory

⁵² Climate-related risks are not limited to physical and transition risks and may include other risks such as liability risk and operational risk. Where applicable, FIs need to also consider the impact of these risks in their assessment.

⁵³ “Enhancing environmental risk assessment in financial decision-making” (July 2017), G20 Green Finance Study Group.

⁵⁴ “The Use of Scenario Analysis in Disclosure of Climate-Related Risks and Opportunities”, TCFD

⁵⁵ https://www.unepfi.org/wordpress/wp-content/uploads/2018/11/NCFA_Exploring-Natural-Capital-Opportunities-Risks-and-Exposure_Nov-2018.pdf

⁵⁶ <https://impakter.com/nature-risks-are-financial-risks/>

- standards and best practices within a certain timeline in efficient management of energy.
- (iii) Identify event(s) that would constitute impact-based non-compliance/ breach e.g. failure to comply with time bound plan to adopt efficient management of energy, decayed level of energy cost savings due to lack of monitoring.
 - (iv) Identify standard representations and warranties to be produced by customers :-
 - conduct detailed analysis on benefits of modern energy management systems and to be able to capture the value/ benefits of cost-effective energy savings that can be achieved by the customer;
 - adoption/ introduction of energy resource/ consumption planning;
 - implementation of metering and energy consumption data; and/ or
 - contribution towards EE funds/ programmes aimed at creating awareness on importance of EE.
 - (v) Identify escalation and exit procedures including remedies/ penalties and event of default.
 - (vi) Identify incentives, if applicable e.g. step-down pricing if meet certain impact-based targets.
61. FIs need to ensure that their counterparties have appropriate and adequate protection such as :-
- (i) Takaful protection/ energy savings insurance (ESI)⁵⁷ to mitigate the risk of technology not performing and any potential losses arising from underperformance.
 - (ii) Guaranteed energy savings arrangement such as that provided by government schemes.
 - (iii) Adequate contractual penalties and warranties with contractors to mitigate risk of operational disruptions/ delays during project implementation and after completion (on-going maintenance).
62. FIs need to establish clear escalation and exit procedures :-
- (i) Identify time bound rectification plan(s) in the event of impact-based non-compliance/ breach e.g. improvement plan for deteriorated energy performance within 6 to 12 months.
 - (ii) Identify penalty(ies) e.g. increase/ step-up pricing, temporarily stop availability of revolving/ trade finance facility, no additional facility.
 - (iii) Identify events of default e.g. continuous breach/ repeated breach, certification withdrawn, and action to be taken such as cancel undisbursed financing amount, recall financing and terminate relationship (negative list).

⁵⁷ ESI model includes financial and non-financial elements that work together to create trust and credibility among key EE market actors, and to reduce EE investment risk. The ESI model is typically designed to drive investments from SMEs in efficient technologies. (Report by BASE – Basel Agency for Sustainable Energy for UN Environment, p. 57, <http://energy-base.org/wp-content/uploads/2013/11/Manual-of-Financing-Mechanisms-and-Business-Models-for-Energy-Efficiency2.pdf>)

63. FIs should collaborate with relevant stakeholders to establish appropriate nurturing programmes :-
- (i) Customers :-
 - Collaborate with relevant government agencies/ local authorities/ NGOs to provide training/ awareness programme and advisory services on EE standards/ certification.
 - Conduct regular workshop for FIs' customers to share experience and knowledge with the support of external parties.
 - Offering green financial products to incentivise customers to improve their sustainability practices e.g. reduced margin based on pre-determined target relating to improvements in EE.
 - Setting aside part of the total financing (at preferential rates) to the customer for certification.
 - (ii) Community :-
 - Collaborate with relevant government agencies/ local authorities/ NGOs to conduct awareness/ education programme on EE to induce behavioural changes.
 - General education and promotion of EE to the public through roadshows and social media platforms.

IV. Impact-risk reporting and monitoring

64. FIs should establish appropriate reporting mechanisms to adequately monitor the impact-based performance of their counterparties (Table 11). An impact-based risk report may be constructed as follows :-
- (i) Objective: Provide comprehensive information on material impact-based risk factors that is critical for effective risk management decision making.
 - (ii) Minimum components and example(s) :-
 - Impact-based target(s)
 - Energy/ cost savings, energy consumption, MyCREST rating
 - GHG emissions reduction.
 - Key impact risk(s) and outlook (positive, stable, negative)
 - Trend of energy cost savings/ consumption (improving, unchanged or deteriorating; calculated from baseline period).
 - Impact-based metrics at portfolio level
 - Number of EE buildings financed
 - Percentage of customers with high, medium, low risk scoring, trend of scoring (improving, unchanged, deteriorating).
 - Climate change metrics
 - internal climate change target(s) – aggregate GHG emissions⁵⁸
 - climate change classifications⁵⁹
 - Compliance
 - Internal audit findings/ site visits/ surveillance audits

⁵⁸ FIs should assess its total GHG emissions at portfolio level, and proactively manage them using science-based targets.

⁵⁹ Following the classification of economics activities as outline in the CCPT.

- Exception reporting/ breaches e.g. lapsed MyCREST certification for government building, installation of EE machinery equipment by incompetent installer
- Rectification action plan and progress
- Penalties/ fines imposed by regulatory bodies e.g. electricity theft
- Penalties/ cancelled financing.

65. FIs also need to monitor and report on stakeholder feedback (Table 11). A stakeholder feedback report may be constructed as follows :-

- (i) Objective: Provide comprehensive information on key capacity building/ engagement initiatives and feedback/ grievances from wider stakeholder that is critical for effective risk management decision making.
- (ii) Minimum components :-
 - Nature of capacity building for key stakeholders (directly related to sector) e.g. employee, customers, community.
 - Nature/ types of feedback/ grievance – positive/ negative, non-compliances/ breaches.
 - Summary of action plan e.g. community engagement, additional green-improvement financing.
 - Status of action plan e.g. complete, in-progress.
 - Impact e.g. improved policies and procedures, improved public sentiment/ branding, reduction in GHG emissions.

The rest of this page has been intentionally left blank.

Table 11. Reporting channel and type of report

Stakeholder	Channel	Type of report/ information content	Frequency
Internal			
1. Board/ Risk Management Committee	<ul style="list-style-type: none"> Board/ Management meetings 	<ul style="list-style-type: none"> Impact-based risk Stakeholder feedback 	Quarterly
2. Employees (e.g. customer relationship managers, credit officers)	<ul style="list-style-type: none"> Department meetings/ focus groups Feedback forms/ surveys Intranet/ Internal communication channels 	<ul style="list-style-type: none"> Impact-based risk Stakeholder feedback Trainings/ up-skilling programmes on relevant sustainability policies, procedures, systems, products and services 	Quarterly
External			
3. Regulators	<ul style="list-style-type: none"> Meetings Seminars/ Forums Annual Report Others 	<ul style="list-style-type: none"> Impact-based risk Stakeholder feedback 	Ad-hoc
4. Shareholders/ Investors	<ul style="list-style-type: none"> Annual Report Annual general meeting Briefings 	<ul style="list-style-type: none"> Impact-based risk Stakeholder feedback 	Annually
5. Customers	<ul style="list-style-type: none"> Distribution channels Feedback forms/ surveys Other technologies e.g. social media, call centres Annual report 	<ul style="list-style-type: none"> Impact-based risk* Stakeholder feedback <p>*customer/ transactional level information</p>	Ad-hoc
6. Community/ Local authority	<ul style="list-style-type: none"> Community engagement programs Focus groups Feedback forms/ surveys Other technologies e.g. social media, call centres Annual report 	<ul style="list-style-type: none"> Impact-based risk Stakeholder feedback 	Ad-hoc

The rest of this page has been intentionally left blank.

E. APPENDICES

1. Technical glossary

Term	Definition
Energy index	Energy index is the amount of electric energy consume per year per meter square, where electric energy in kWh unit. Unit of building energy index is kWh /m ² / yr. According to MS1525 standard, recommended building energy index, BEI is 135 kWh/ m ² / yr
Energy intensity	Energy intensity is a measure of the energy efficiency calculated as units of energy per unit of GDP.
EEV	EEV is vehicles that meet a set of define specifications in terms of carbon emission level (gram/kilometre - g/km) and fuel consumption (l/100km). EEV is defined as vehicles that meet a defined specification in terms of carbon emission level (g/km) and fuel consumption (l/100 km) – EEV includes fuel efficient vehicles, hybrids, EVs and alternatively-fuelled vehicles, e.g. CNG, LPG, Biodiesel, Ethanol, Hydrogen and Fuel Cell.
Performance gap	The gap between projected energy savings and actual energy savings that are achieved in practice. Factors affecting performance include design and equipment technology, weather and changes in hours of occupancy and production volume.

The rest of this page has been intentionally left blank.

2. List of applicable laws and regulations

- (i) Laws and regulations
- Electricity Supply Act 1990
 - Electricity Regulations 1994
 - Energy Commission Act 2001
 - Efficient Management of Electricity Energy Regulations (EMEER) 2008⁶⁰
- (ii) Standards
- MS1525:2014E - Energy Efficiency and Use of Renewable Energy for Non-Residential Buildings – Code of Practice
 - Development and Publication of EE in Buildings Guidelines by Ministry of Energy, Telecommunications & Post, 1989.
 - MS1525:2001 – Code of Practise Use of Energy Efficiency and Renewable Energy for Non-residential Buildings (Revised in 2007)
 - Malaysian Standard ISO 50001 (Energy Management System)
 - Malaysia Industrial Energy Audit Guidelines, a handbook for energy auditors by Kementerian Tenaga, Air dan Komunikasi (KTAK), Pusat Tenaga Malaysia (PTM) and UNDP-GEF, 2003.
 - Guidelines for Conducting Energy Audits in Commercial Buildings, 2004
 - Design Strategies for Energy Efficiency in New Buildings (Non-Domestic), 2004
 - Energy Efficiency & Conservation Guidelines for Malaysian Industries by KTAK, PTM and UNDP-GEF
 - Part 1: Electrical Energy-use Equipment, 2007.
 - Part 2: Thermal Energy-use Equipment (2010)
 - Sustainable Low Carbon Building Performance Framework (documentation in progress) by SEDA Malaysia
 - Minimum Energy Performance Standard (MEPS)⁶¹
 - Energy Management Gold Standard (EMGS) under ASEAN Energy Management Systems (AEMAS) – MGTC appointed by ASEAN Centre for Energy as Certification Body for Malaysia
 - IFC 2012 Performance Standard 3: Resource Efficiency and Pollution Prevention
 - United Nations Environment Programme: Resource Efficient and Cleaner Production
 - European Committee of Manufacturers of Electrical Machines and Power Electrics (CEMEP) Standard
 - International Electrotechnical Commission (IEC) Standard

⁶⁰ Developed under the Energy Supply Act 1990 and is applicable for any installation that consumes at least 3 mil kWh of electricity in 6 consecutive months. Requires appointment of registered electrical energy manager (REEM), establishment of energy efficiency management system and periodic reporting.

⁶¹ Enforcement of standards, criteria and labelling for 5 domestic electrical products – A/C, fans, lighting, refrigerator, TV and washing machine. Certificate of Approval to be issued by Energy Commission (<https://www.st.gov.my/web/application/details/2/20>)

3. Examples of EE financing and investment activities globally

Center-invest Bank (Russia)

Uses an energy efficiency calculator to assess potential energy and cost savings of a project upfront. Once a project is implemented, the bank tracks energy savings as well as reduced CO₂ emissions.

The programme has enabled companies not only to reduce production costs, but also significantly reduce CO₂ emissions, on average between 30-50% in 2008. Energy efficiency loans totalled approximately 420 million rubles (or USD 12.6 million) in 2008.

HSBC UK

A collaboration with Argent, a UK property developer to green and retrofit buildings. In 2018, HSBC UK acted as the green coordinator, mandated lead arranger and hedging counterparty for the first green loan for UK commercial buildings. The £400 million green loan facility, which is helping Argent fund the development of two office buildings, is compliant with the Loan Market Association's and Asia Pacific Loan Market Association's Green Loan Principles. The offices have been designed with sustainability features that will bring the carbon footprint down to approximately 50% of similar offices in the country and are both targeting BREEAM Outstanding – one of the highest levels of green building certification globally.

Bank of Tokyo-Mitsubishi UFJ (BTMU)

New buildings in Japan can be certified eco-friendly and energy efficient by the BTMU. Consumers of new buildings with the certificate can benefit from the Eco Support Benefit, which provides loans at a borrowing rate 0.1% lower than standard loans. House owners in Japan are also eligible for other incentives to upgrade their houses with environmental-friendly features such as solar panels. They can receive Super Renovation Loans which is 0.5% lower than the annual interest rates of conventional loan scheme.

Citigroup

Asset Finance Citi's Asset Finance Group (AFG), housed in Capital Markets Origination, deploys an innovative solution for energy efficiency finance. Through the use of Energy Services Agreements, AFG is able to help corporates acquire better performing equipment, meet energy reduction and environmental goals, and create operational savings. Performance benefits are guaranteed, realized without any capex expenditure, and can be off-balance sheet.

City Developments Limited

City Developments Limited issued a two-year secured bond of SGD100 million (US\$74 million) at a 1.98% fixed rate due 2019 for the retrofit of an office building including an upgraded chiller plant, EE lights and motion sensors to reduce energy waste.

4. Examples financial products and services globally⁶²

Product	Key product designs and results/potential	Bank	Country
Home Mortgage	Government led 'green' mortgage initiative. 1% reduction on interest for loans that meet environmental criteria.	Dutch Banks	Europe
	MyCommunityMortgage and Smart Commute Initiative Mortgage. Available to help borrowers buy energy efficient homes and use public transportation. Products feature a variety of options and flexible terms.	Fannie Mae (Citigroup)	US
	CMHC offers up to 25% premium refund on its mortgage loan insurance premiums to purchase energy efficient homes or make energy efficient renovations.	CMHC (CIBC, BMO)	Canada
Commercial Building Loan	Green Loans for new condominiums. Developer (Tridel) repays loan with funds that would otherwise be spent on operating costs using conventional equipment and material. Buildings must demonstrate 25%+ energy savings over conventional designs.	TAF/ Tridel	Canada
	Provides first mortgage loans for building and refinancing LEED-certified commercial buildings. Developers do not have to pay an initial premium for "green" commercial buildings, due to features such as lower operating costs and higher performance.	Wells Fargo	US
Home Equity Loan	Environmental Home Equity Program. For customers using line of Visa Access Credit, bank will donate to an environmental NGO.	Bank of America	US
Auto Loan	Clean Air Auto Loan with preferential rates for hybrids. Product recently redesigned to cover all low-emitting vehicle types.	VanCity	Canada

5. Customer on-boarding checklist – commercial building developer

⁶² More examples from <https://valueandrisk.eefig.eu/financingenergy> and http://unepinquiry.org/wp-content/uploads/2017/12/Green_Tagging_Mobilising_Bank_Finance_for_Energy_Efficiency_in_Real_Estate.pdf.

Customer:	Location:
Financing amount:	
Type of building (brief description of relevant EE considerations):	
1. Performance risk	
<input type="checkbox"/> Energy management system – commitment, strategy and policy including monitoring mechanism, transparency and disclosure.	<p>Remarks: <i>Review comprehensiveness of energy management systems.</i></p> <p><i>Include significant elements cited in design reports – What type of accreditation? What is estimated energy savings? What is benchmark for similar project?</i></p> <p><i>What type of accreditation? What is the grade/star level?</i></p>
<input type="checkbox"/> Accredited EE design	
<input type="checkbox"/> Accredited EE technology	
	Risk grade:
2. Energy price risk	
<input type="checkbox"/> Energy consumption measure	<p>Remarks: <i>What is current energy intensity measure?</i></p> <p><i>What are specialised equipment used? What type of accreditation available for equipment used?</i></p> <p><i>Status of high energy consumption sector.</i></p>
<input type="checkbox"/> Specialised/ energy intensive equipment	
<input type="checkbox"/> High energy consumption sector	
	Risk grade:
3. Construction risk	
<input type="checkbox"/> Project implementation plan	<p>Remarks: <i>Review comprehensiveness of plan – timelines/ schedules, mitigations.</i> <i>Review contractual agreements – adequacy of penalties, warranties against contractors.</i></p> <p><i>Registered with EC? Performance track record?</i></p>
<input type="checkbox"/> Qualification of contractors	
	Risk grade:
4. O&M risk	
<input type="checkbox"/> Internal expertise	<p>Remarks: <i>Review adequacy of internal expertise e.g. number of licensed energy experts, work experience.</i></p> <p><i>Review adequacy outsourcing arrangement, terms and conditions including penalties, warranties.</i> <i>Review scope and frequency of maintenance arrangement. What is benchmark for similar project?</i></p>
<input type="checkbox"/> Maintenance arrangement	
	Risk grade:
5. M&V risk	

<input type="checkbox"/> Applicable measurement standard	Remarks: <i>What is measurement standard? (if other than energy intensity)</i>
<input type="checkbox"/> Periodic M&V report/ audit	<i>Review plan for M&V/ independent energy audit</i>
	Risk grade:
6. Desktop research	
<input type="checkbox"/> Benchmarking against other similar projects	Remarks: <i>Include significant elements from reports</i>
<input type="checkbox"/> Adverse news articles, reports from regulators, civil societies etc. about the project.	
	Risk grade:
Final risk grade:	
Recommendation:	
Additional conditions:	

The rest of this page has been intentionally left blank.

6. List of guidance and tools from ENERGY STAR

- (i) “ENERGY STAR Action Workbook for Small Business”
This guidebook is intended to serve as a resource and planning guide for owners, operators, and employees of small businesses. This guidebook provides step-by-step guidance on ways to increase EE in facilities by implementing realistic and cost-effective energy improvement projects.
https://www.energystar.gov/sites/default/files/tools/ENERGYSTAR_Small_Business_AWB_Main_508_November_2019.pdf

- (ii) “Small and Medium Sized Manufacturers’ Guide to Energy Management”
This guide helps small and mid-sized manufacturers apply United States Environmental Protection Agency (EPA)’s Guidelines for Energy Management to their own company.
<https://www.energystar.gov/buildings/tools-and-resources/small-and-medium-sized-manufacturers-guide-energy-management>

- (iii) “15 O&M Best Practices for Energy Efficient Buildings”
This report presents an overview of the 15 best practices building owners and managers can employ to make their buildings more energy-efficient.
<https://www.energystar.gov/sites/default/files/buildings/tools/Fifteen%20O%26M%20Best%20Practices.pdf>

- (iv) “Operations and Maintenance Service Contracts”
This report presents guidance for designing and obtaining a good O&M service contract. Clear information on service contract options and trends to commercial and retail building owners, facility managers, property managers, and chief building engineers is provided.
https://www.energystar.gov/sites/default/files/buildings/tools/Operations%20and%20Maintenance%20Service%20Contracts_0.pdf

- (v) “Putting the “O” back in O&M Best Practices in Preventive Operations, Tracking and Scheduling.”
This guide presents an overview of best practices in preventive operations, performance tracking, and scheduling.
https://www.energystar.gov/sites/default/files/buildings/tools/Putting_the_O_Back_in_O%26M.pdf

The rest of this page has been intentionally left blank.

7. Selected energy policies and targets by ASEAN countries⁶³

Country	Sector	Policies and targets
Brunei Darussalam	Efficiency	Reduce total energy consumption by 63% from BAU levels by 2035.
	Renewables	Achieve 10% of electricity generation from renewables by 2035.
	Climate change	Reduce CO ₂ emissions from morning peak-hour vehicle use by 40% from BAU level by 2035.
Cambodia	Electrification	Electrification for all villages by 2020 and 70% electrification for households by 2030.
	Renewables	Increase hydropower capacity to 2 241 megawatts by 2020.
	Climate change	Reduce GHG emissions 27% from baseline emissions by 2030 with international support.
Indonesia	Electrification	Achieve electrification ratio of 99.7% by 2025.
	Efficiency	Reduce energy intensity by 1% per year to 2025.
	New and renewable energy*	Increase share of "new and renewable energy" in primary energy supply to reach 23% by 2025 and 31% by 2050.
	Climate change	Reduce GHG emissions 26% by 2020 and 29% by 2030 from BAU levels, and 41% by 2030 with international support.
Lao PDR	Electrification	Achieve electrification rate of 98% by 2025.
	Efficiency	Reduce final energy consumption by 10% from BAU level.
	Renewables	Achieve 30% share of renewables in primary energy supply by 2025.

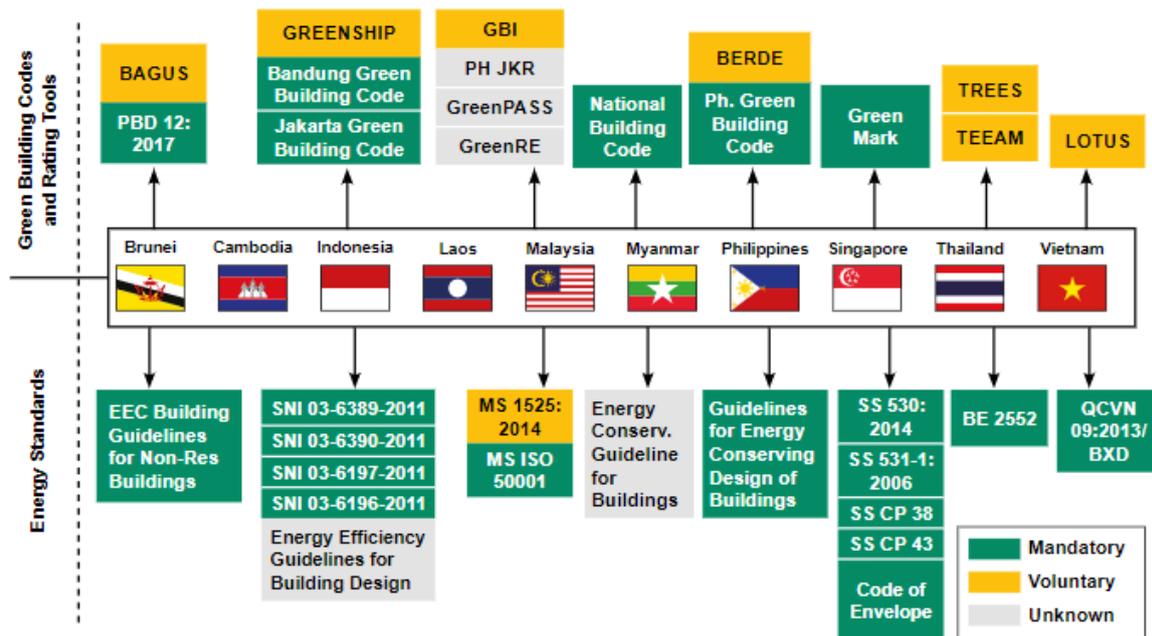
Country	Sector	Policies and targets
Malaysia	Efficiency	Promote energy efficiency in the industry, buildings and residential sectors with methods of standard setting, labelling, energy audits and building design.
	Renewables	Increase capacity of renewables to 2 080 MW by 2020 and 4 000 MW by 2030.
	Transport	Introduce 100 000 electric vehicles by 2020 with 125 000 charging stations.
	Climate change	Reduce GHG intensity of GDP by 35% by 2030 from 2005 level, increase to 45% reduction with enhanced international support.
Myanmar	Electrification	Achieve electrification rate of 80% by 2030.
	Efficiency	Reduce primary energy demand by 8% by 2030 from 2005 level.
Philippines	Electrification	Achieve 100% electrification by 2022.
	Efficiency	Reduce energy intensity 40% by 2030 from 2010 level.
		Decrease energy consumption by 1.6% per year by 2030 from baseline forecasts.
	Renewables	Triple the installed capacity of renewables-based power generation from 2010 level to 15 GW by 2030.
Climate change	Reduce GHG emissions by 70% from BAU level by 2030 with the condition of international support.	

⁶³ Southeast Asia Outlook 2019, IEA.

Country	Sector	Policies and targets
Singapore	Efficiency	Improve energy intensity by 35% by 2030 from 2005 levels.
	Renewables	Increase solar PV capacity to 350 MW by 2020 and 1 GW beyond 2020.
	Climate change	Reduce GHG emissions by 16% below BAU level by 2020, stabilise emissions with the aim to peak around 2030.
Thailand	Efficiency	Reduce energy intensity by 30% by 2036 from 2010 level.
	Renewables	Increase share of renewables to 30% in total final energy consumption by 2036; increase share of renewables-based power to 36% in generation capacity and to 20% in generation by 2037. Increase share of renewables in transport fuel consumption to 25% by 2036.
	Transport	Increase to 1.2 million electric vehicles and 690 charging stations by 2036.
	Climate change	Reduce CO ₂ emissions from power sector to 0.283 kg CO ₂ in 2037 from 0.413 kg CO ₂ in 2018. Reduce GHG emissions by 20% from BAU level by 2030, increase to 25% with enhanced international support.
Viet Nam	Electrification	Ensure most rural households have access to electricity by 2020.
	Efficiency	Increase commercial electricity savings to more than 10% of total power consumption by 2020 relative to BAU.
	Renewables	Increase the share of non-hydro renewables-based generation capacity to 12.5% by 2025 and 21% by 2030.
	Climate change	Reduce GHG emissions by 8% by 2030 and by 25% from BAU levels with international support.

The rest of this page has been intentionally left blank.

8. National green building standards and codes in ASEAN countries



Source: Report on Mapping of Green Building Codes and Building Energy Efficiency in ASEAN: Towards Guidelines on ASEAN Green Building Codes

The rest of this page has been intentionally left blank.

F. ESSENTIAL READINGS

1. Building Energy Efficiency Technical Guideline for Passive Design, http://bseep.gov.my/App_ClientFile/df08bc24-99fb-47a3-937f-dc25df9d3997/Assets/Books/BSEEP-Passive-Design-Guidebook-Content.pdf
2. Building Energy Efficiency Technical Guideline for Active Design, http://bseep.gov.my/App_ClientFile/df08bc24-99fb-47a3-937f-dc25df9d3997/Assets/Books/BSEEP-Active-Design-Guidebook-Content.pdf
3. CDC ESG Toolkit: Sector Profiles, <https://toolkit.cdcgroup.com/sector-profiles/power/>
4. EEFIG Underwriting Toolkit: Value and Risk Appraisal for Energy Efficiency Financing (2017), The Energy Efficiency Financial Institutions Group, <https://valueandrisk.eefig.eu/>
PDF version – <http://www.unepfi.org/publications/climate-change-publications/eefig-underwriting-toolkit-value-and-risk-appraisal-for-energy-efficiency-financing/>
5. Energy Efficiency Indicators: Fundamentals on Statistics (2014), IEA, <https://webstore.iea.org/energy-efficiency-indicators-fundamentals-on-statistics>
6. Energy Malaysia, Volume 18 (2019), www.st.gov.my/web/download/listing/112
7. Energy Malaysia, Volume 12 (2017), www.st.gov.my/web/download/listing/112
8. GRI 302: Energy 2016, Global Reporting Initiative, www.globalreporting.org
9. Manual of Financing Mechanisms and Business Models for Energy Efficiency (March 2019), <http://energy-base.org/wp-content/uploads/2013/11/Manual-of-Financing-Mechanisms-and-Business-Models-for-Energy-Efficiency2.pdf>
10. NEEAP, <https://www.pmo.gov.my/ms/2019/07/pelan-tindakan-kecekapan-tenaga-negara/>
11. Special Report: Global Warming of 1.5 °C (2018) by Intergovernmental Panel on Climate Change (IPCC), <https://www.ipcc.ch/sr15/>
12. Southeast Asia Energy Outlook (2019), IEA, <https://www.iea.org/reports/southeast-asia-energy-outlook-2019>