UN environment programme | finance initiative

Principles for Responsible Banking

UNEP Finance Initiative

Energy Efficiency Finance capacity building for Asia Pacific Banks

5-8 June 2023

MINISTERO DELL'AMBIENTE
E DELLA SICUREZZA ENERGETICA

We would like to thank the Italian Ministry of Environment and Energy Security for supporting the UN system's contribution to a green and inclusive recovery by harnessing the power of financial systems to support the SDG Decade of Action, access of developing countries to sustainable finance and Multilateral Environmental Agreements.

The outline of the capacity building program

5 June – Workshop 1#: Why energy efficiency?

- Understanding impacts: Energy efficiency (EE), the SDGs and the Circular Economy
- The business opportunity - EE in the Buildings, Transport, Equipment, Industry sectors
- Focus on SMEs
- Key EE regulations and policies for bank lending

7 June – Workshop 2#: Financing energy efficiency

- UNEP FI's guidance for banks to set EE targets
- Finance instruments overview
- Financing EE investments in industries
- A zoom on ESCOs

8 June - Workshop 3#: Financing renovations/new constructions in the buildings sector

- The emerging EE and green building concepts
- Deep dive on conventional lending and innovative financing instruments
- IFC's experience with green buildings
- Putting the pieces together

After the workshops possibility to request **further individual technical assistance**.

Today's detailed agenda

2.00 PM* **Introduction to the program**

2.15 **Setting the scene: the PRB view on energy efficiency** (UNEP FI)

2.30 **The business opportunity – what role energy efficiency could play in the coming decades** (Ksenia Petrichenko, International Energy Agency)

- Multiple benefits of EE
- Buildings, Transport, Equipments, Industry and SMEs
- Scenarios: Sustainable Development and Net Zero by 2050 for Asia Pacific

3.30 Coffee break

3.45 **SMEs and energy efficiency investments – A case study of Energy Savings Insurance as an innovative instrument** (Viola Buli, BASE)

4.05 **Energy efficiency target setting & implementation** (UNEP FI)

5.00 **Closing**

*China Standard Time

Before we get started

Connect to Slido via the link posted in the chat

or go to **www.slido.com** and
enter code: **123 23 23**

or scan QR code:

- Post questions in Slido or Raise hands in Webex (if you want to speak up)
- Recordings and materials will be shared after the meeting to participants

slido

Let's start with introductions (your bank, department, country)

ⓘ Start presenting to display the poll results on this slide.

slido

Is energy efficiency currently part of your sustainability strategy?

ⓘ Start presenting to display the poll results on this slide.

slido

Why do you think can energy efficiency be important in your country?

ⓘ Start presenting to display the poll results on this slide.

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What are your expectations for this programme?

ⓘ Start presenting to display the poll results on this slide.

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You can post questions during the whole workshop on Slido!

ⓘ Start presenting to display the audience questions on this slide.

Workshop 1#

Why energy efficiency?

Energy Efficiency in the PRB Framework

EE is key for several impact areas

PRINCIPLE 1:
ALIGNMENT

We will align our business strategy to be consistent with and contribute to individuals' needs and society's goals, as expressed in the Sustainable Development Goals, the Paris Climate Agreement and relevant national and regional frameworks.

PRINCIPLE 2:
IMPACT & TARGET SETTING

We will continuously increase our positive impacts while reducing the negative impacts on, and managing the risks to, people and environment resulting from our activities, products and services. To this end, we will set and publish targets where we can have the most significant impacts.

PRINCIPLE 3:
CLIENTS & CUSTOMERS

We will work responsibly with our clients and our customers to encourage sustainable practices and enable economic activities that create shared prosperity for current and future generations.

PRINCIPLE 4:
STAKEHOLDERS

We will proactively and responsibly consult, engage and partner with relevant stakeholders to achieve society's goals.

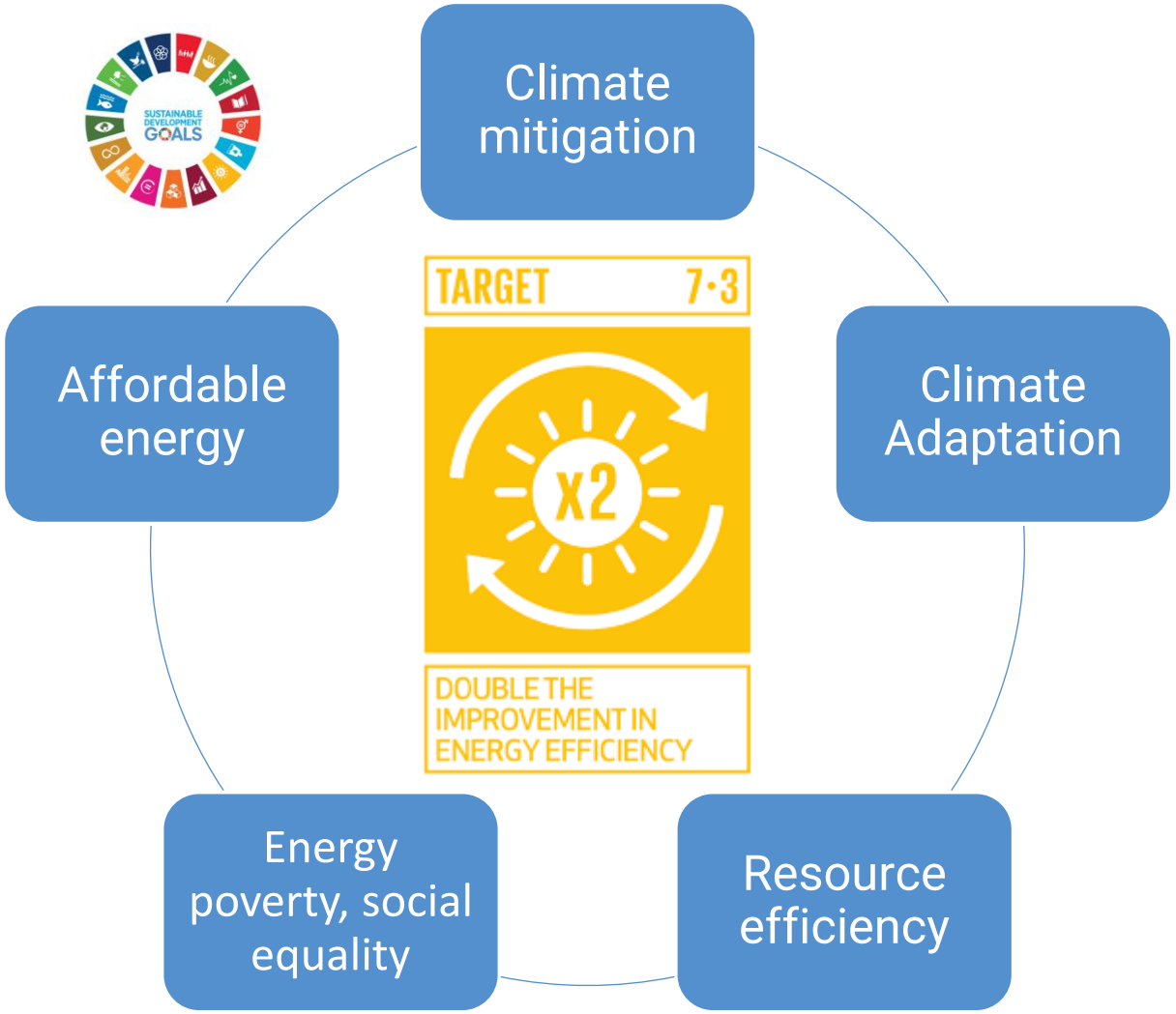
PRINCIPLE 5:
GOVERNANCE & CULTURE

We will implement our commitment to these Principles through effective governance and a culture of responsible banking.

PRINCIPLE 6:
TRANSPARENCY & ACCOUNTABILITY

We will periodically review our individual and collective implementation of these Principles and be transparent about and accountable for our positive and negative impacts and our contribution to society's goals.

EE is key for several impact areas



As a PRB bank you can approach EE from at least two impact areas for your target setting

DRIVERS FOR IMPACT MANAGEMENT (Inputs)

- Policy and regulatory context
- Stakeholder expectations and demands (investors, customers)
- Business risk and opportunities deriving from economic, social and environmental context

PRACTICE

How sustainability issues are integrated into the bank's strategy, business and systems

Actions
The actions taken by the financial institution to manage impacts in response to the drivers

- Policies & Processes
- Portfolio Composition
- Client Engagement
- Advocacy

Outputs
The deliverables from the actions taken

[output indicators]

Outcomes
What happens as a result of the actions and their outputs

[outcome indicators]

IMPACT

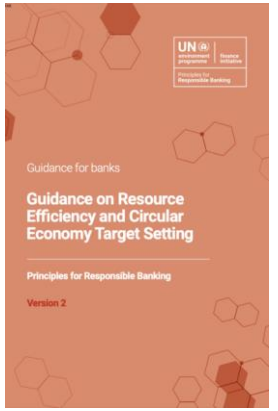
The positive impacts achieved and the negative impacts avoided, mitigated and/or compensated as a result of the bank's practice

Impacts
End-results for people, society and the environment

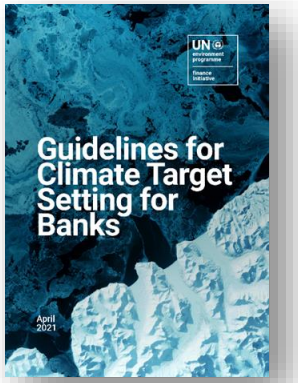
[impact indicators]

ALIGNMENT WITH POLICY OBJECTIVES, FILLING OF SDG GAPS* & SUSTAINABILITY LINKED RISKS AND OPPORTUNITIES MANAGED

Note: alignment at the level of individual portfolios does not necessarily translate into system-level alignment and hence the filling of SDG gaps



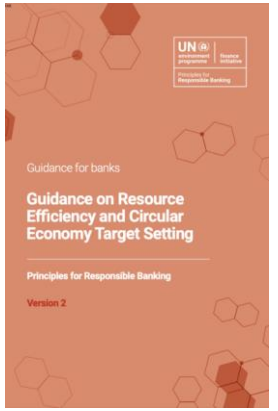
Resource efficiency & Circular economy



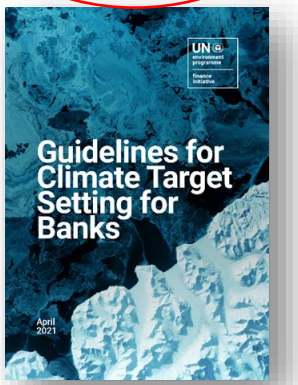
Climate Change

You can also consider setting combined climate & circular economy targets, using both guidances to maximize synergies and avoid a silo-effect

As a PRB bank you can approach EE from at least two impact areas for your target setting

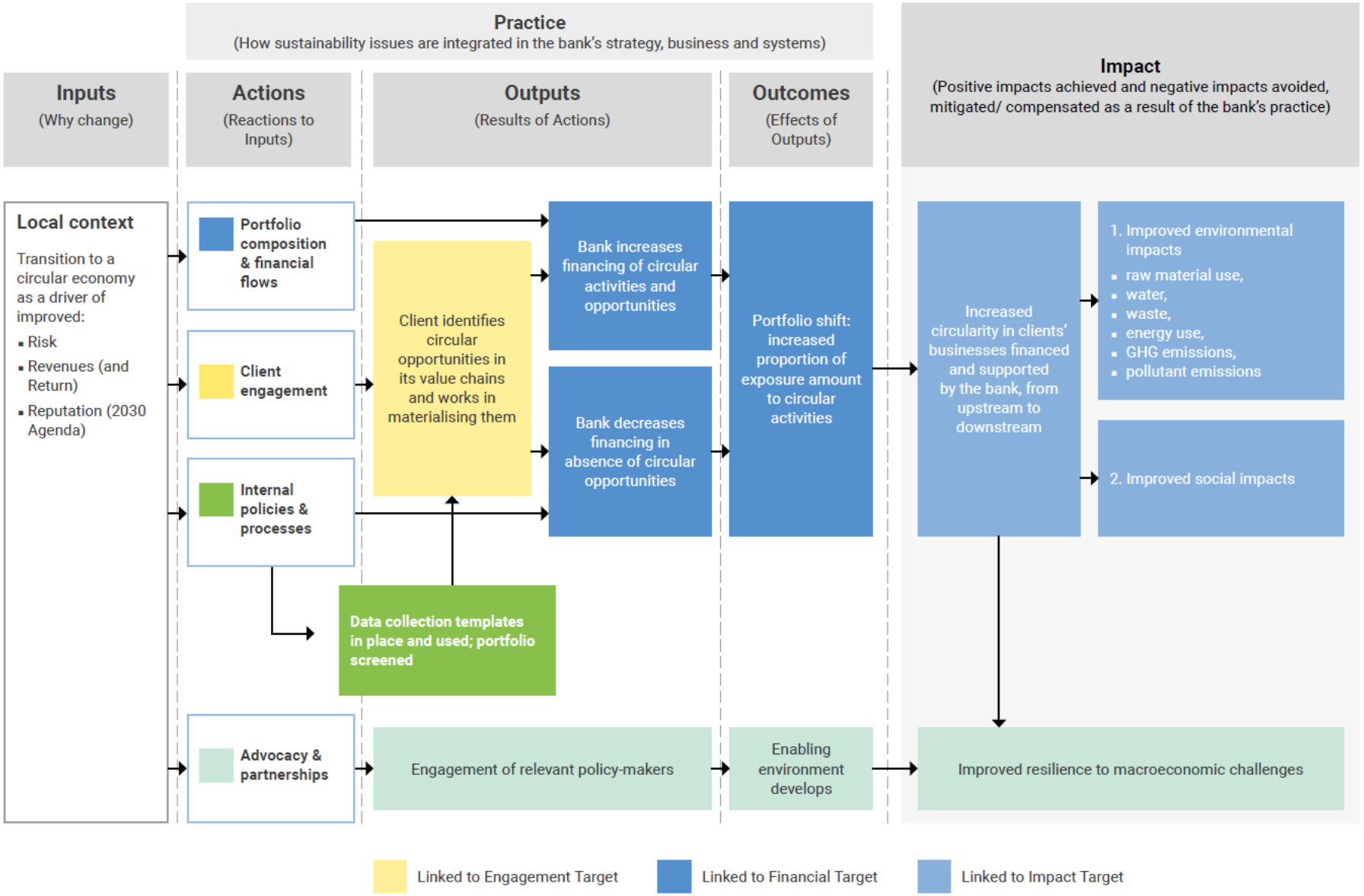


Resource efficiency & Circular economy



Climate Change

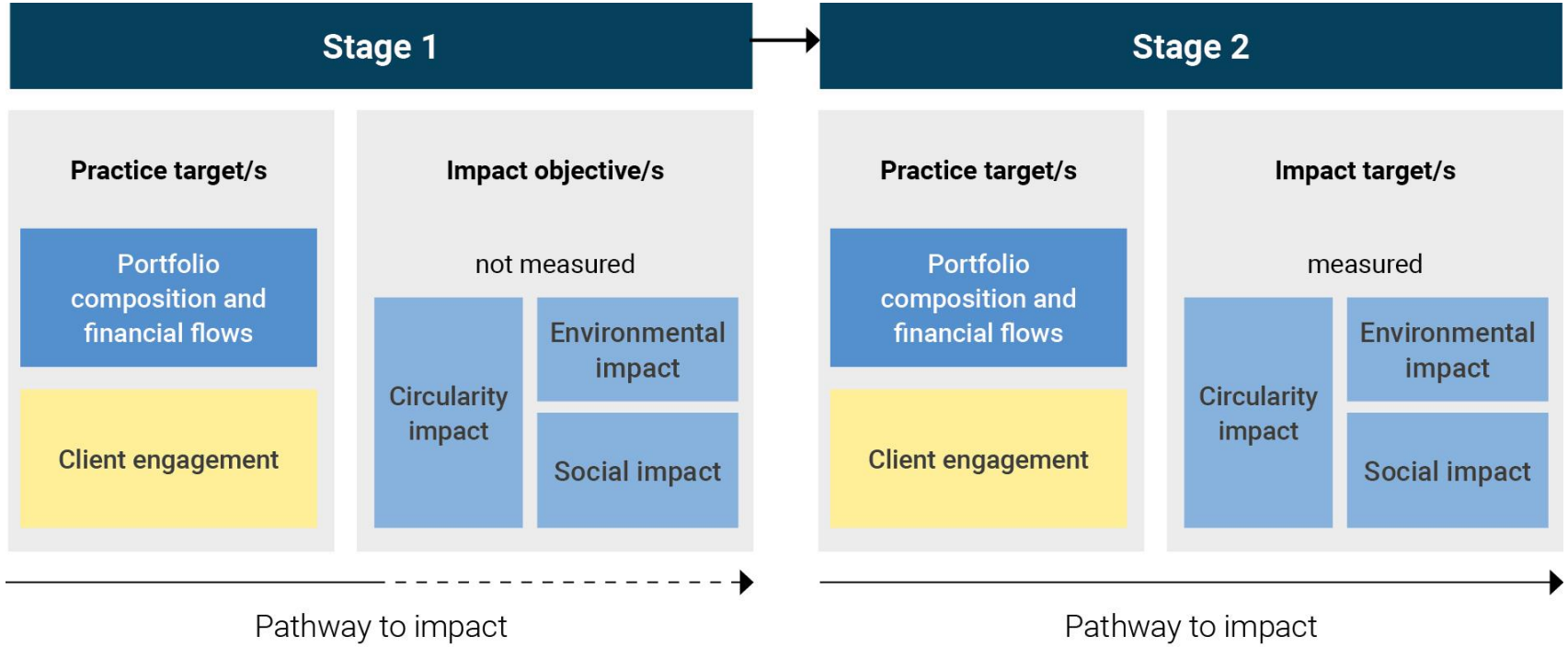
EE as part of your bank's resource efficiency agenda



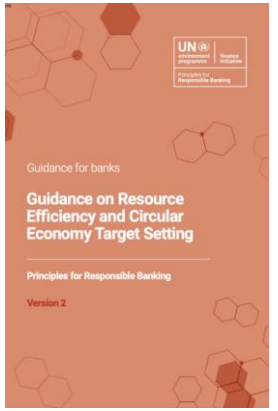
The framework for resource efficiency and circular economy

Progressive approach to target setting

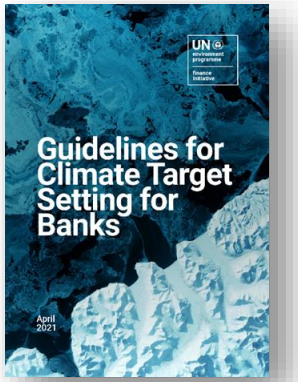
- Setting **practice targets** with impact objectives
- This acts as a first step in a journey to ultimately set **impact targets** that are required by the PRBs.
- Energy efficiency is well established, thus we encourage you to move to Stage 2 immediately



As a PRB bank you can approach EE from at least two impact areas for your target setting



Resource efficiency & Circular economy



Climate Change

PATHWAY TO CLIMATE IMPACT

INPUTS

BANK & REGIONAL CONTEXT

ACTIONS

- Does your bank have a climate strategy in place?
- Has your bank set a long-term portfolio-wide Paris-alignment target?
- Has your bank put in place rules and processes for client relationships (both new clients and existing clients), to work together towards the goal of transitioning the clients' activities and business model?
- Has your bank analyzed (parts of) its lending and/or investment portfolio in terms of financed emissions (Scope 3, category 15); technology mix or carbon-intensive sectors in the portfolio?
- Has your bank developed financial products tailored to support clients' and customers' reduction in GHG emissions (such as energy efficient mortgages, green loans, green bonds, green securitisations etc.)?

OUTPUTS

- Is your bank in an engagement process with clients regarding their strategy towards a low(er)-carbon business model (for business clients), or towards low(er)-carbon practices (for retail clients)?
- What are your absolute emissions (financed emissions = scope 3, category 15) in your lending and/or investment portfolio?
- What is the emission intensity within the relevant sector?
- What proportion of your bank's financed emissions is covered by a decarbonization target, i.e. stem from clients with a transition plan in place?

OUTCOMES

- How much does your bank lend to/invest in green assets / loans and low-carbon activities and technologies?
- How much does your bank lend to / invest in carbon-intensive sectors and activities?
- How much does your bank invest in transition finance?

IMPACTS

- How much have the GHG emissions financed been reduced?
- How much of your bank's portfolio is aligned with Paris (depending on the target set either 1.5 or 2 degrees)?

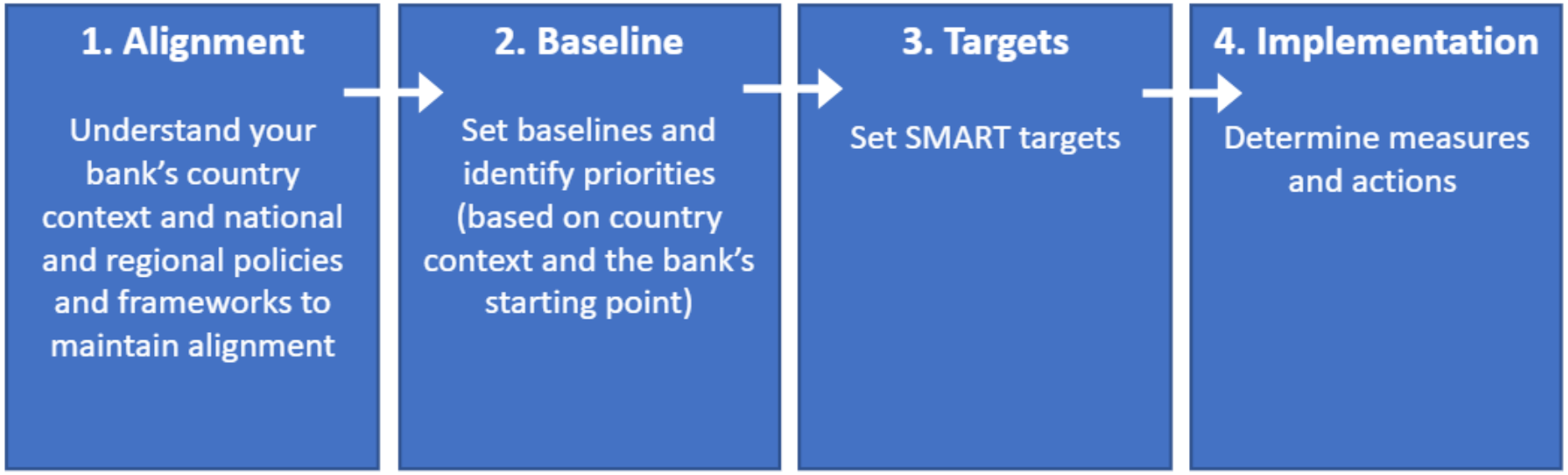
From banks' perspective, energy efficiency can…

Reduce risks linked to an energy-inefficient model, by reducing dependence on energy supply, exposure to price volatility and improving borrower repayment capacities & collateral values

Come with huge **business opportunities** – see IEA presentation coming next

Be a key driver to maximize your positive **impacts on planet & people** in line with your PRB committment

The target setting process (climate or resource efficiency)



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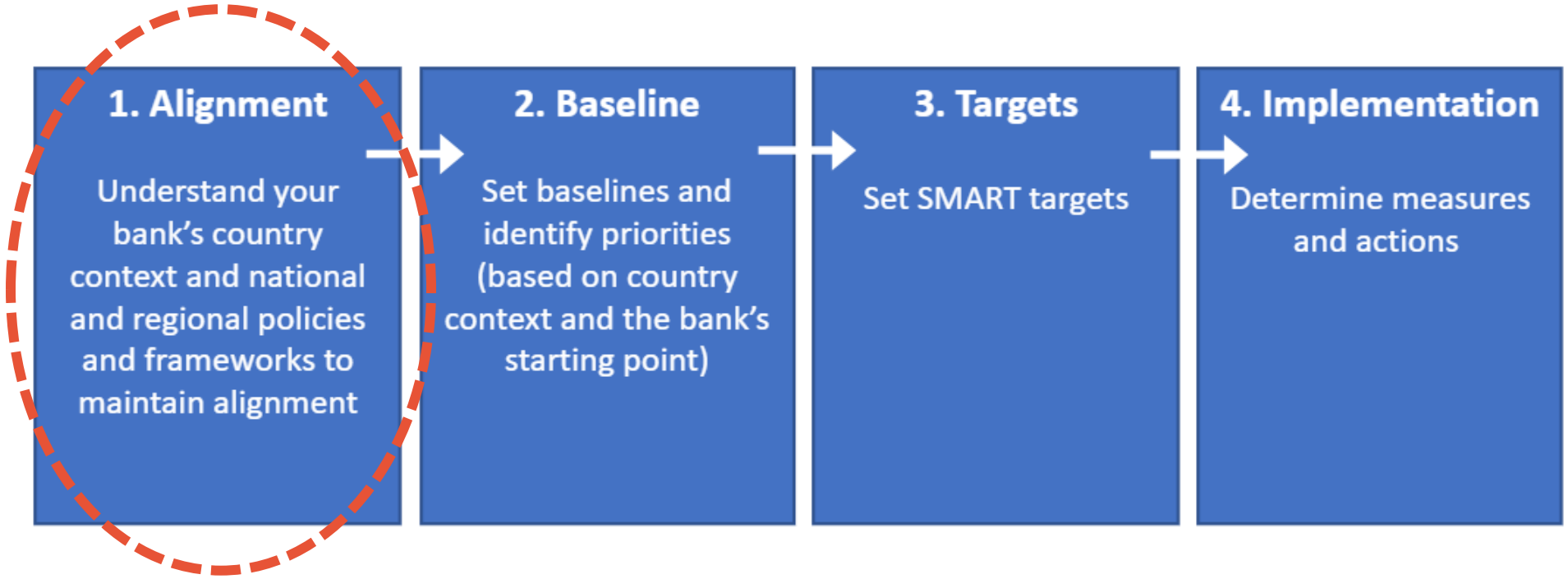


Alignment & context analysis

- Understanding what scenario and ambition to align with
- EE as a business opportunity
- Policy context to support your EE planning

International Energy Agency

Energy Efficiency

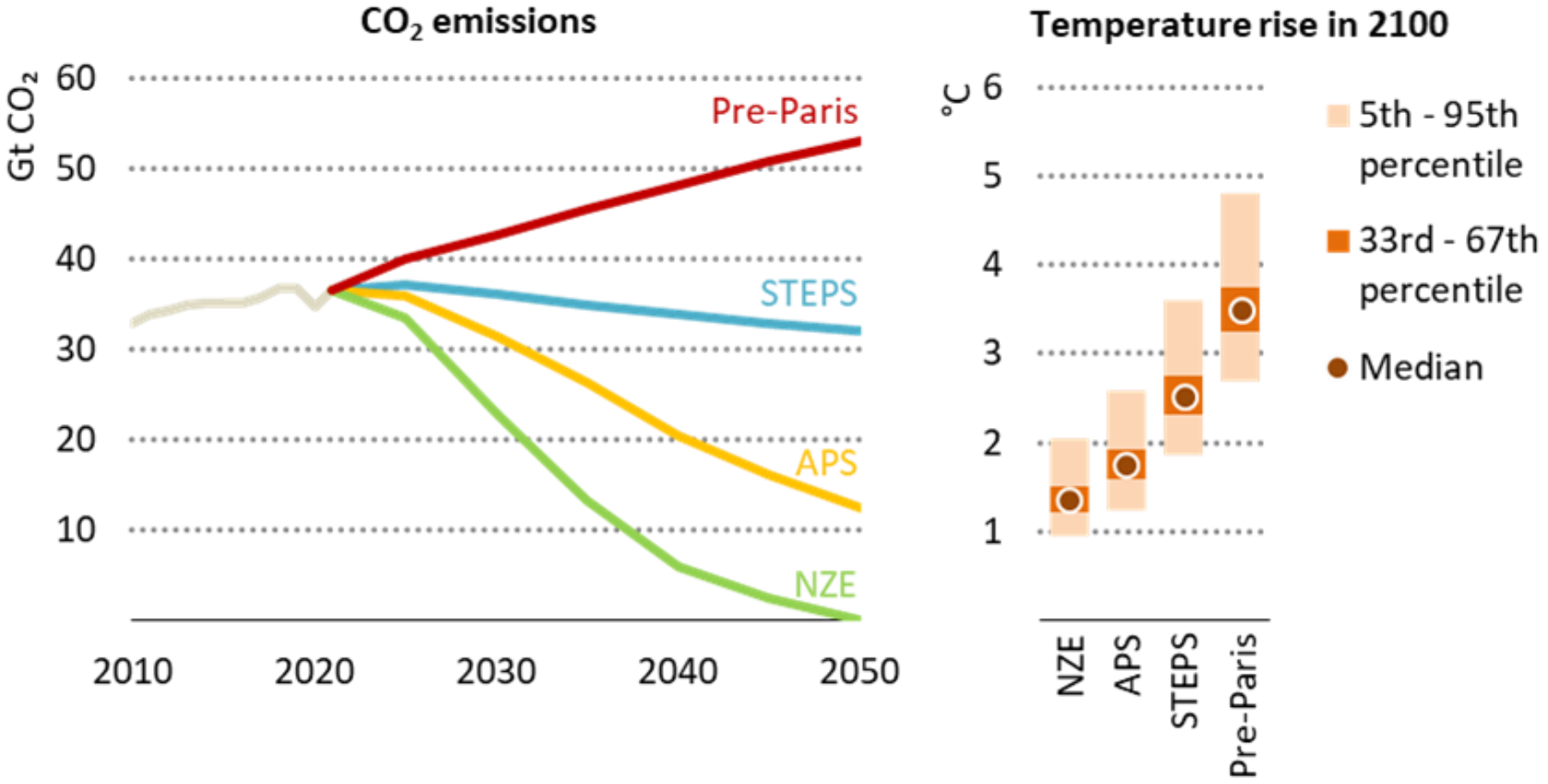
Ksenia Petrichenko, Energy Efficiency Division, International Energy Agency

UNEP-FI EE training for banks

5th June 2023

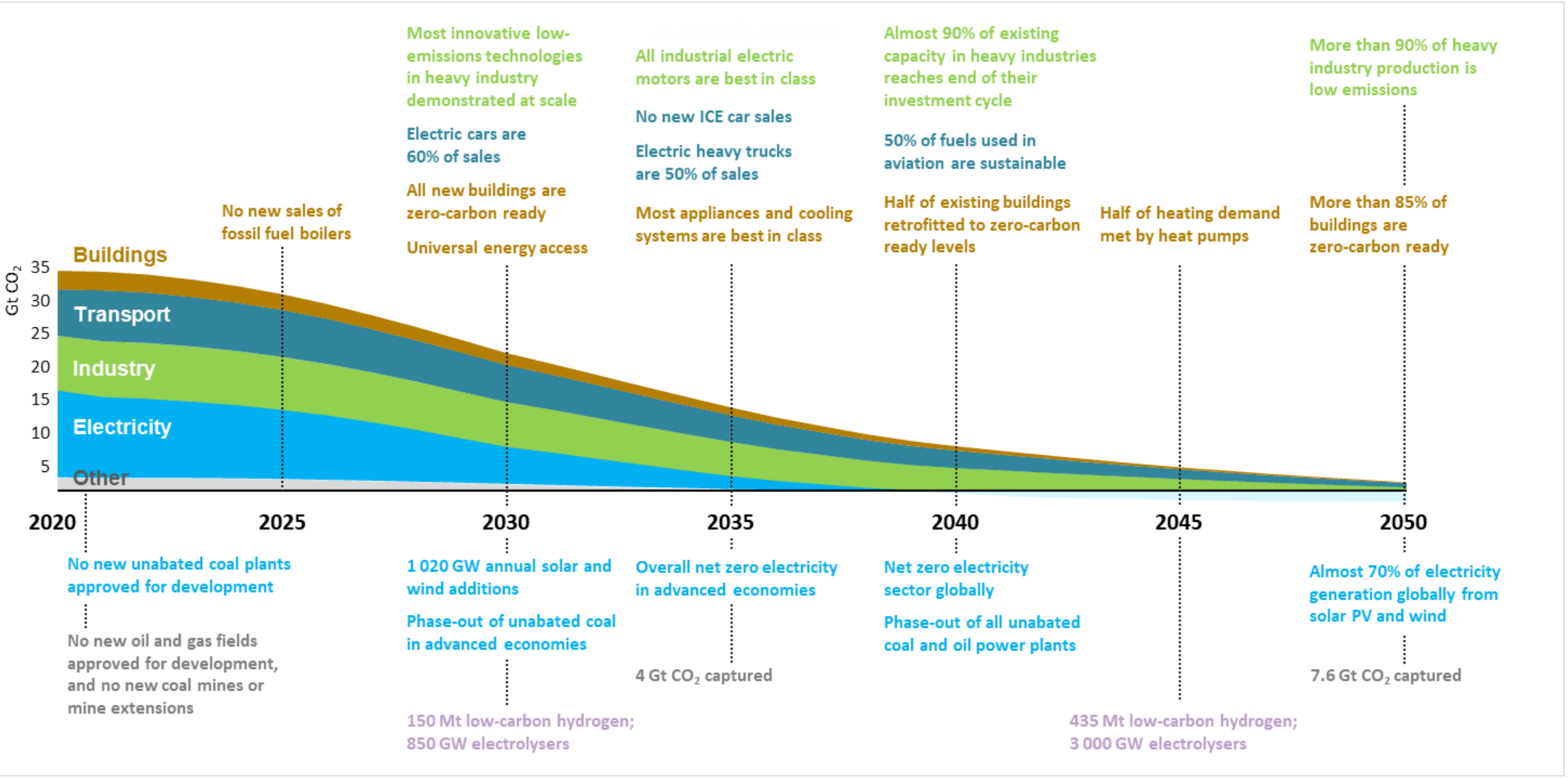
Energy efficiency's role in climate goals

Global CO_2 emissions per scenario and related temperature rise in 2100



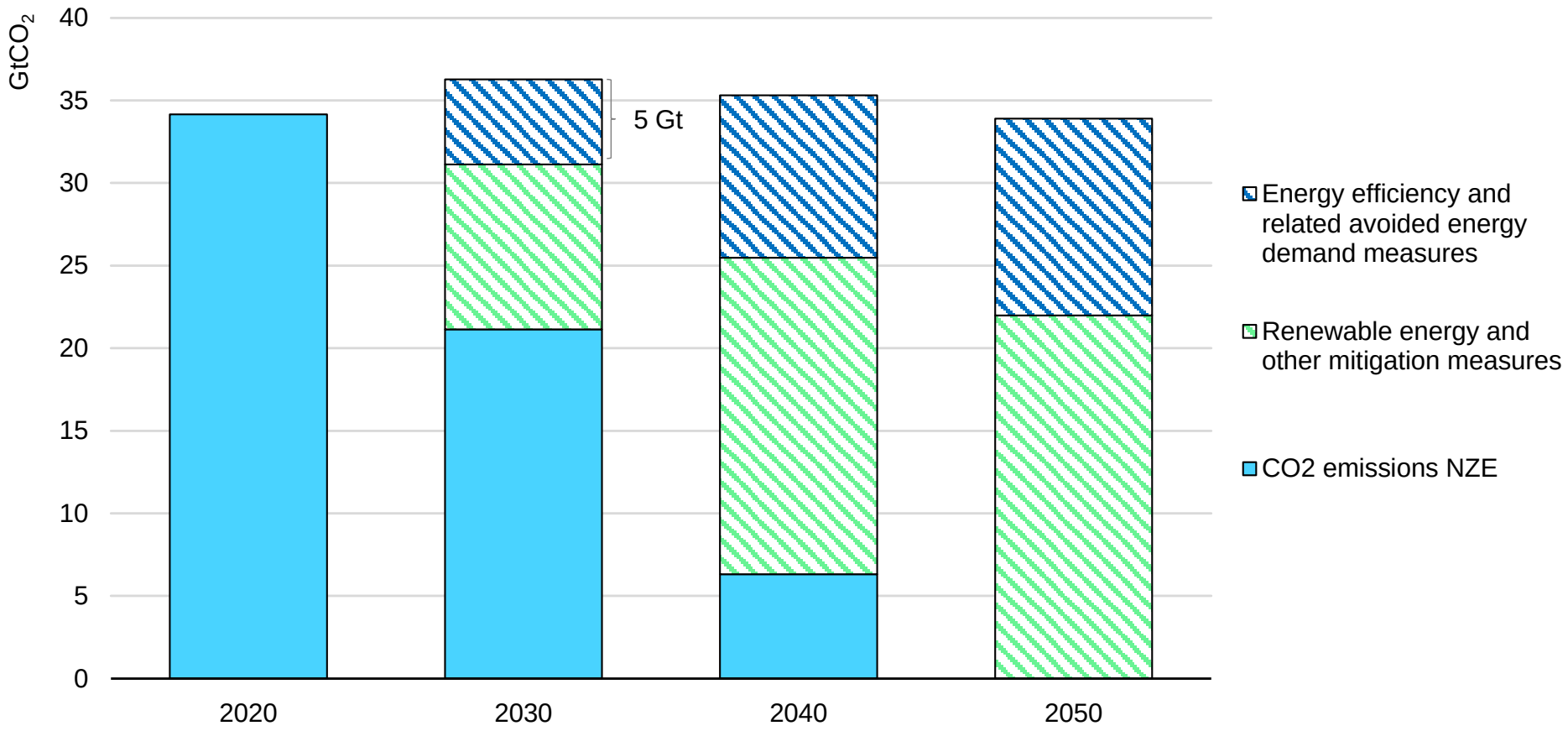
Energy efficiency plays a key role in achieving the climate targets and in reaching net zero emissions by 2050

Key milestones on the road to net zero emissions



Efficiency provides one-third of the mitigation in Net Zero Scenario

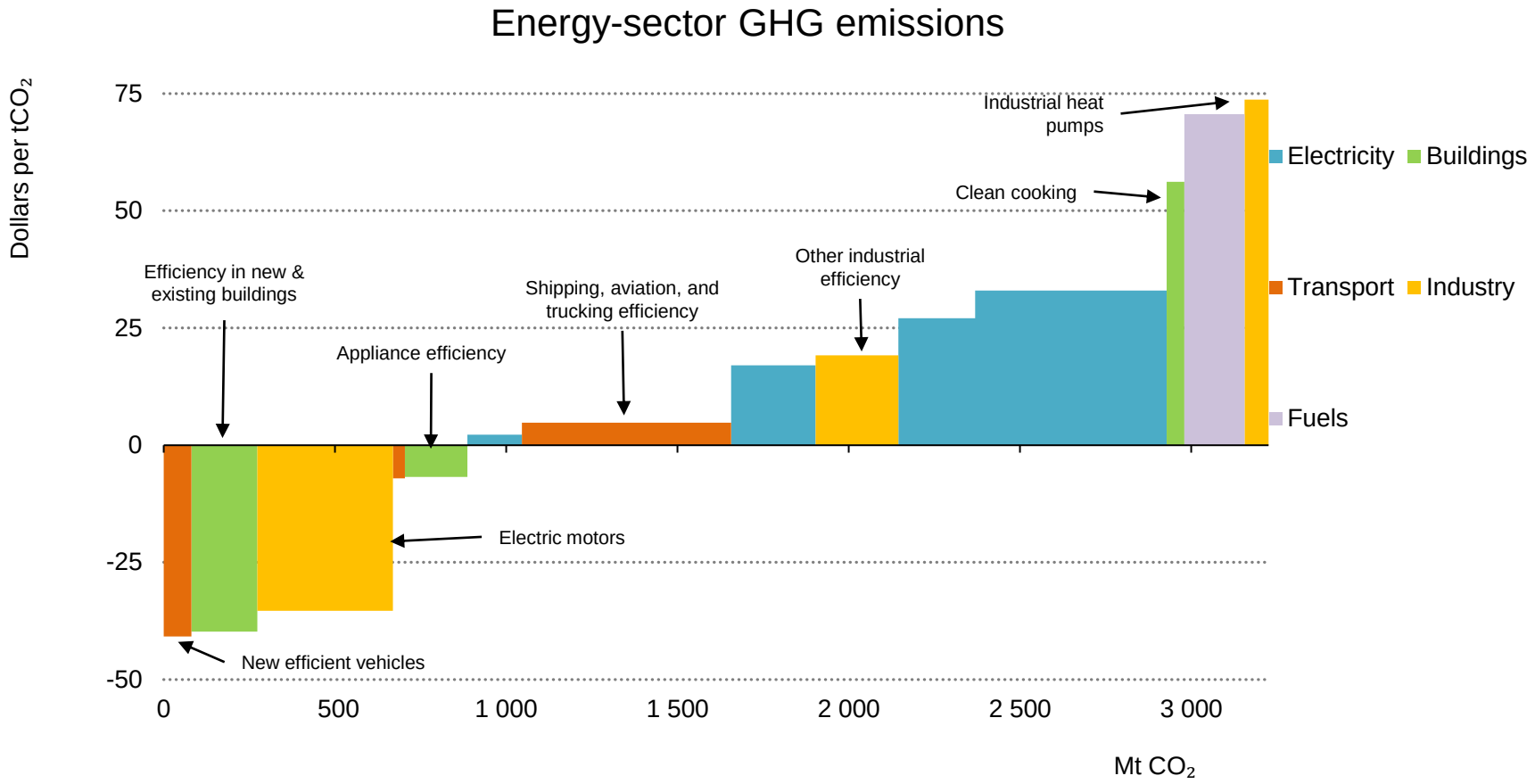
CO2 emissions and main mitigation measures in the Stated Policies Scenario and the Net Zero Scenario, 2020-2050



Annual efficiency improvements needs to double, from 2 to 4% per year during this decade to match the ambition of the IEA Net Zero by 2050 Scenario

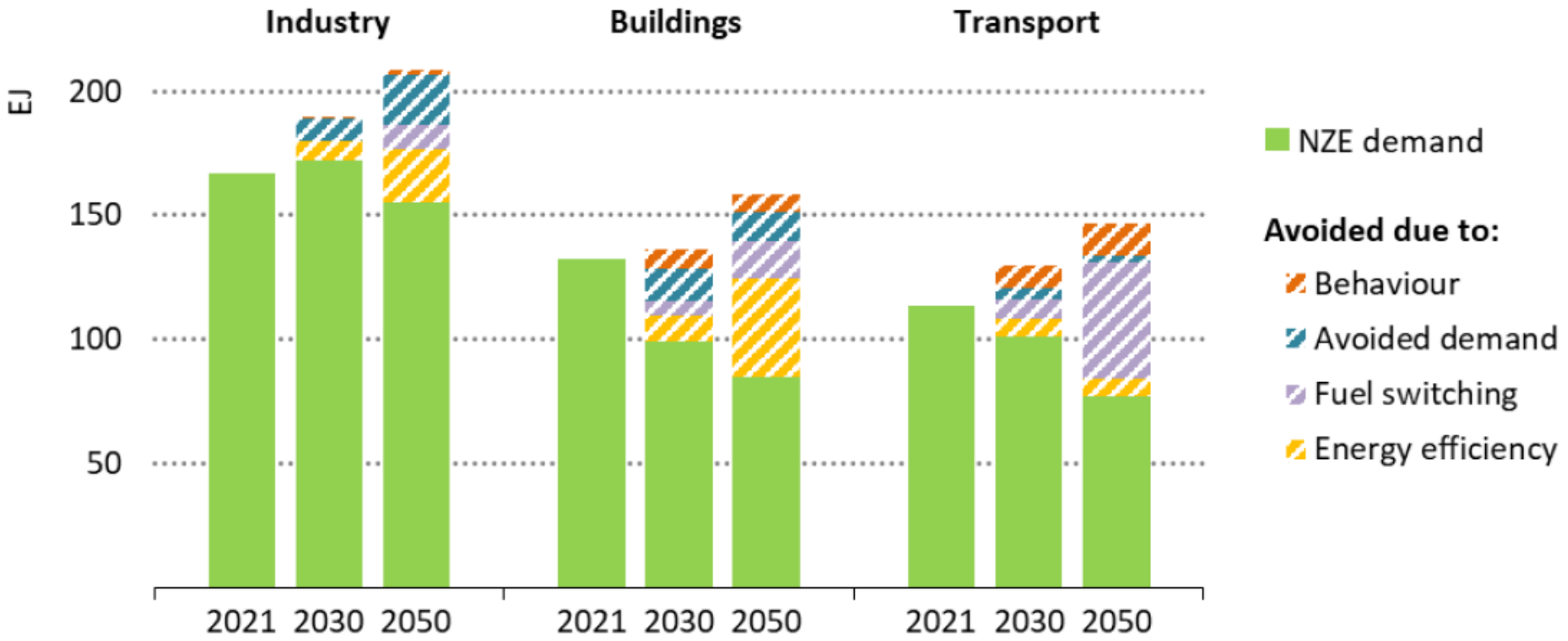
Over 5 Gt CO2 can be avoided through energy efficiency related measures through to 2030

Efficiency contributes the most to emissions and cost reductions



Improving electric motors efficiency represents one of the most cost-effective ways to reduce CO_2 emissions in the short term.

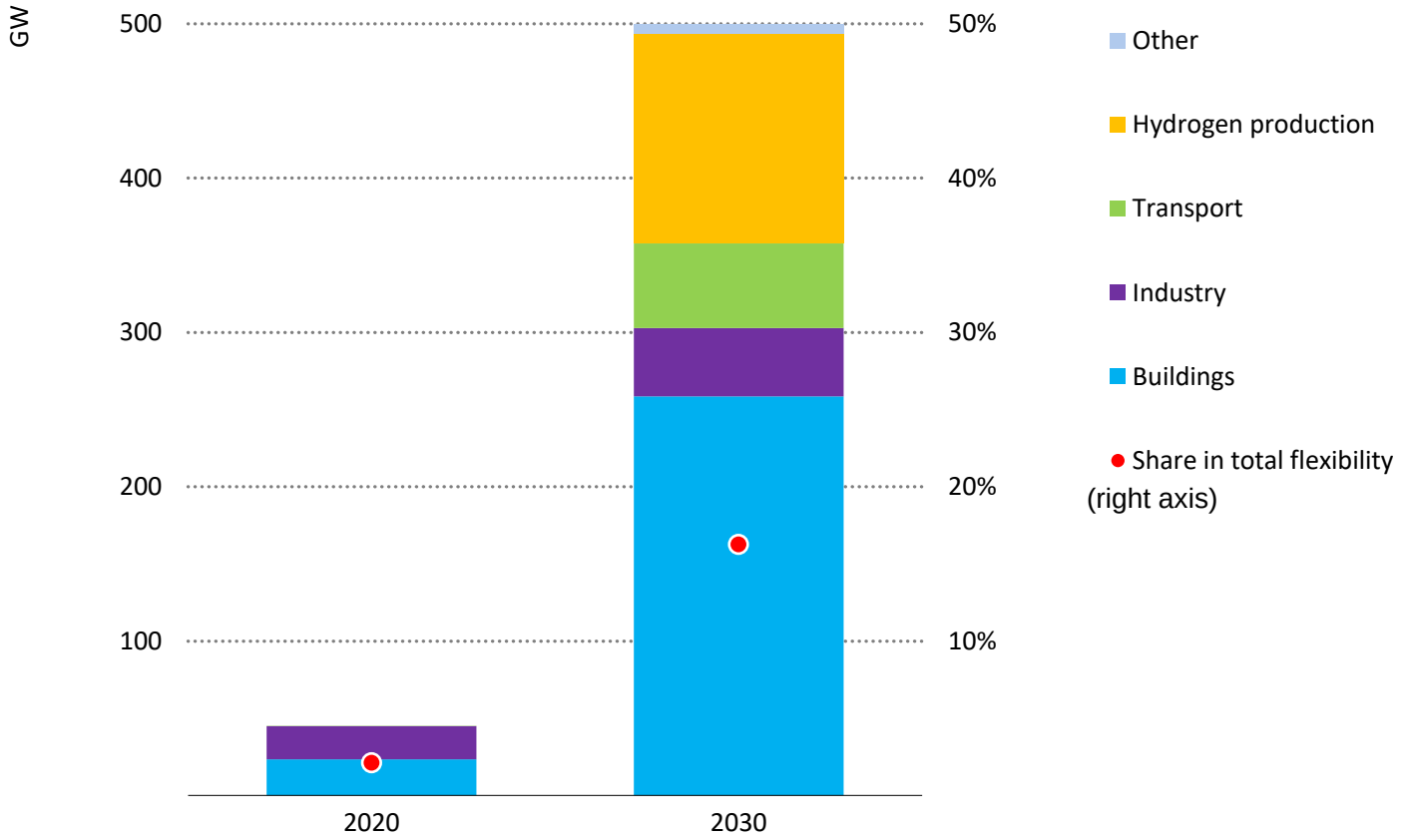
Total final consumption avoided by measure in the NZE Scenario



Energy efficiency plays a key role in reducing energy consumption by 2050 across all sectors, especially in buildings and industry

Demand-response availability increases tenfold in the next ten years

Demand response availability at times of highest flexibility needs and share in total flexibility provision in the Net Zero Scenario, 2020 and 2030

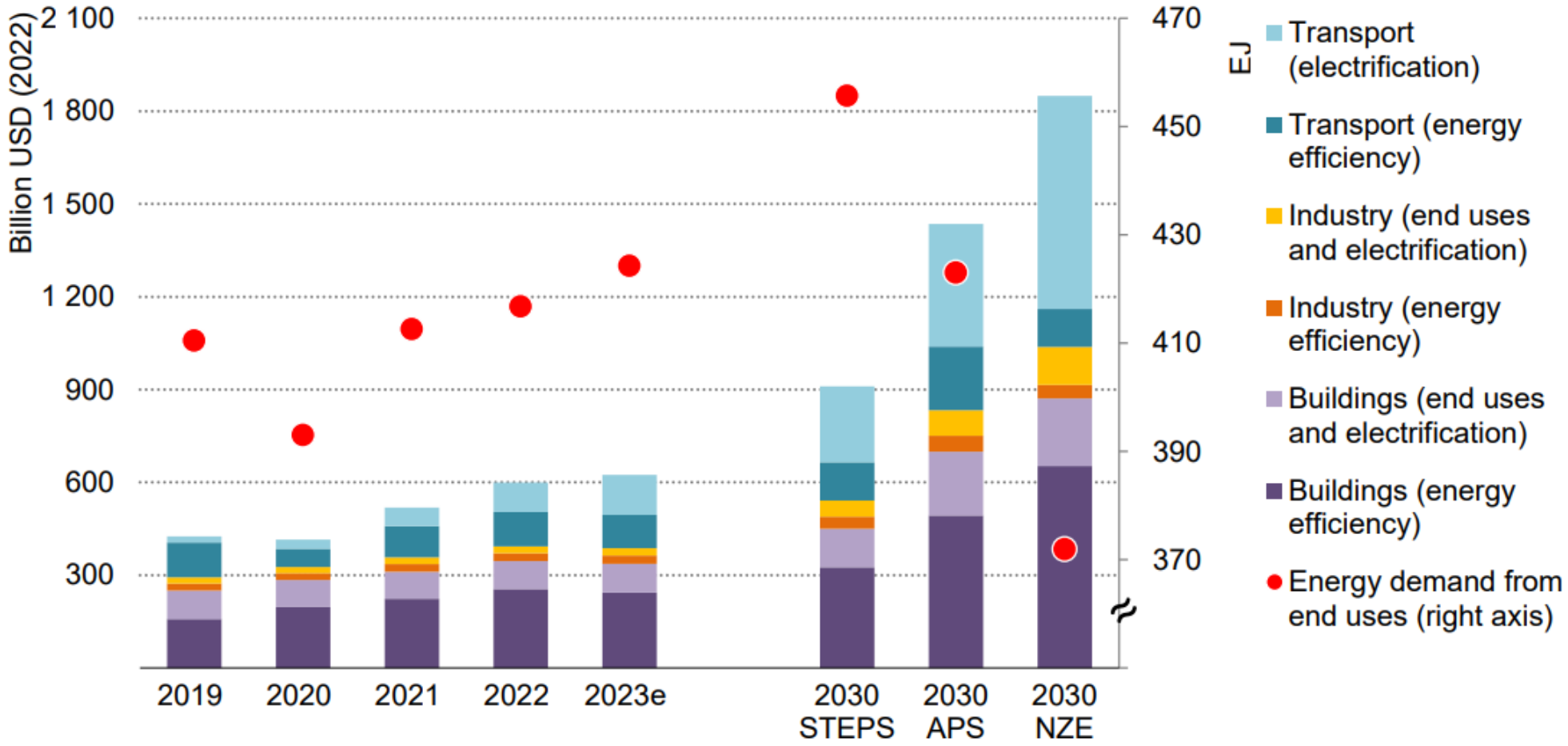


Actions taken in this decade to open markets to demand-side participation, encourage new business models and establish controllability standards for equipment and appliances

https://www.iea.org/reports/demand-response

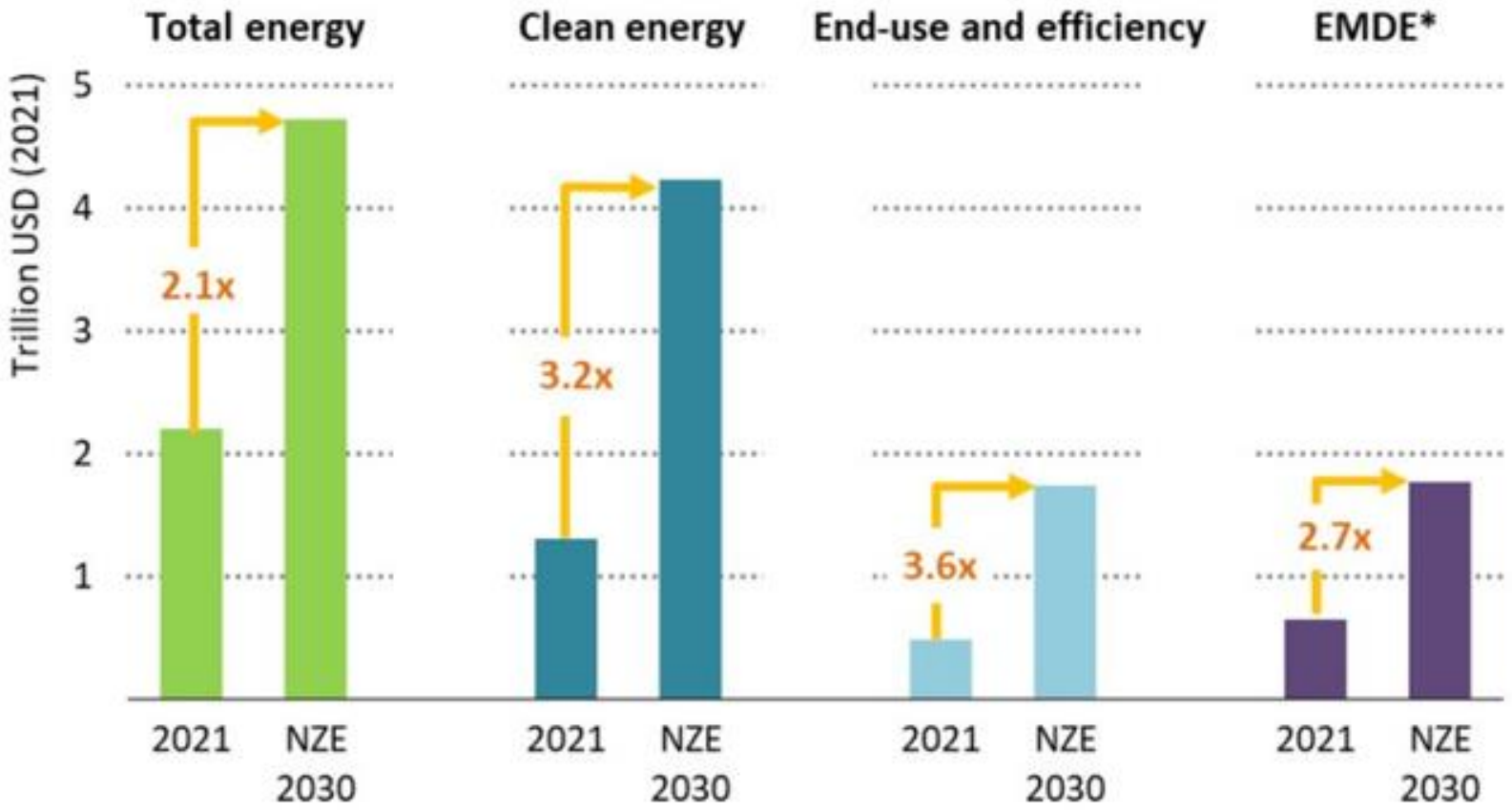
Global efficiency-related investment up 16% in 2022

Global investment and energy demand for end uses compared with annual average investment needs in 2030, by scenario



Spending on energy efficiency and electrification is reaching new highs thanks to dynamic growth in electrification of the transport sector

Scale-up of energy investment in the NZE Scenario, 2021 and 2030



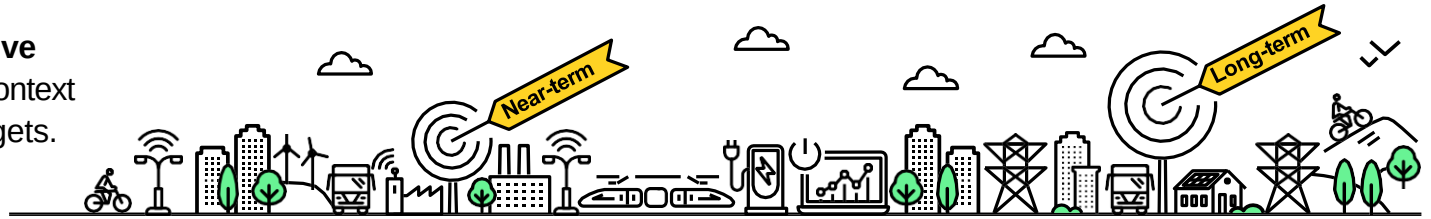
Investment in end-uses such as buildings needs to increase substantially, though more is needed to generate clean energy, especially expanded electricity networks.

Policy Packages for Energy Efficiency

In all sectors the greatest efficiency gains are achieved by a package of policies that combine three main types of mechanisms: Regulation, information and incentives. Careful design and implementation will deliver efficiency's full potential to enhance energy security, create jobs, increase living standards, cut energy bills and reduce emissions.

Targets

Policies are more effective when they are set in the context of clear strategies and targets.

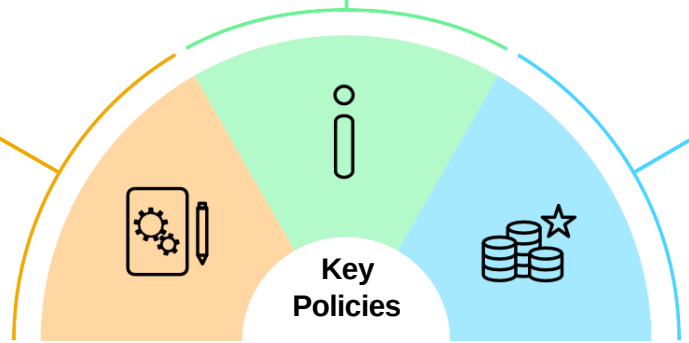


Essential elements

Regulation is essential to exclude the worst performing equipment and practices from the market, to drive average efficiency levels up, and to set rules for measurement of performance.

Information helps people make more efficient choices in what they buy and how they use energy.

Incentives make efficient options more attractive and speed up the upgrade and replacement of appliances, buildings and vehicles. They also encourage the use of new technologies and practices.



Implementation is as important as policy design.

Ensuring that the **resources** are in place to put policies into action.

Address **vital elements** such as capacity building, enforcement, monitoring.

It is important to continually assess **policies and programmes** so as to keep up to date with technology developments.

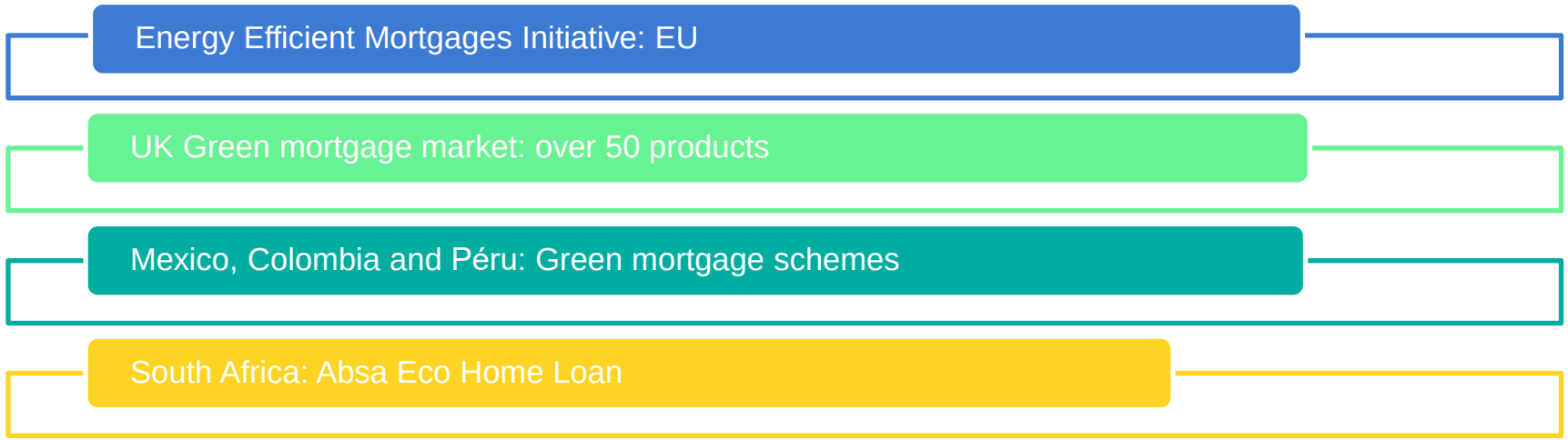
Financing EE construction and retrofits: Concessional loans

Green Mortgages: to build a new home with sustainability rating or to invest in renovating an existing unit to high sustainability standards.

Banks typically offer lower interest rates or increase the loan amount available to borrowers, as green buildings represent a lower risk investment

Benefits: concessional finance; unlocks private sector capital for renovation; adds mortgage banks as a new market player; comes at a time when renovation decisions are typically made

Examples

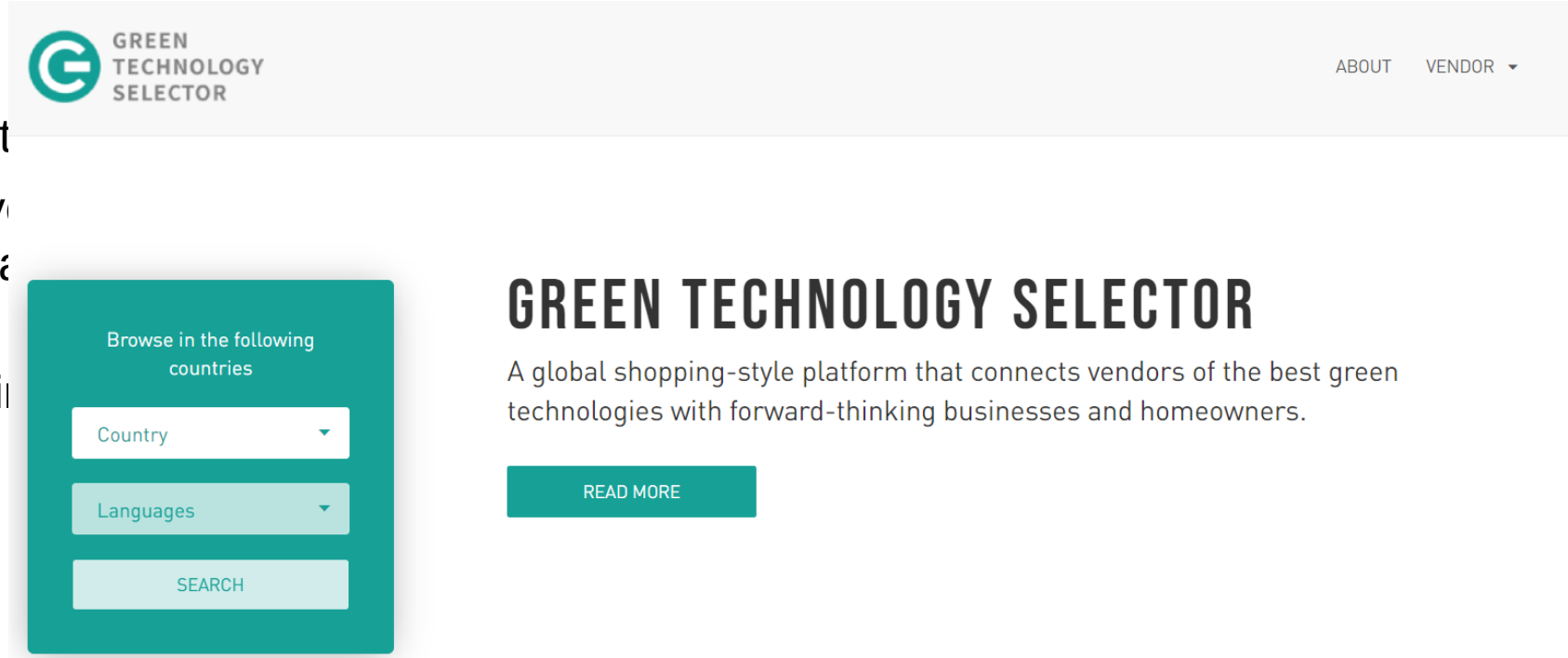


Energy Technology Lists can qualify efficient products for financing

- **Energy Technology List:** list of pre-assessed and pre-approved energy efficient appliances and equipment that can automatically qualify for subsidies or funding
  - Procurement tool
  - De-risking instrument through independently measured and verified energy performance
  - Regular reviews of criteria as well as of technologies and products that qualify for inclusion

- UK Energy Technology List - Government list of energy efficient plant and machinery that meets specified energy savings criteria

- EBRD Green Technology Selector: vendors that offer high-performing t
  - Pre-assessed and pre-approv through a participating financia per equipment)
  - Regular adjustments of baseli

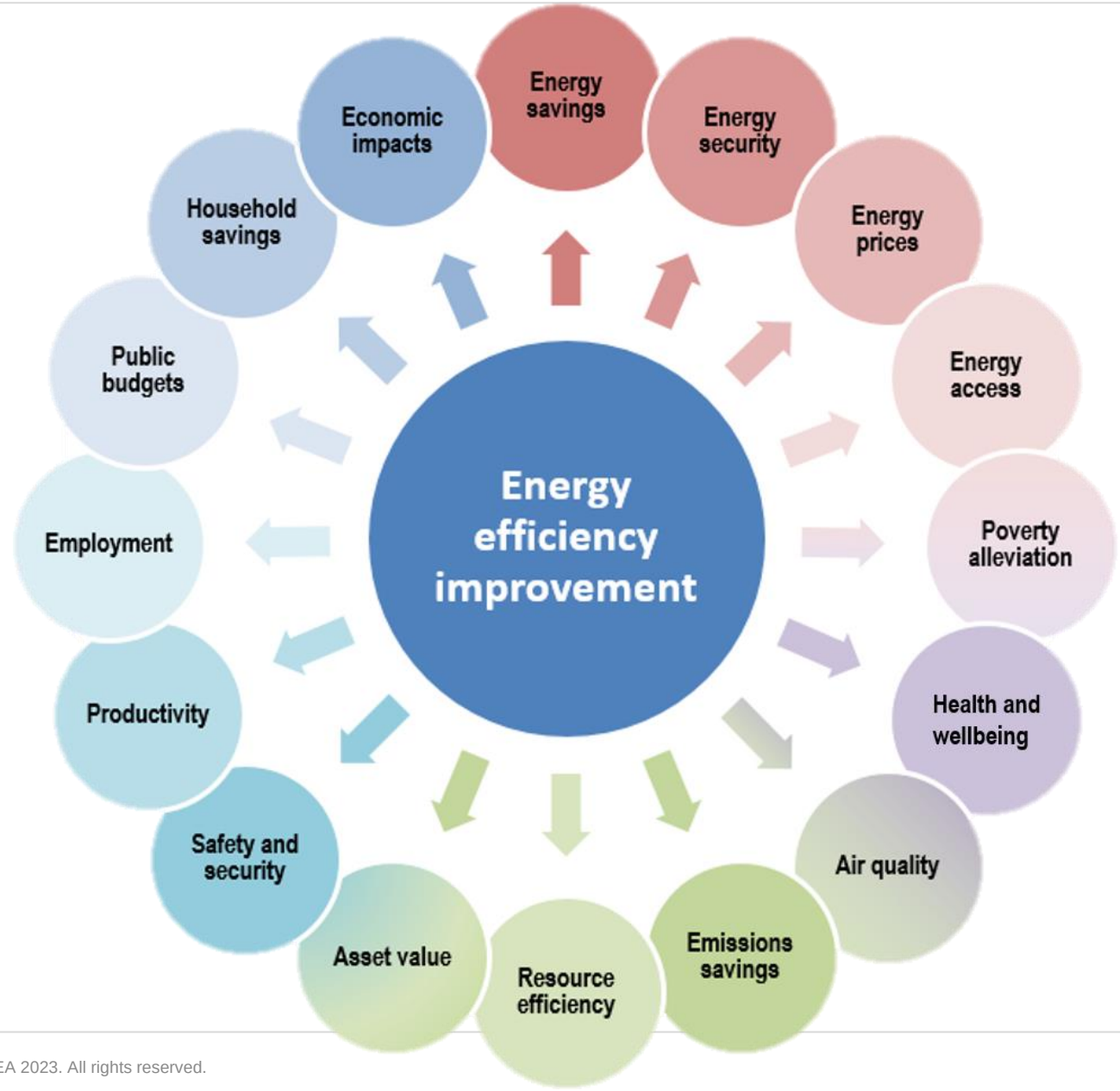


How can we scale up energy efficiency? Addressing the barriers

Source: Institute for Building Efficiency, WRI

What are common barriers to improving energy efficiency in your country?

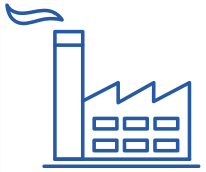
Energy efficiency delivers many benefits



Supporting various policy priorities and addressing barriers

Benefits of energy efficiency in buildings – important perspectives

Individual – building occupant, operator, owner



Industry –commercial, industrial and energy utility sectors

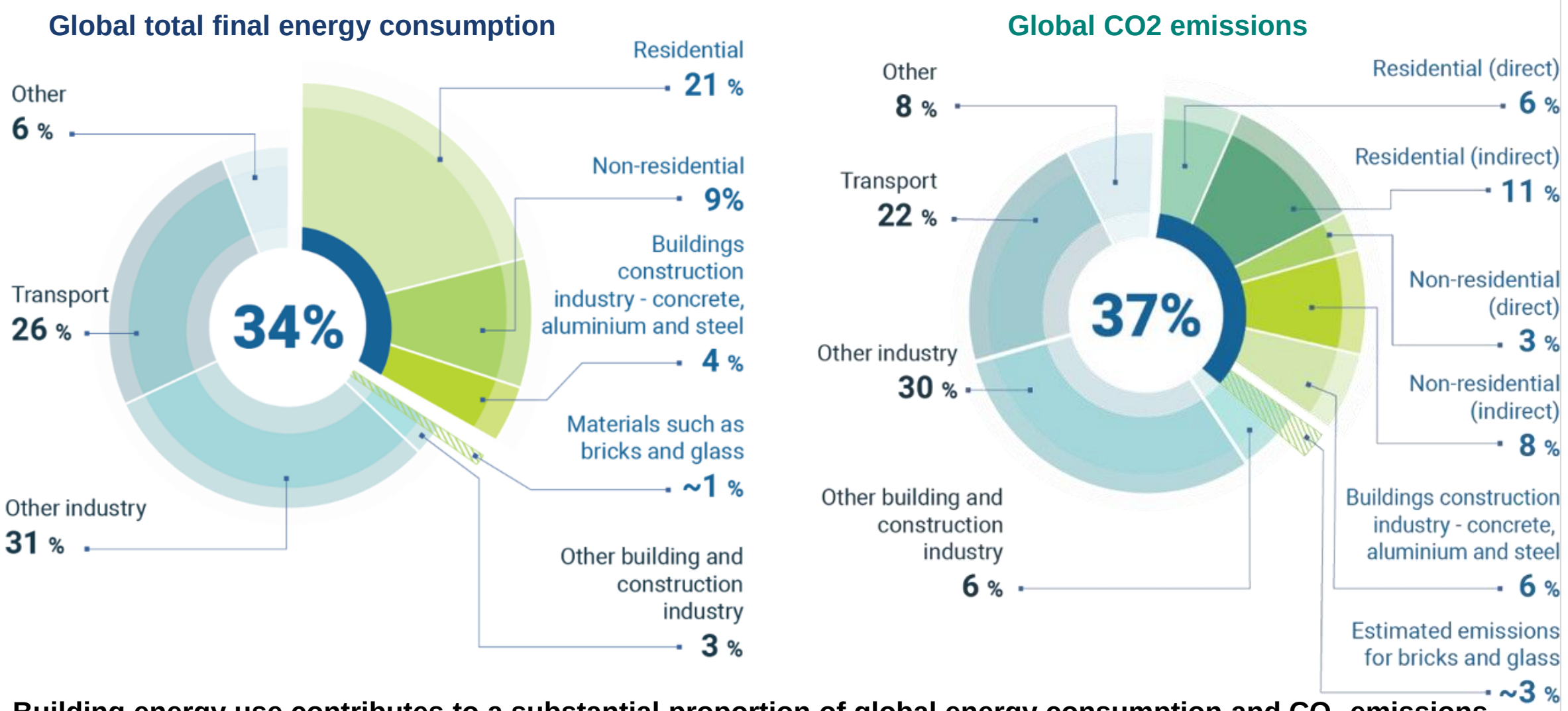
Public sector – national and sub-national

Societal – benefits accrue across society and the economy

Policymakers must keep in mind these various perspectives in aligning policies and programmes with objectives

Buildings

Buildings play an important role in the global energy system

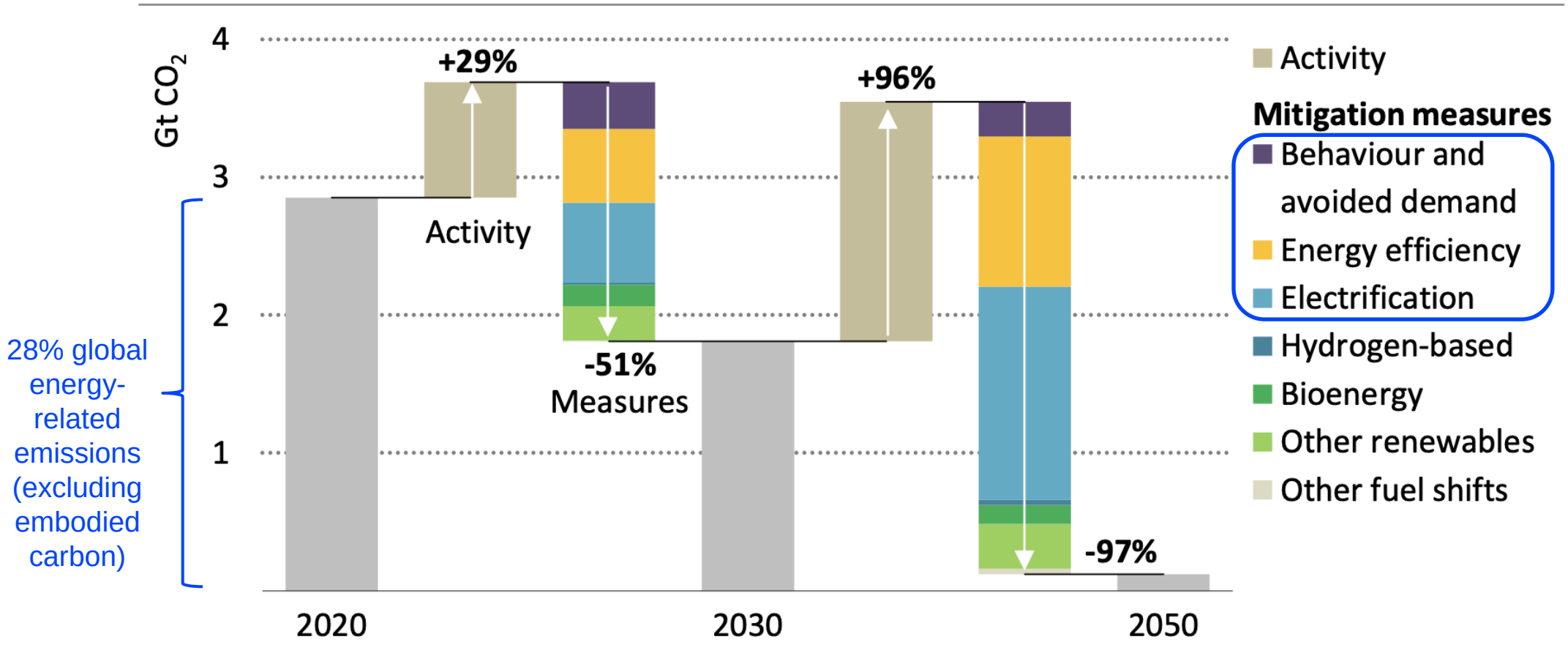


Building energy use contributes to a substantial proportion of global energy consumption and CO_2 emissions

 Source: IEA Energy Technology Perspective 2022

Buildings in a Net Zero Emissions Scenario

Global direct CO2 emissions reductions by mitigation in buildings in the NZE

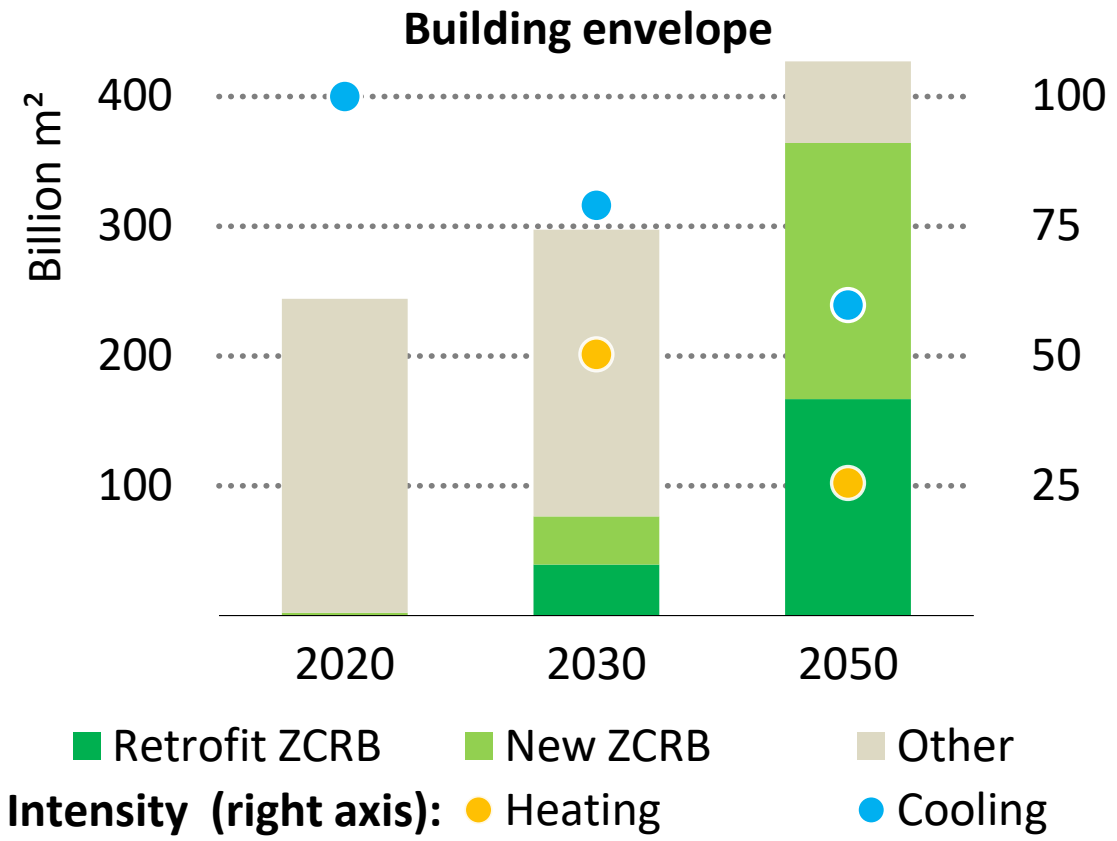


Electrification and energy efficiency account for nearly 70% of buildings-related emissions reductions through to 2050

Source: IEA (2021), Net Zero by 2050, IEA, Paris https://www.iea.org/reports/net-zero-by-2050

Improving energy efficiency and electrification go hand in hand

Global building and heating equipment stock in the NZE



What is a ZCRB : A zero-carbon-ready building is highly energy efficient and either uses renewable energy directly, or uses an energy supply that will be fully decarbonised by 2050, such as electricity or district heat. This means that a zero-carbon-ready building will become a zero-carbon building by 2050, without any further changes to the building or its equipment.

By 2050, over 85% of buildings are zero-carbon-ready, reducing average useful heating intensity by 75%, with heat pumps meeting over half of heating needs

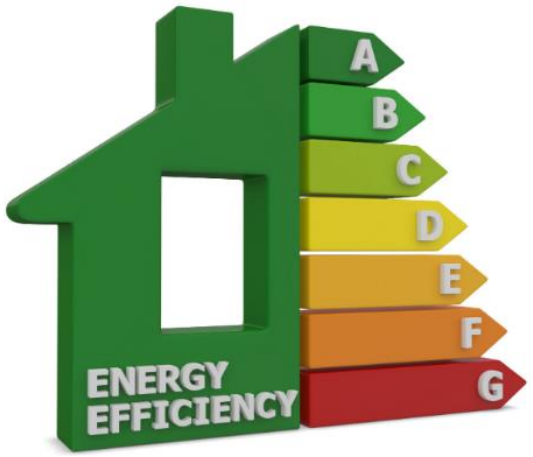
IEA (2021). Net Zero by 2050: A roadmap for the global energy sector

REGULATION | INFORMATION | INCENTIVES

Energy performance certificates

provide information to consumers on buildings they plan to purchase or rent.

They include an energy performance rating and recommendations for cost-effective improvements.



Energy Performance Certificate (EPC)

SAP © Crown copyright 2009

17 Any Street, District, Any Town, B5 5XX

Dwelling type:	Detached house	**Reference number:**	0919-9628-8430-2785-5996
Date of assessment:	15 August 2011	**Type of assessment:**	RdSAP, existing dwelling
Date of certificate:	13 March 2012	**Total floor area:**	165 m²

Use this document to:

- Compare current ratings of properties to see which properties are more energy efficient
- Find out how you can save energy and money by installing improvement measures

Estimated energy costs of dwelling for 3 years	**£5,367**
Over 3 years you could save	**£2,865**

Estimated energy costs of this home

	Current costs	Potential costs	Potential future savings
Lighting	£375 over 3 years	£207 over 3 years	You could save £2,865 over 3 years
Heating	£4,443 over 3 years	£2,073 over 3 years	
Hot water	£549 over 3 years	£222 over 3 years	
Totals:	£5,367	£2,502	

These figures show how much the average household would spend in this property for heating, lighting and hot water. This excludes energy use for running appliances like TVs, computers and cookers, and any electricity generated by microgeneration.

Energy Efficiency Rating

	Current	Potential
Very energy efficient - lower running costs		
(92 plus) A		
(81-91) B		76
(69-80) C		
(55-68) D		
(39-54) E	49	
(21-38) F		
(1-20) G		
Not energy efficient - higher running costs		

The graph shows the current energy efficiency of your home.

The higher the rating the lower your fuel bills are likely to be.

The potential rating shows the effect of undertaking the recommendations on page 3.

The average energy efficiency rating for a dwelling in England and Wales is band D (rating 60).

Top actions you can take to save money and make your home more efficient

Recommended measures	Indicative cost	Typical savings over 3 years	Available with Green Deal
1 Increase loft insulation to 270 mm	£100 - £350	£141	✓
2 Cavity wall insulation	£500 - £1,500	£537	✓
3 Draught proofing	£80 - £120	£78	✓

See page 3 for a full list of recommendations for this property.

To find out more about the recommended measures and other actions you could take today to save money, visit **www.direct.gov.uk/savingenergy** or call **0300 123 1234** (standard national rate). When the Green Deal launches, it may allow you to make your home warmer and cheaper to run at no up-front cost.

COMMON EUROPEAN VOLUNTARY ENERGY PERFORMANCE CERTIFICATE

EUROPEAN VOLUNTARY CERTIFICATE

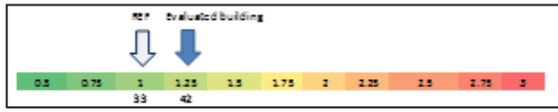
ALDREN

AWARD (only for classes A, B, C): **B**

ENERGY PERFORMANCE RATING	Building category (% of each category for mixed use)	
Most efficient	Max. limit (ratio to Ref)	Rating
Energy +	< 0	
A	≤ 0.35	
B	≤ 0.50	**B**
C	≤ 0.71	
D REFERENCE*	≤ 1.00 Ref EP*	
E	≤ 1,41 Ref	
F	≤ 2,00 Ref	
G	2,00 Ref <	
Least efficient		

Non-renewable primary energy balance	0.50 Ref EP	59.6 kWh EP/(m².a)
*Reference Ref EP		120 kWh EP/(m².a)
Exported primary energy		10 kWh EP/(m².a)
CO_2 emissions		25.7 kg/(m².a)

Non-renewable primary energy	69.6	kWh EP/(m².a)
Total primary energy (nearby, distant)	80.04	kWh EP/(m².a)
Final energy	42	kWh/(m².a)
Ratio of renewable (including all renewables)	13 %	



Final energy

1.25 Ref EF

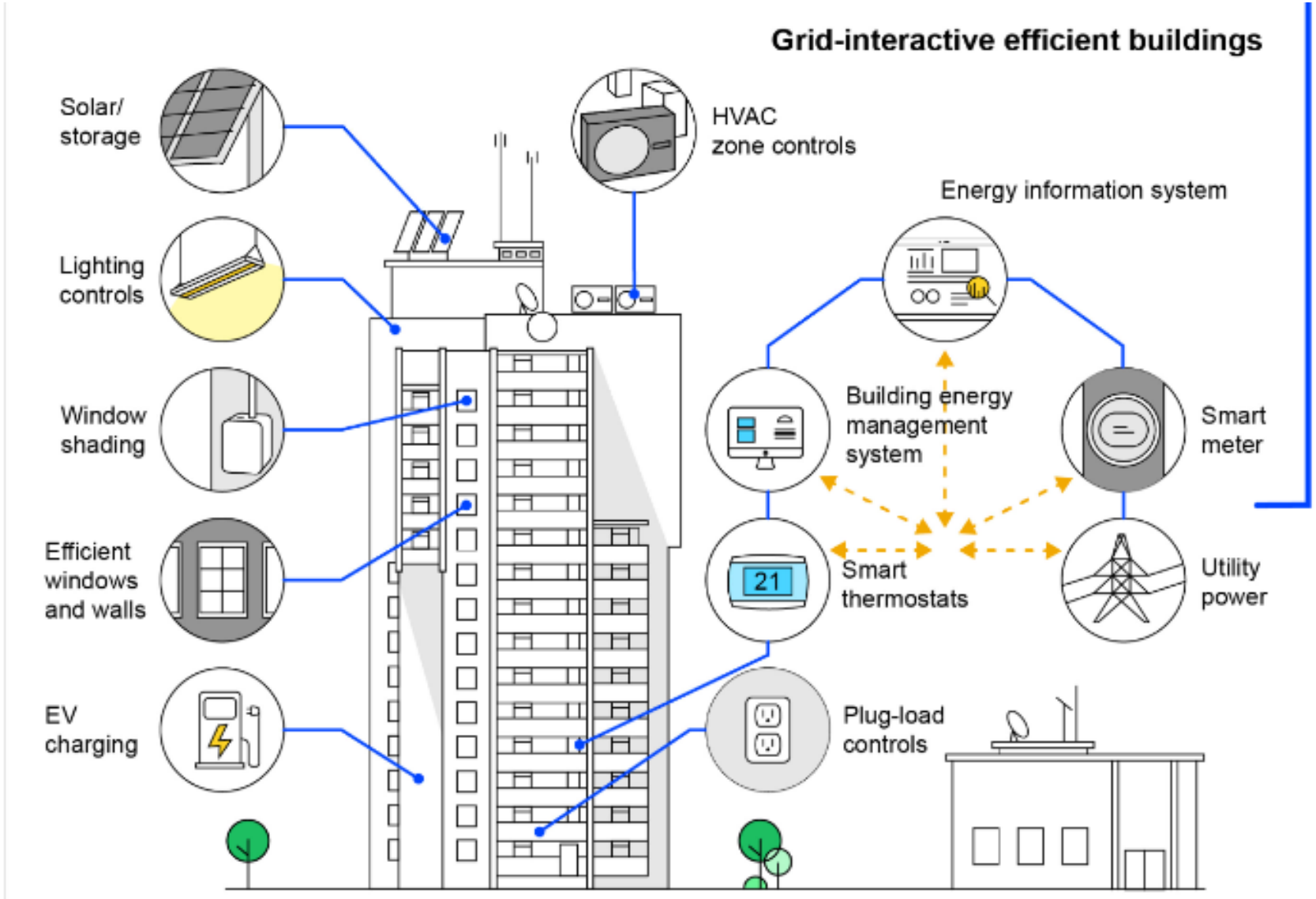
Year of construction:	1970	Year of last renovation:	2015
Reference floor area:	5000 m²	Number of floors	8
Building volume:	20 000 m³	Climate locality:	JRC

Building: Covent Garden
Address: Rue de mot 24, Brussels, Belgium
Issued by:
Contact:

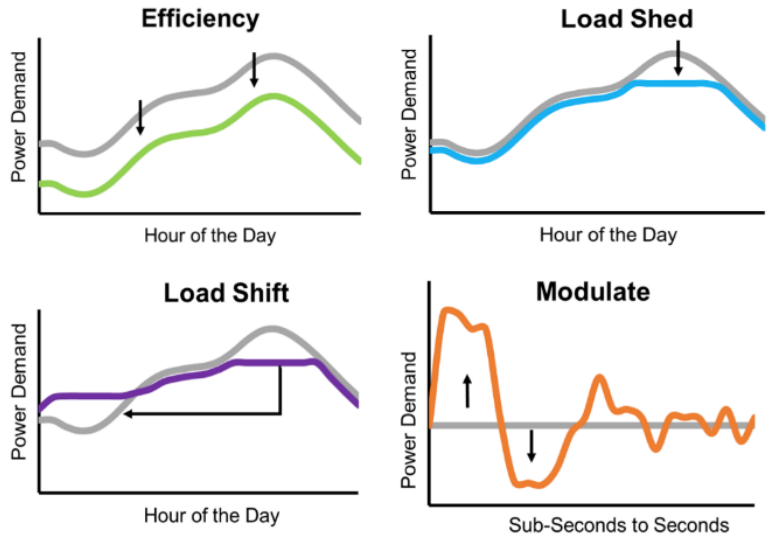
Parcel No: 3500 Cadaster: Brussels
Date: 20.4.2016 Validity: 20.4.2026
Signature

No. of energy certificate: 00001/SK_0001/2017

Grid-interactive buildings – provide efficiency and flexibility



Efficient grid-interactive buildings are energy efficient buildings with smart technologies characterized by the active use of distributed energy resources (DERs) to optimize energy use for grid services, occupant needs and preferences, and cost reductions in a continuous and integrated way



Grid interactive buildings and smart charging for EVs can help to manage the expanding share of variable renewable energy and increasing peak demand

Appliances

S&L Programs – Implementation and market impact

No S&L programs in place leading to :

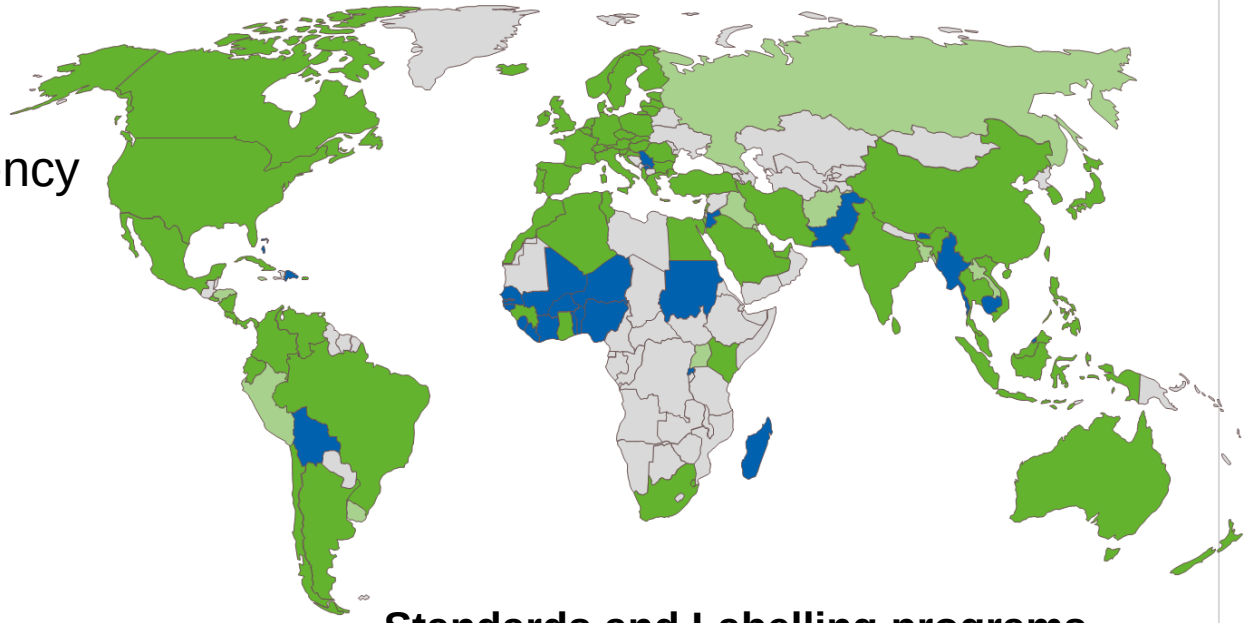
- Dumping opportunities for obsolete products
- Power generation shortages due to low efficiency

Voluntary S&L programs :

- Lack of impact due to weak enforcement
- Slow transition and benefits

Mandatory S&L programs with surveillance:

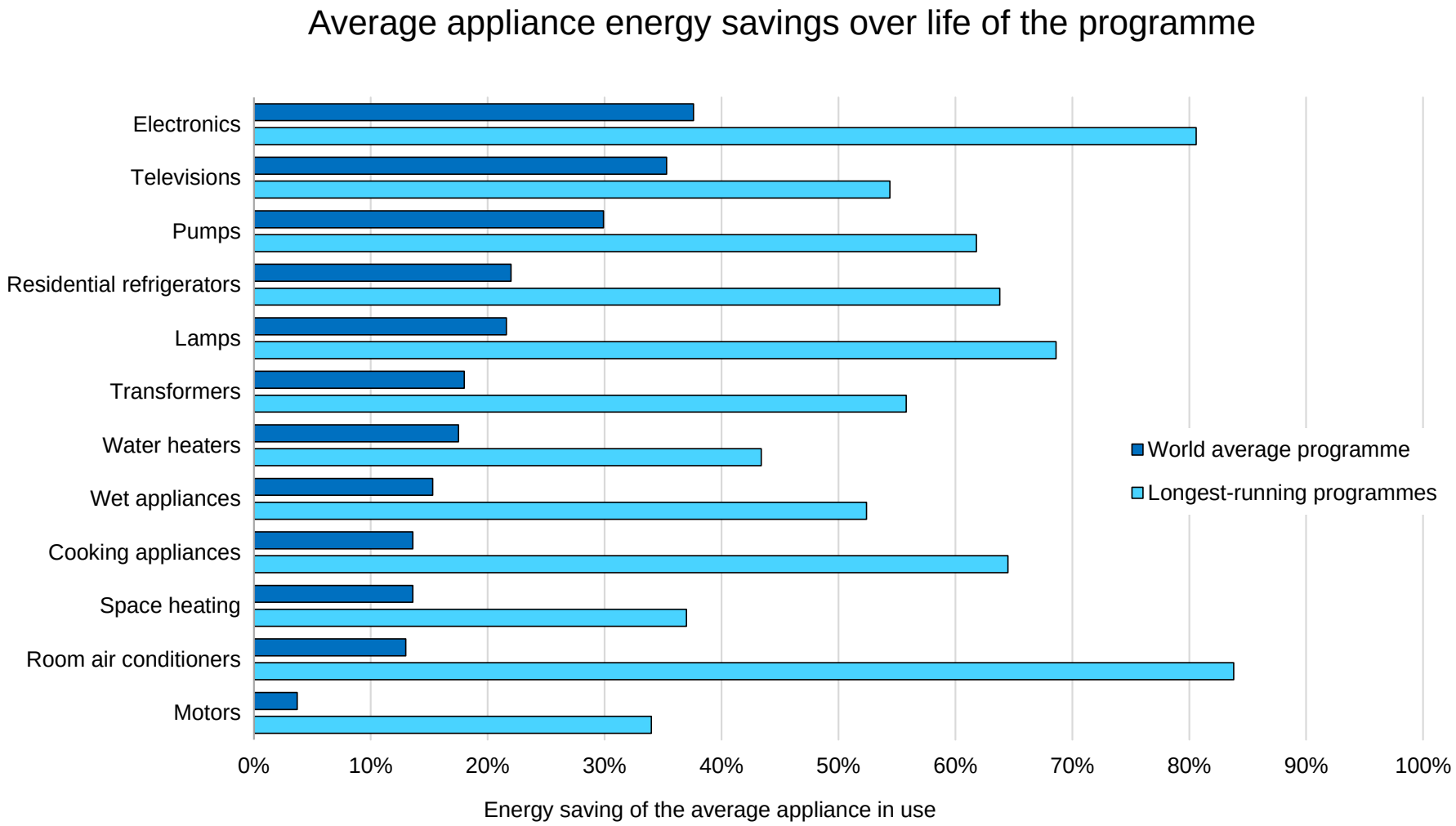
- Gradual shift towards higher efficiency products
- Gradual cost reduction of high Energy Efficiency products
- Consumer can estimate the operating cost vs first cost



Standards and Labelling programs

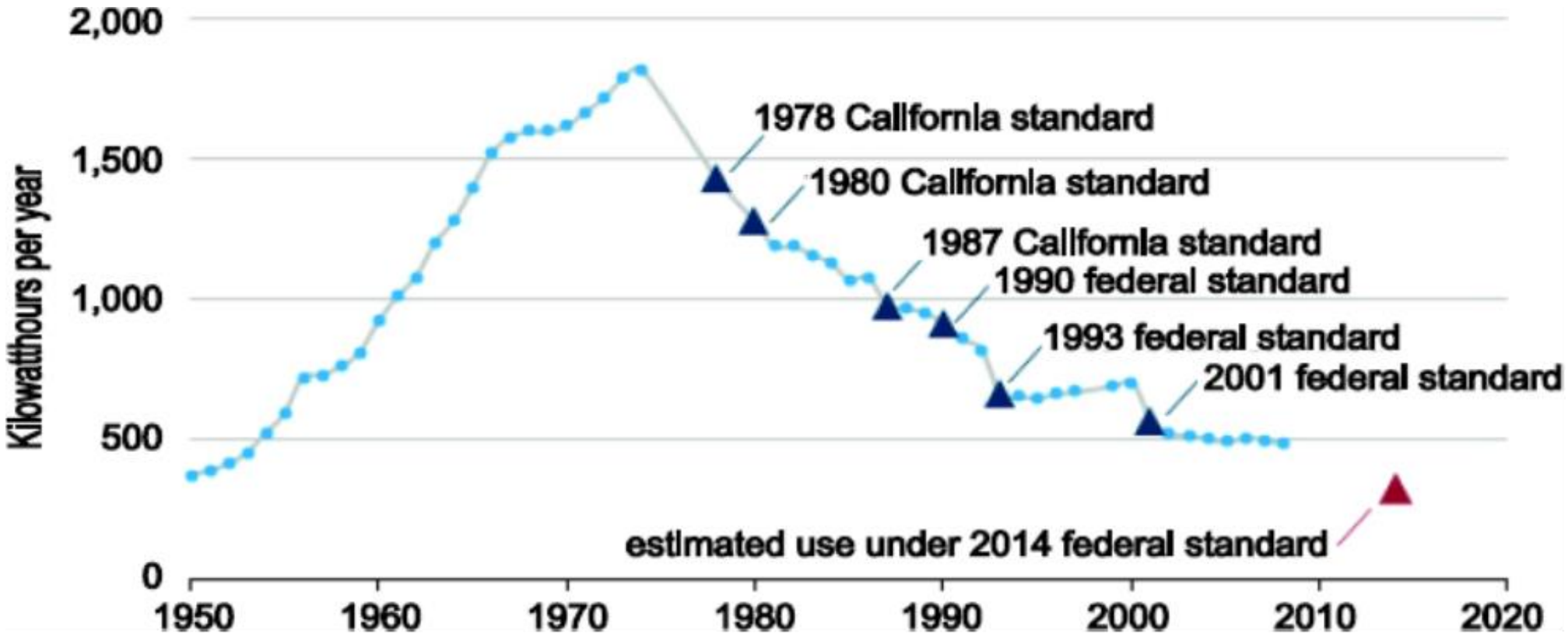
Enforced Standards and Labelling policies helps shifting the market towards higher Energy Efficiency

Efficiency policies have delivered substantial energy savings



The longest running efficiency programmes have reduced appliance energy consumption by over half

Impact of MEPS in energy consumption of new refrigerators in California



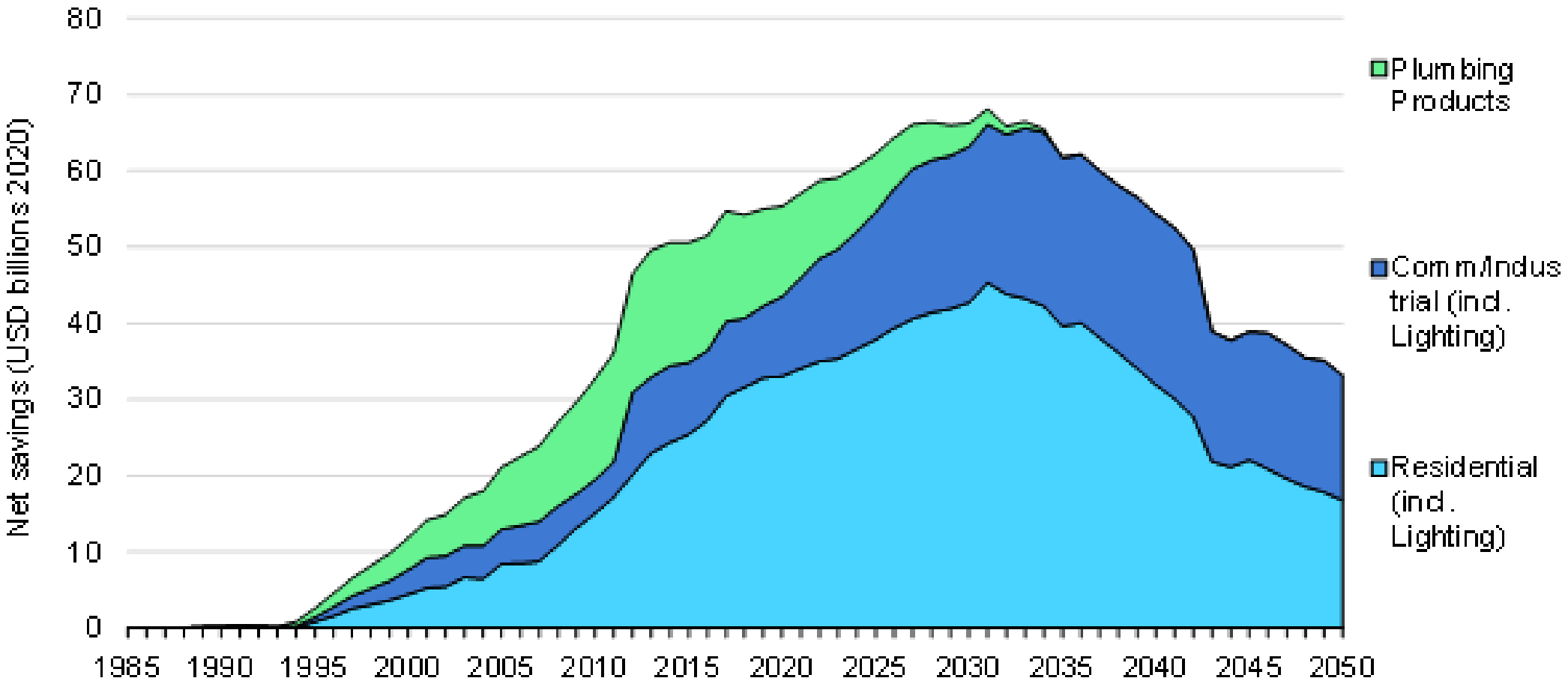
Source:EIA,2013

Ratcheting MEPS has reduced energy consumption of new refrigerators in California by 75%

Appliance programmes and their capacity to reduce energy bills

Net savings (USD billions 2020) from appliance programmes*. Years 1995 to 2050.

*Annual undiscounted net consumer benefit by year for US MEPS by sector

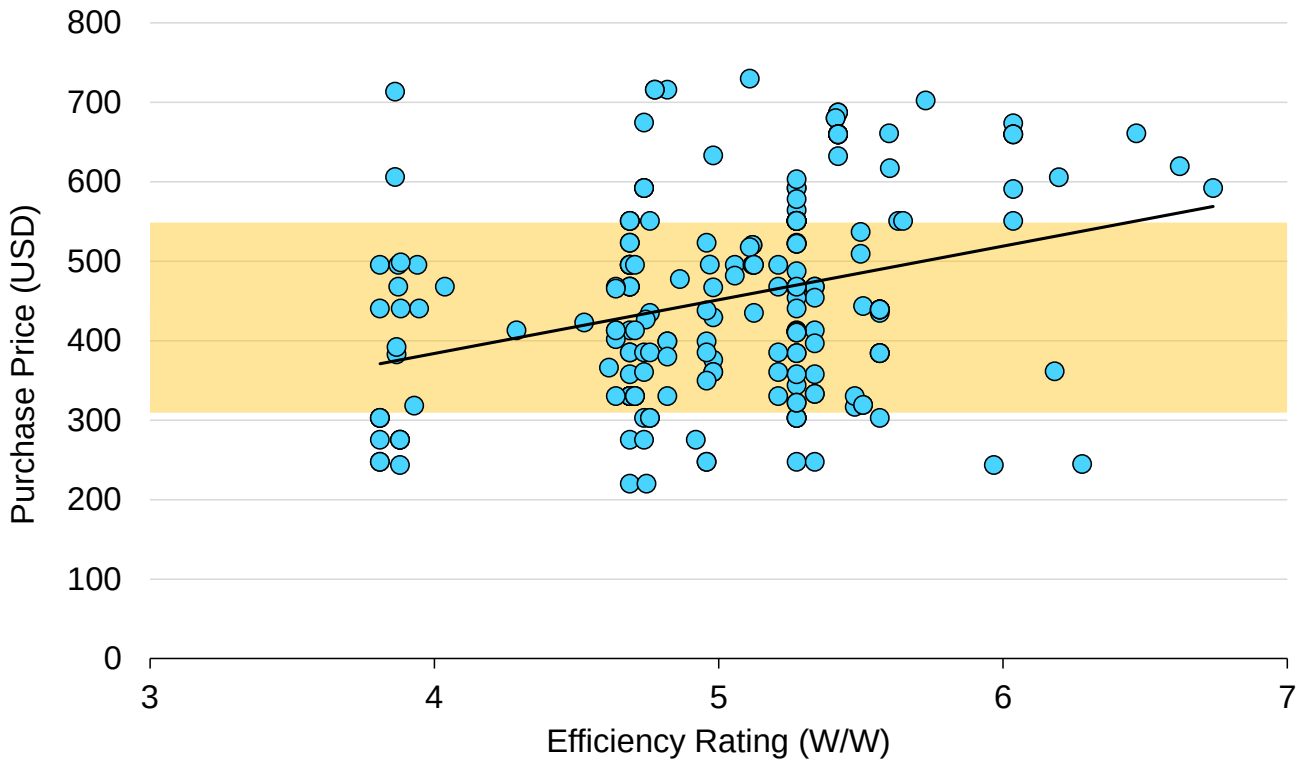


The US financial benefits for consumers from MEPS are substantial, now reaching over USD 40 billion per annum in reduced energy consumption, or USD 320 per customer each year

Space cooling drives electricity consumption in Southeast Asia

- Space cooling is among the fastest growing end uses in the region, with electricity consumption expected to more than quadruple by 2040.
- Market data shows that more efficient cooling systems are not necessarily more expensive.

AC energy efficiency versus purchase price, Thailand, 2022



Policy action on more efficient ACs, fans and building envelopes could reduce space cooling energy use by over one-third by 2040

Opportunities for appliances in commercial and public buildings and industry

Commercial / Public buildings

Smart plugs

25- 60% of plug load use

Smart lighting

Up to 45% of lighting energy use

HVAC control

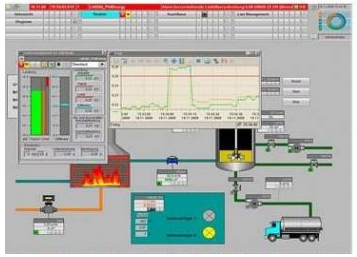
24-32% of HVAC energy use

Industry

Smart motors

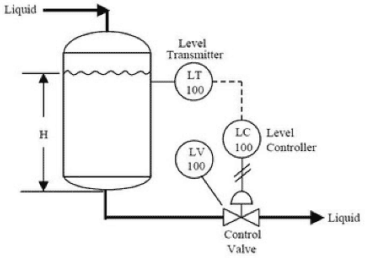
Up to 50% of motor system energy use

Smart EMS



Up to 30% of total energy use

Smart process control

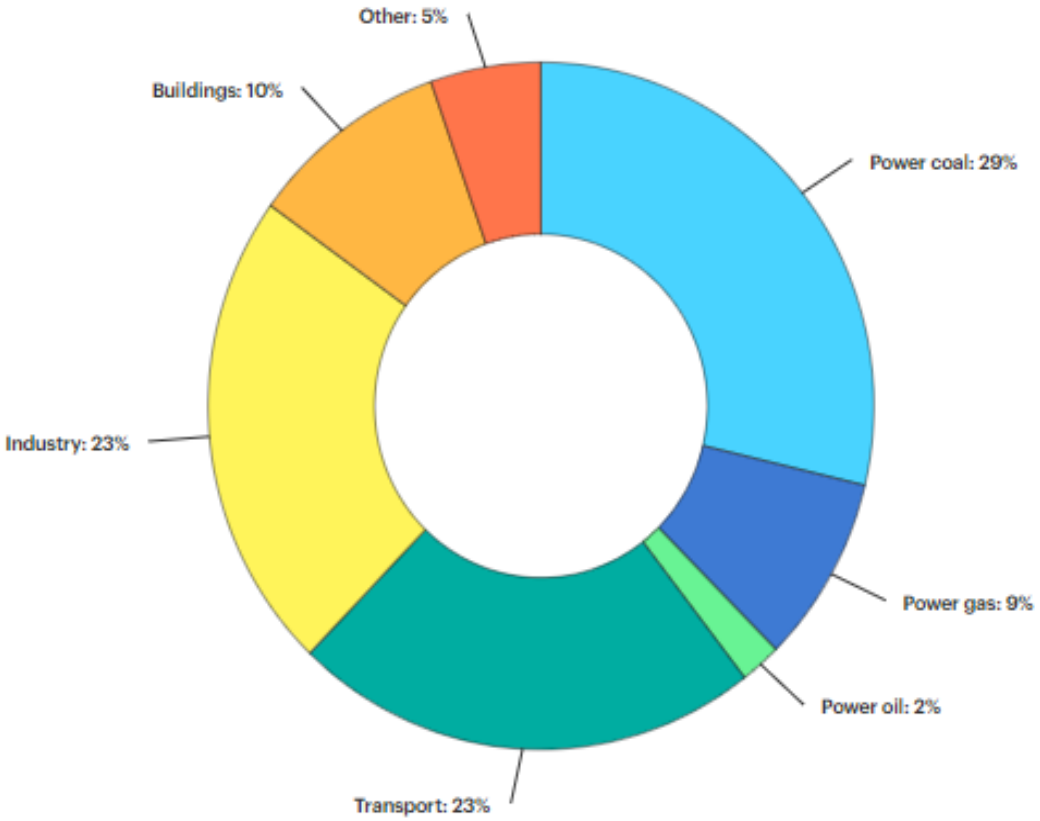


Around 20% energy demand of process

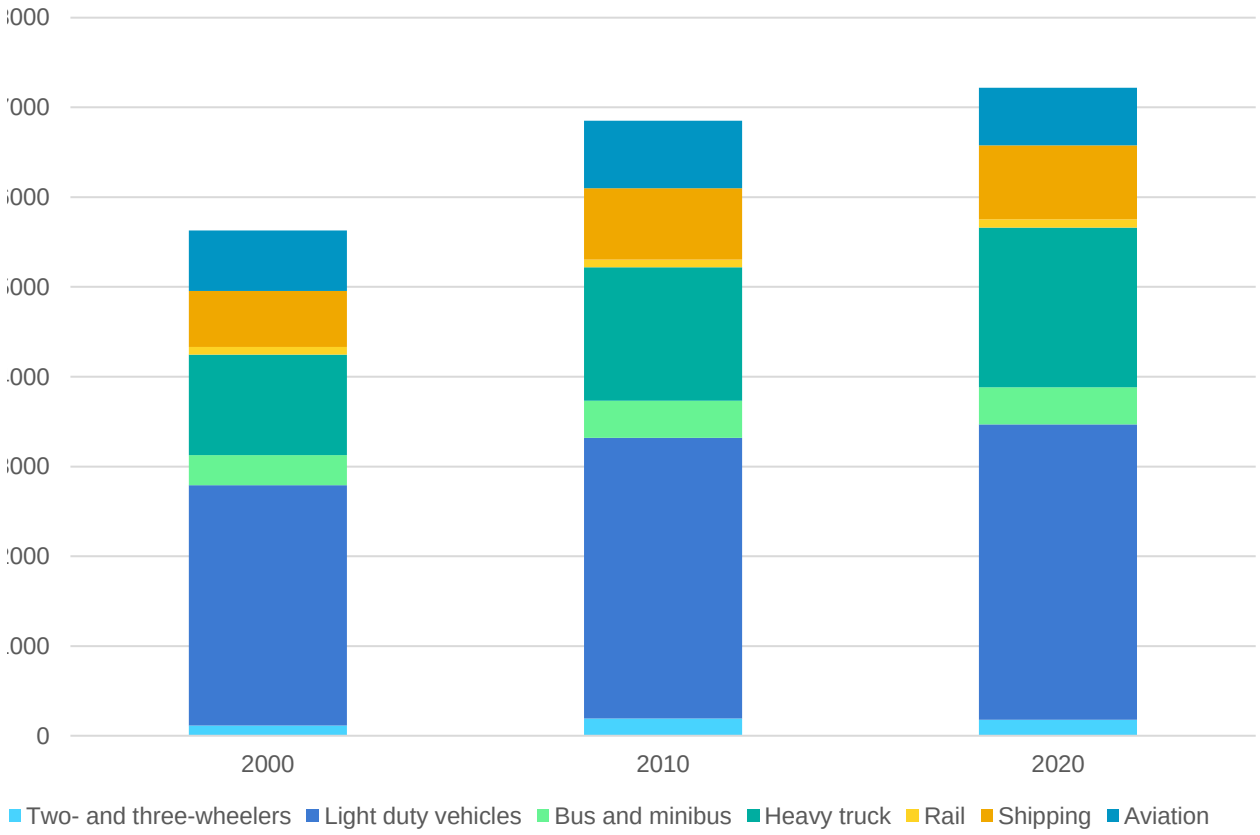
Note: significant variations in achievable savings depending on size and sector

Transport

Road transport dominates energy use and emissions



issions from transport by sub-sector 2000-2021

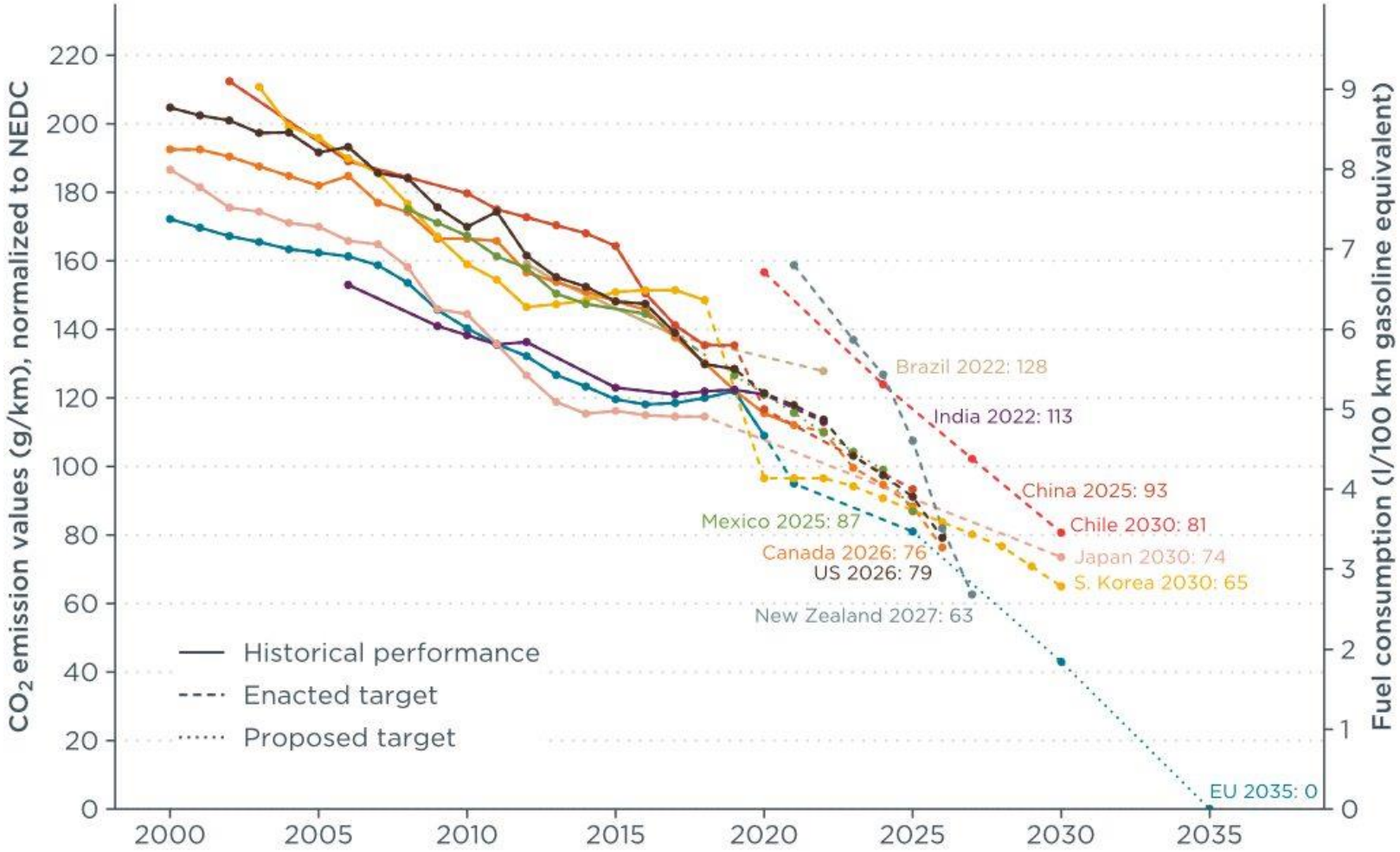


IEA, 2022

Road transport is over 80% of transport sector CO_2 emissions.
Trucks have increasing energy and emission profile

Fuel economy standards play a key role in improving efficiency

Passenger car CO_2 emission and fuel consumption values

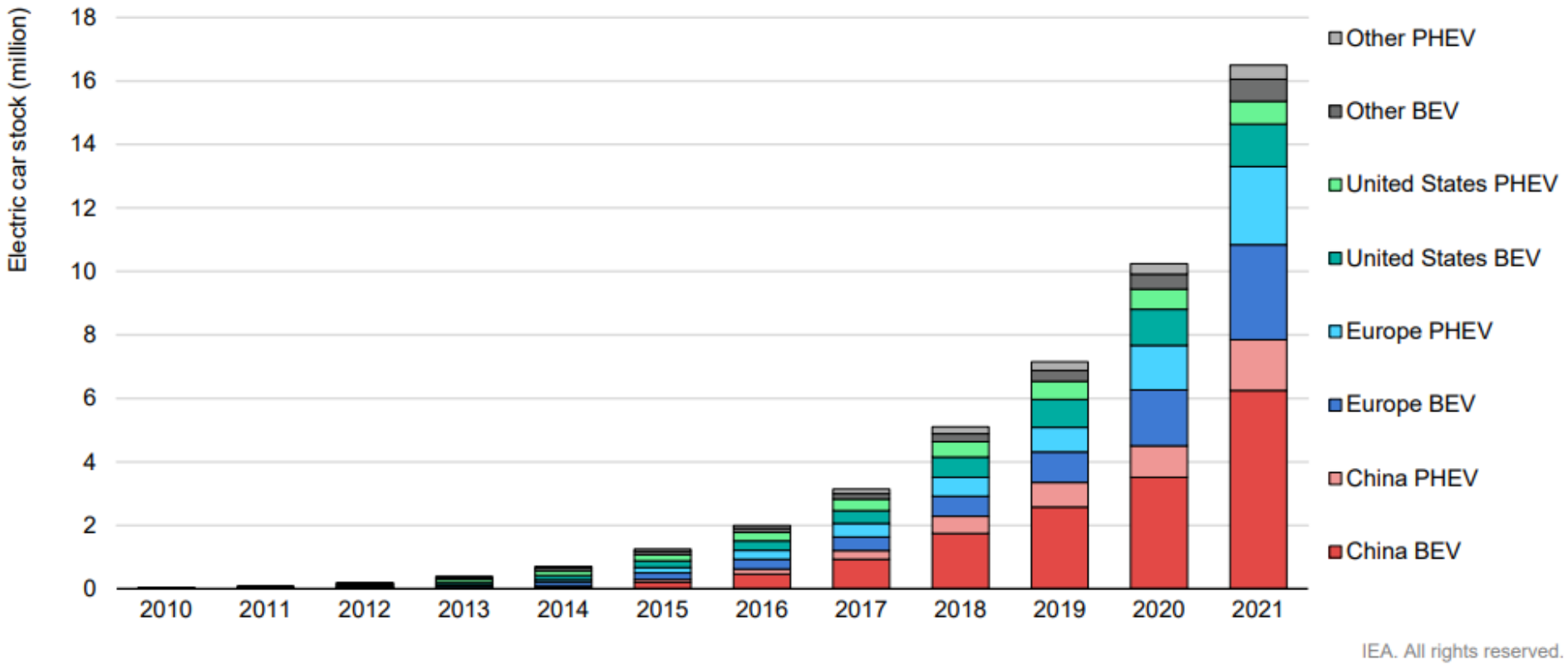


ICCT, 2022

Countries with regulations and/or efficiency-based purchase incentives in place improved efficiency on average 60% faster than countries without such policies

Positive trends in terms of electrification for cars

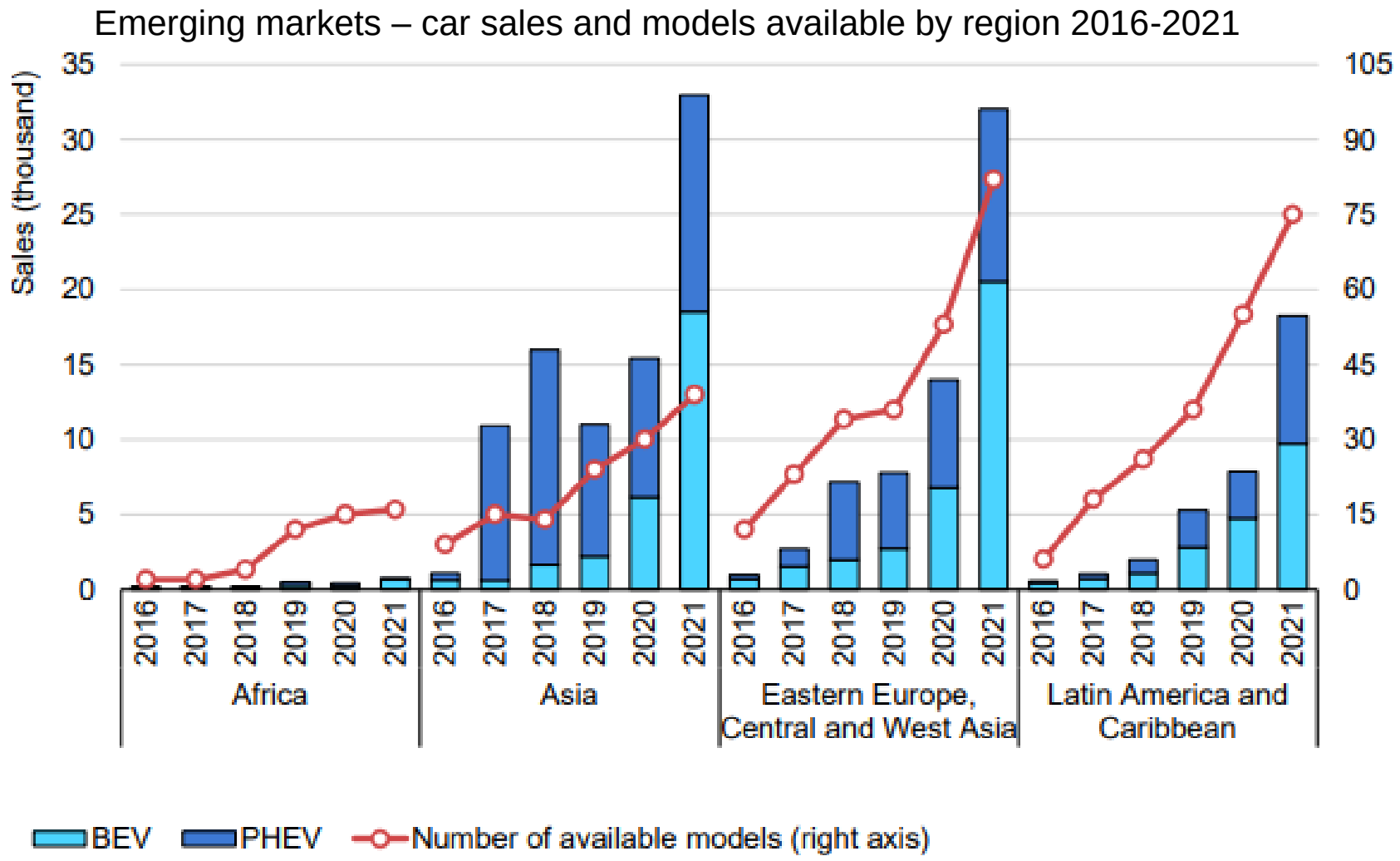
Global electric car stock, 2010- 2021



IEA, GEVO 2022

Over 16.5 million electric cars on the road in 2021

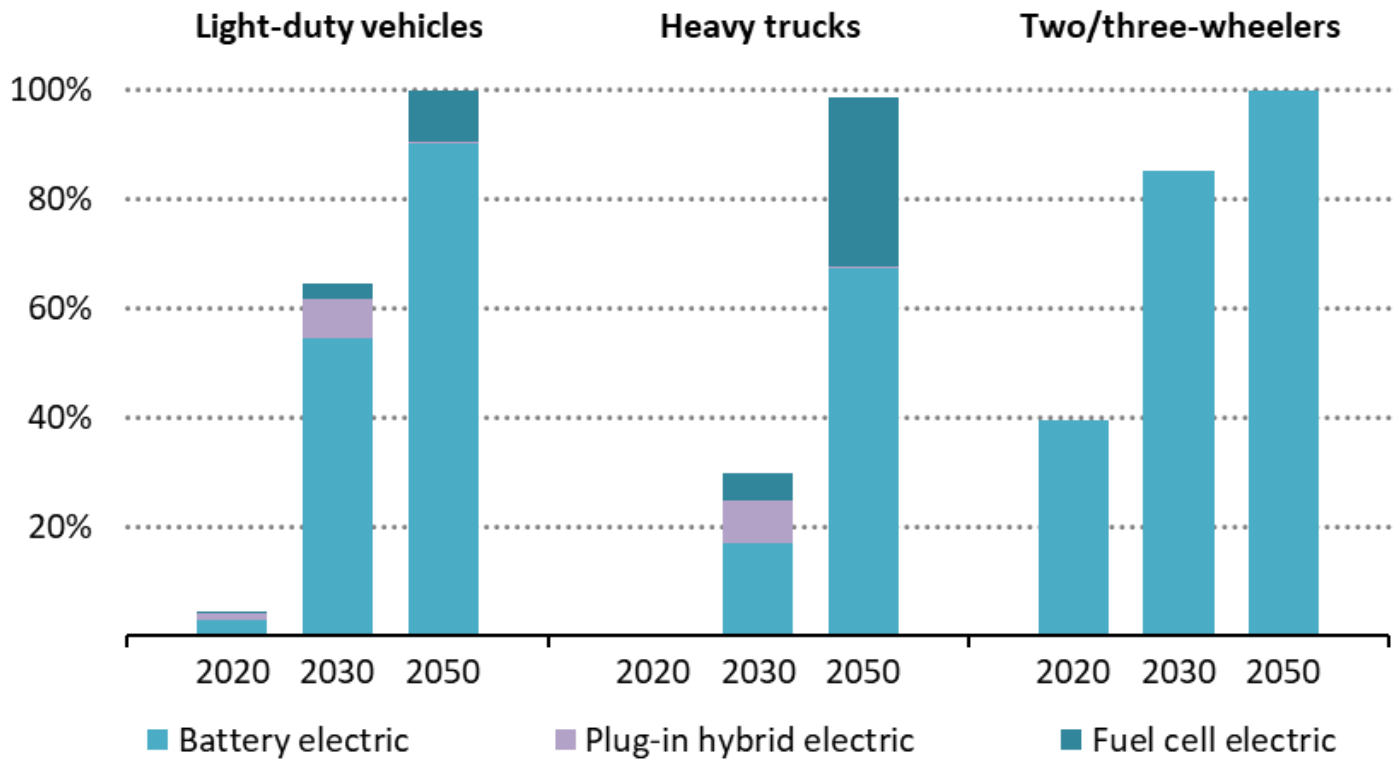
Emerging markets play a key role in electrification



Electric car sales spiked in emerging markets in 2021

Electrification differs by vehicle type

Global share of ZEVs in total sales by vehicle type in the NZE

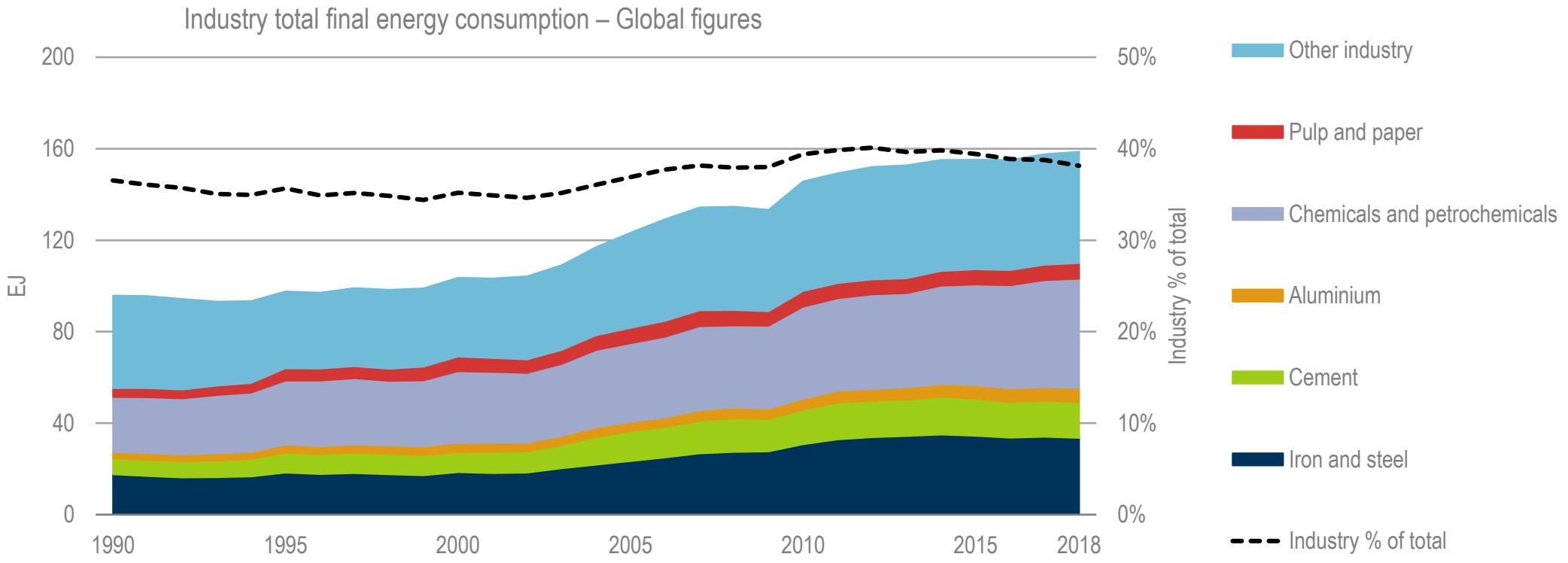


IEA, 2021

Light-duty vehicle sales are about 100% ZEVs by the late-2030s in advanced economies and by 2040 in emerging market and developing economies

Industry

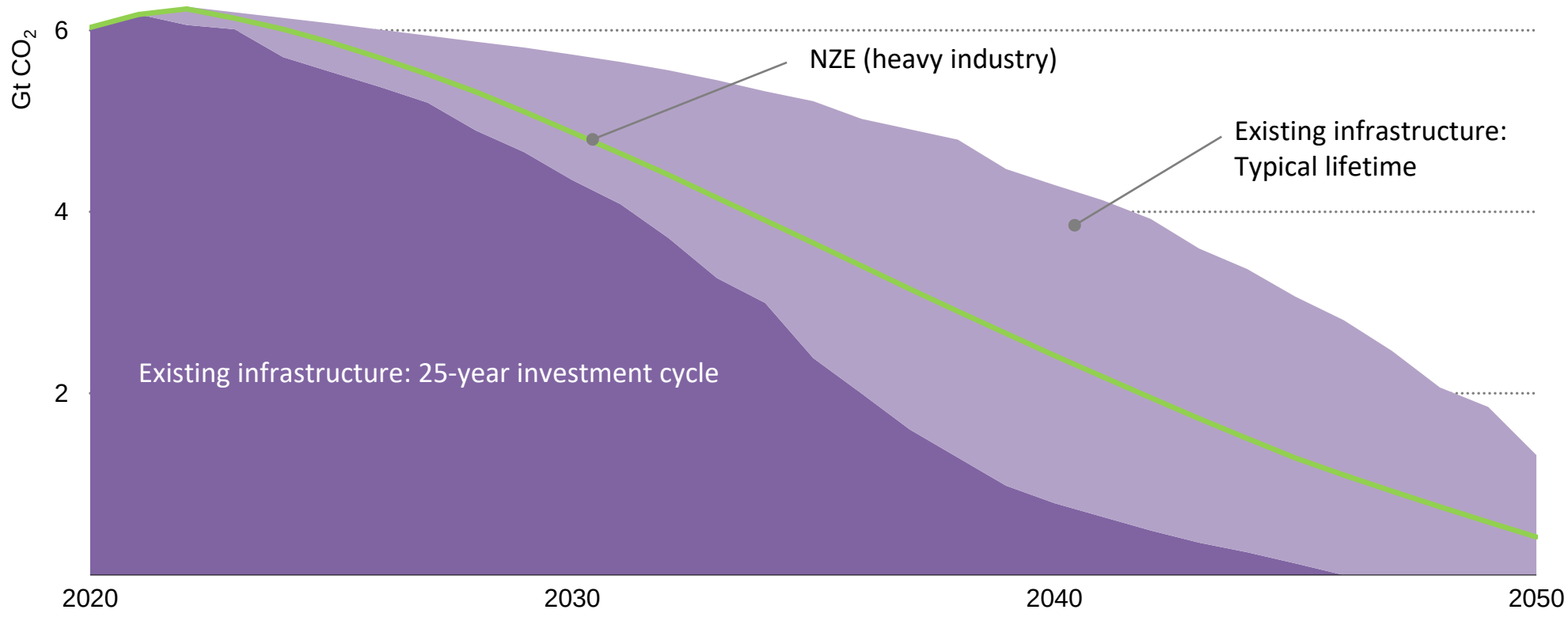
Industry contributes to a large share of global energy use



Globally, industry total energy use has grown more than one and a half times over the last 25 years driven by the doubling of energy use from the chemical and petrochemical and iron and steel sectors which represent more than 60% of that growth.

Addressing CO_2 emissions from heavy industry

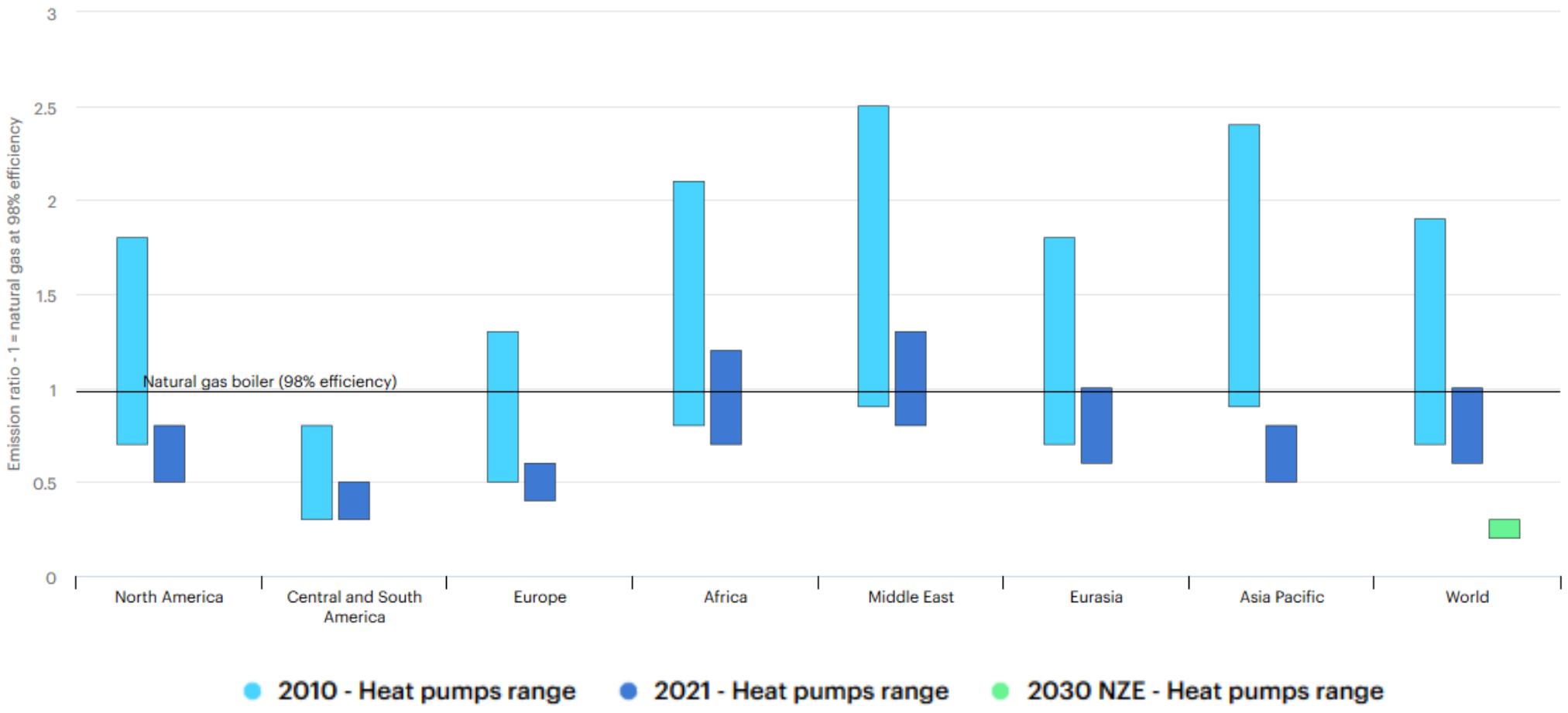
CO_2 emissions from existing heavy industrial assets in the NZE



Intervening at the end of the next 25-year investment cycle could help unlock 60 Gt CO_2, around 40% of projected emissions from existing heavy industry assets

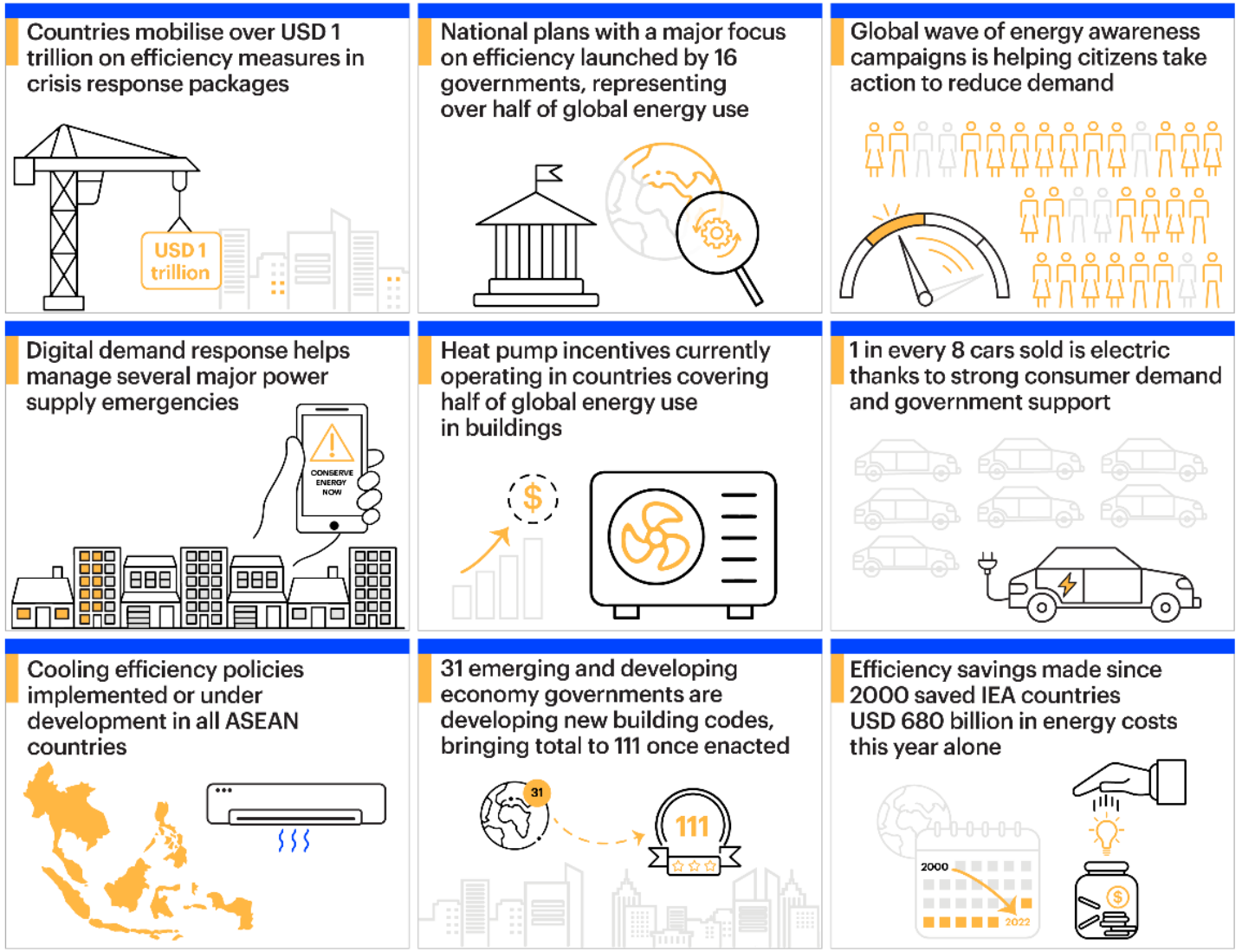
Heat pumps have a key role in decarbonising industry

Relative CO_2 emissions from the operation of air-source heat pumps compared with the most efficient condensing gas boilers by region in the Net Zero Scenario, 2010-2030



So, where do stand on improving energy efficiency?

Will we see a turning point for energy efficiency progress?



Many hopeful signs through new policy focus, but challenges remain

IEA Annual Global Conference on Energy Efficiency

- The 7th conference held in Denmark, June 2022
- 26 governments issued a joint statement, “calling on all governments, industry, enterprises and stakeholders to strengthen their action on energy efficiency” and welcomed the Sønderborg Action Plan

8th Annual Global Conference on Energy Efficiency
Versailles, France, 6-8 June 2023

https://www.iea-events.org/8th-global-conference

What are the priorities to improving energy efficiency in your country?

Exploring key “spots” in global energy

Recent publications

The IEA is shining a light on the major areas of the energy system that need to be combined to ensure a clean transition, with considerable focus on the transport sector.

Energy Efficiency in transport resources

Global EV Policy Explorer

Key policies and measures that support the deployment of electric and zero-emission vehicles

https://www.iea.org/data-and-statistics/data-tools/global-ev-policy-explorer

Last updated 18 Nov 2022

Global Fuel Economy Initiative 2021 Data Explorer

Detailed country-level data on fuel economy by weight, powertrain, market segment and other characteristics

Last updated 4 Nov 2021 Cite Share

https://www.iea.org/data-and-statistics/data-tools/global-fuel-economy-initiative-2021-data-explorer

Country **Select a country** | Show sales by **Footprint** | Show fuel consumption by **Powertrain**

Exploring key “spots” in global energy

Recent publications

The IEA is shining a light on the major areas of the energy system that need to be combined to ensure a clean transition, with considerable focus on the industry sector.

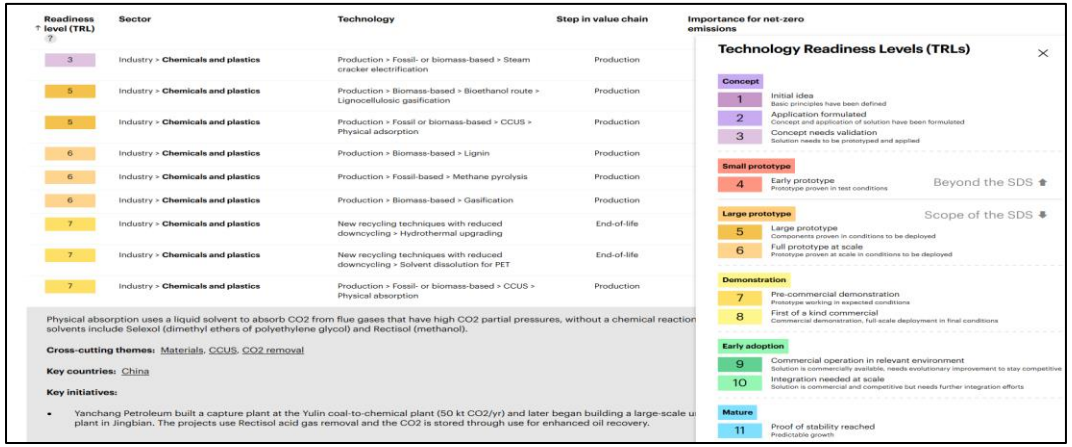
IEA Energy Efficiency in industry resources

Online courses – Energy Efficiency Indicators
- Essentials for Policymakers
- Fundamentals of Statistics

English / Portuguese / Spanish

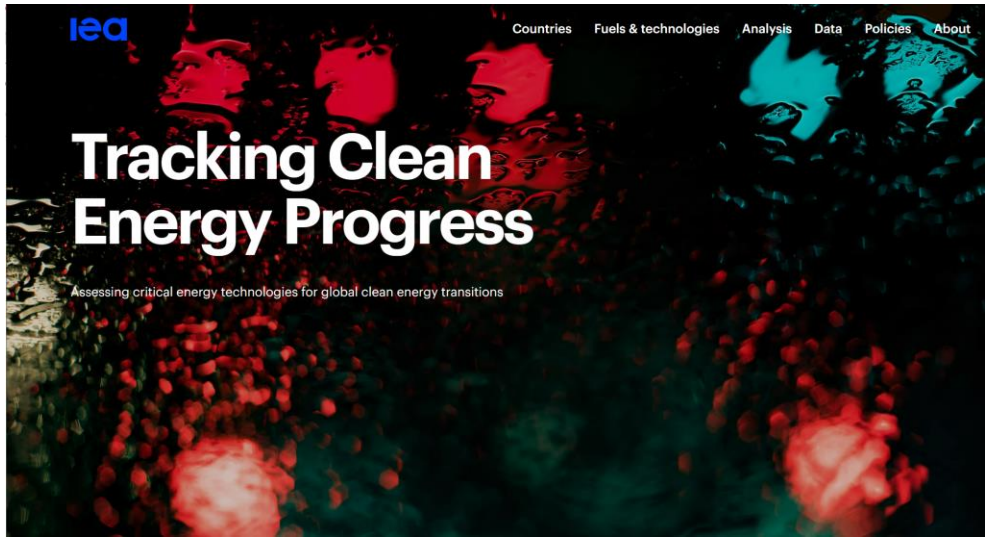
Open to everyone; enrol any time
https://es.edx.iea.org/courses

ETP Clean Energy Technology Guide



https://www.iea.org/articles/etp-clean-energy-technology-guide

IEA Energy efficiency in buildings resources



- Tracking Clean Energy Progress – Topics - IEA

International Energy Agency

Energy Efficiency in Buildings

International Energy Agency

Sustainable Energy Policies for Smart Cities

| IEA Platform E-learning

A brief zoom on SMEs:

- Banking challenges and approaches with industry EE
- Energy Savings Insurance case study

General considerations from surveys - SMEs

- Often there is a lack of awareness about opportunities, esp. about the multiple benefits
- Even those SMEs that do understand the potential competitiveness advancements through energy efficiency improvements, many factors lead to inertia.
  - ❑ Lack of technical human resources
  - ❑ Projects can be technical (or unique), which increases their perceived riskiness and makes rejection a comfortable choice.
  - ❑ Doubts around actual saving potential
  - ❑ Energy price volatility as a double-edged sword – encourages but also discourages investments
  - ❑ From banks' perspective: energy savings documentation required to qualify for energy efficiency financing often is not available or is insufficient to support a loan application
  - ❑ From SME's perspective the admin / documentation / audit requirements can look time-consuming and expensive

Energy Savings Insurance (ESI Model)

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Pablo Oses
pablo.oses@energy-base.org

Viola Buli
viola.buli@energy-base.org

BASE

5 June 2023

UNEPFI
PRB Energy efficiency capacity building (Asia Pacific) | Part I: Why Energy Efficiency?

ABOUT BASE

WHO WE ARE

BASE is founded in 2001 and is a Swiss not-for-profit foundation and a Specialized Partner of UN Environment.

Our vision is a world where markets are transformed, and sustainable energy and climate change solutions are the norm, not the exception.

WHAT WE DO

We develop innovative, actionable financial strategies and market-driven solutions to unlock investment in SE and to tackle climate change.

Around the world, we work with all markets and segments including those that are challenging and underserved.

BASE'S AREAS OF WORK

RENEWABLE ENERGY

ENERGY EFFICIENCY

ENERGY ACCESS

ELECTRIC MOBILITY

CLIMATE FINANCE

ADAPTATION AND RESILIENCE

LAND USE

CIRCULAR ECONOMY

ABOUT BASE


COOLING AS A SERVICE
ENERGY SAVINGS INSURANCE EUROPE
REMITRESILIENCE IN THE PACIFIC
ELECTRIC BUSES IN COLOMBIA
ECOFRIDGES IN WEST AFRICA
YOUR VIRTUAL COLD CHAIN ASSISTANT

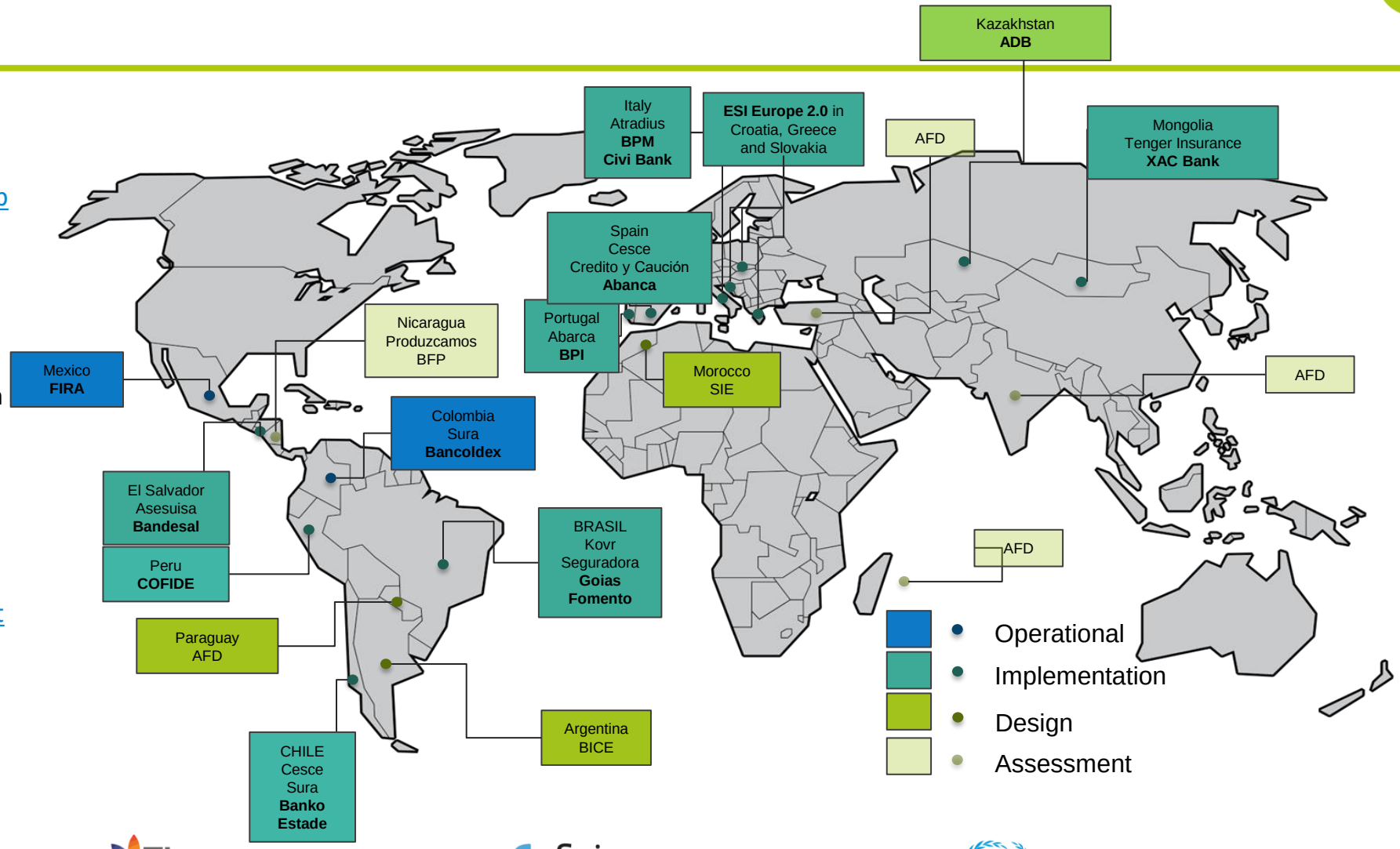
Energy Savings Insurance (ESI) Model

BASE

Geography the ESI Model

The ESI model was recognised by the Global Innovation Lab for Climate Finance as one of the most promising instruments to mobilise private sector investments in energy efficiency.

ESI also features in the G20 Energy Efficiency Investment Toolkit by the UNEP FI and in the Swiss Sustainable Finance compendium of instruments for Financing the Low-Carbon Economy.



Rationale of the ESI model

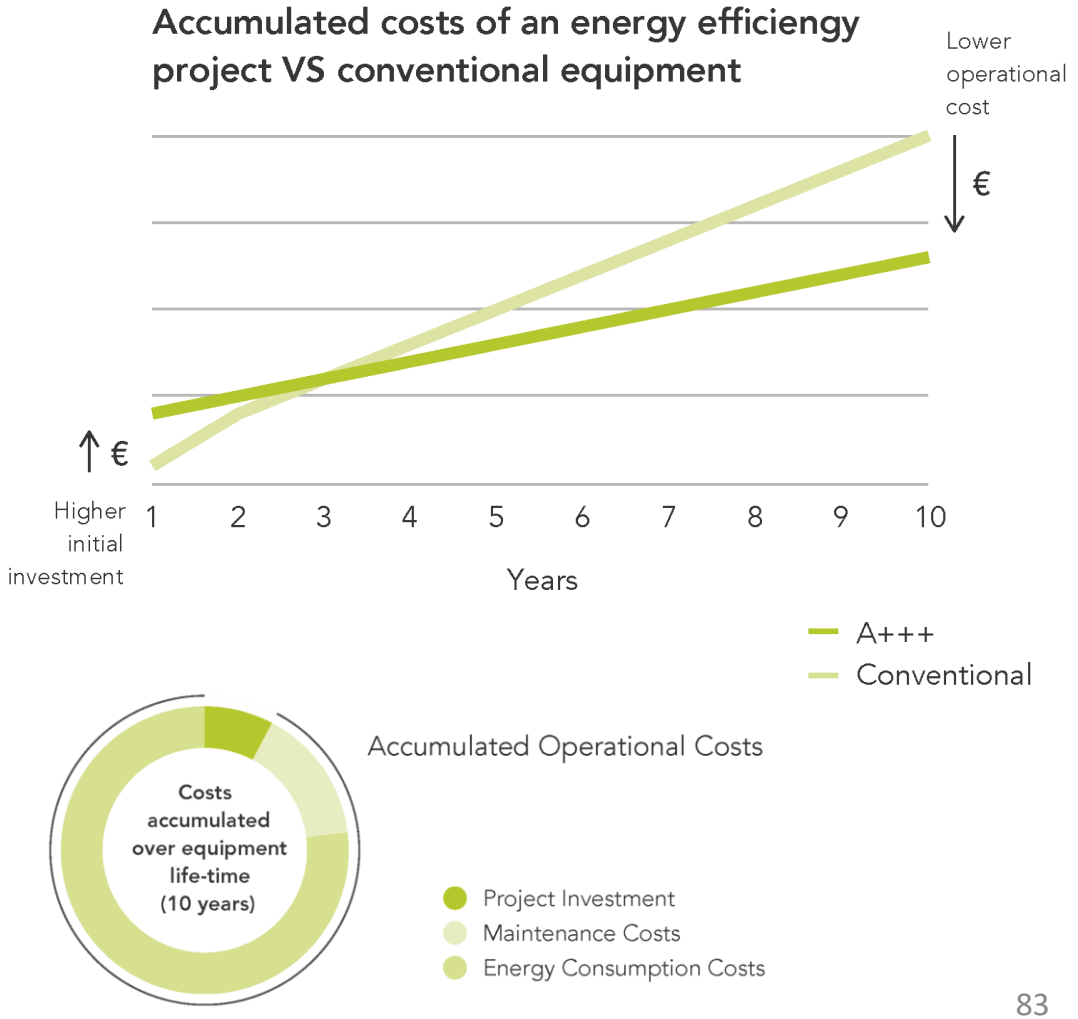
Investments in energy efficient systems…

… have **benefits**:

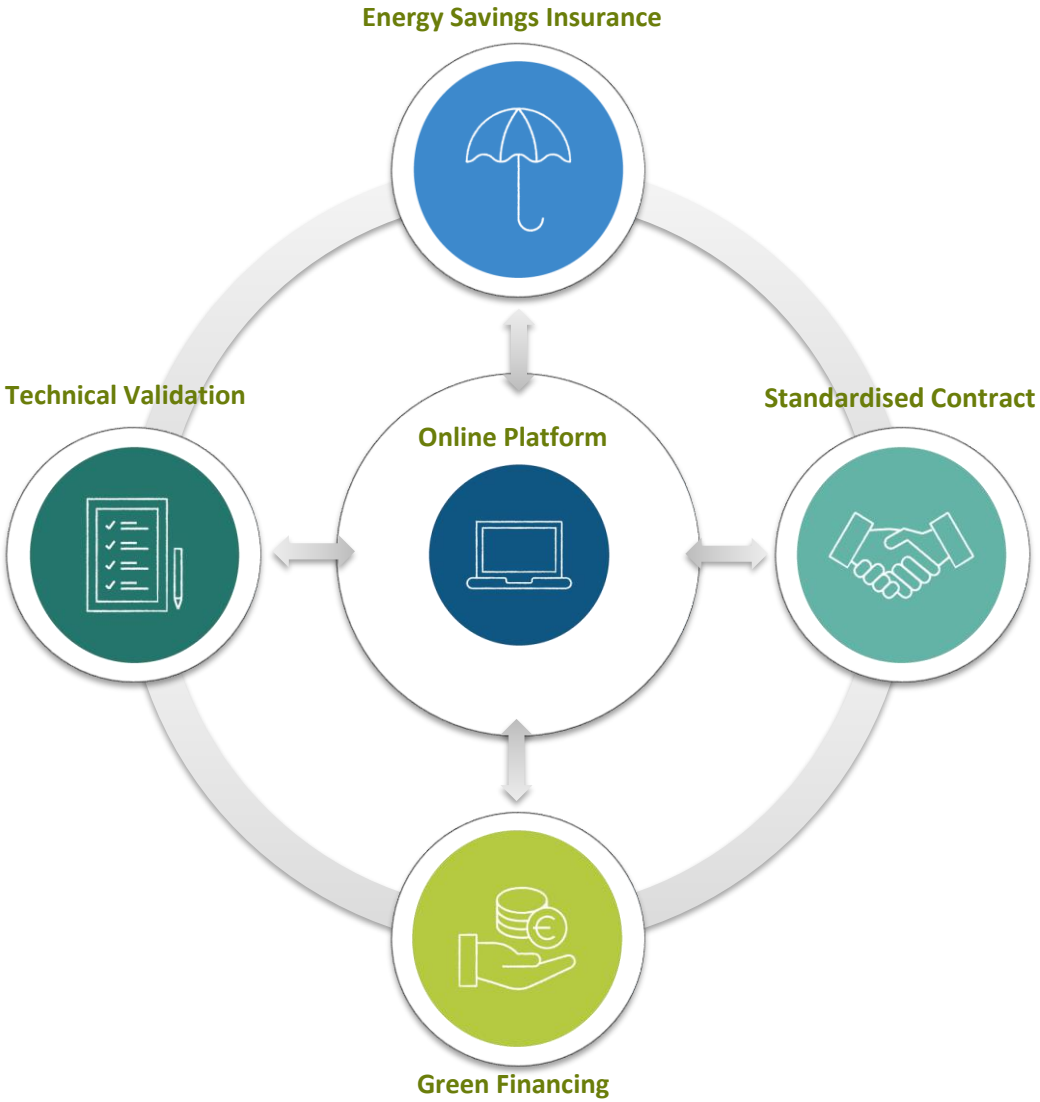
- Reduced operational costs
- Higher productivity and competitiveness
- Improved environmental impact

…face **barriers**:

- Higher upfront costs
- Competing investments opportunities
- **Lack of trust** (among actors, in future energy savings



Energy Savings Insurance tools



The **ESI model** is the combination of financial and non-financial elements designed to work together to reduce the perceived risk and build trust in future energy savings and mobilise private investments in Energy Efficiency.

✓Tools already on the market

✓Innovation lies in the way they interact with each other

Standardised Contract

GoSafe with ESI Ctandardised Contract

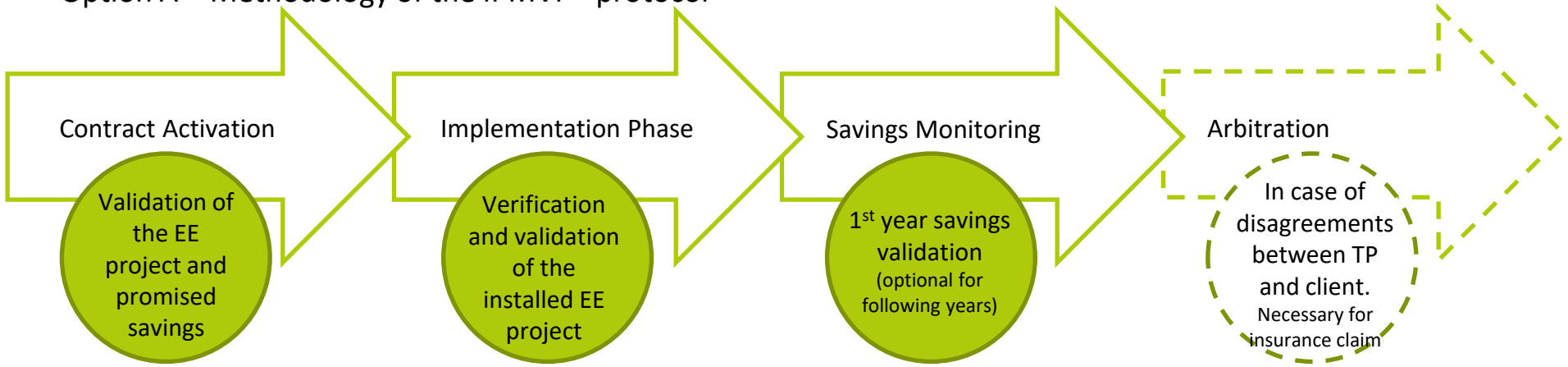
- ✓ An agreement between technology provider (Contractor) and client with guaranteed energy savings clause.
- ✓ The technology provider commits to the energy savings and is responsible for them in the first place.
- ✓ The use of a standard contract makes it easier to evaluate the contract.

Technical Validation

Builds trust and provides certainty of energy efficiency technical aspects to **clients**, **insurance companies** and **financial institutions**.

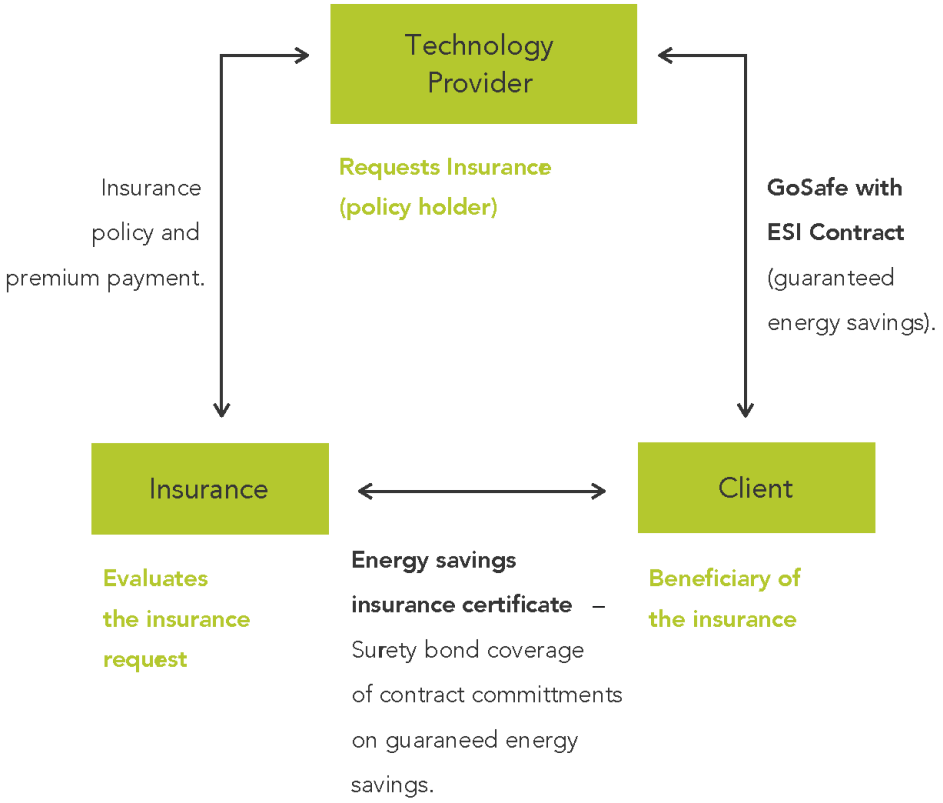
Main characteristics are:

- ✓ it is conducted by an independent technical validation entity
- ✓ the technology-based methodology for the evaluation of the projects is based on Option A – Methodology of the IPMVP® protocol



The validation process increases transparency and creates trust that energy savings will be delivered by the project.

Energy Savings Insurance



A policy to cover clients in the event promised energy savings are not achieved, and the TP cannot fulfil its commitments

The goals are to:

✓ GUARANTEE

Provide a guarantee that reduces the energy efficiency investment risk for clients by insuring TP's savings guarantee commitment.

✓ DE-RISK

Increase the commercial banks' willingness to lend to the clients for these project types given the reduced default risk.

Is a surety bond type of insurance, a contractual agreement among three parties: TP, insurance company and client.

Green Financing

- ✓ Client as investor and credit taker for EE project with GoSafe with ESI.
- ✓ Banks mobilise their green credit lines (or create new products) for EE projects using GoSafe with ESI.
- ✓ Reporting Mechanism of the portfolio through the MIS
- ✓ Links existing supporting financial mechanism (e.g. incentives, credit guarantees, etc.).
- ✓ FIs are engaged and trained to understand the functioning and interaction of GoSafe with ESI EE project.

Online platform - MIS

A functional interface will be developed to facilitate the workflow and information access of the different key actors of the energy efficiency project.

The main characteristics are:

✓ SECURE

It is accessed on a login and password, secured area

✓ PROJECT PROCESS MONITORING

It registers information and actions of the project:

- proposal validation
- contract activation
- installation validation
- Annual project performance reports

✓ TAILORED ACCESS

Accessed by TPs, Clients, Validation Entity, Insurance companies and Financial Institutions

✓ DEVELOPED IN BLOCKCHAIN

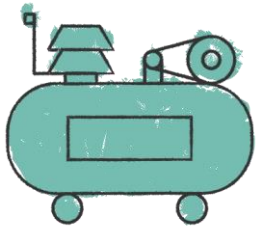
Increased transparency, trust, traceability and reliability of information

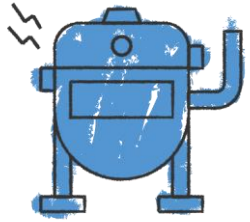
Technologies

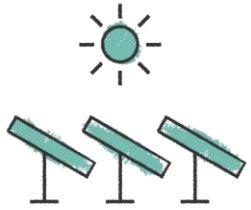
The most common technologies used in Energy Efficiency projects, which opens an interesting new market for the surety bond industry

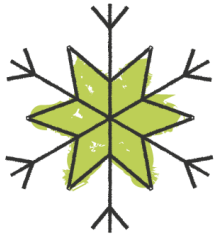

Lighting

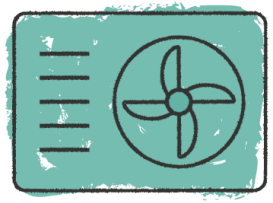

Motors

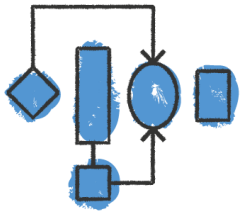

Air Compressors

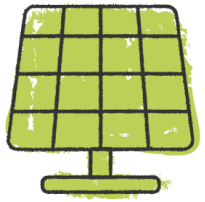

Boilers


Solar water heaters


Refrigeration


HVAC


Co-generation


Photovoltaic Panels


Combination of technologies

With **GoSafe with ESI** the financial institutions has an attractive tool to actively support the green economy and monitor the results the projects they finance.

Case study of Mongolia

Mongolia

SECTORS
- ✓ Hotels and Service Sector
- ✓ Industrial Sector

MARKET TARGET
- ✓ EUR 50 M$ in investments in EE projects in the coming 5 to 7 years

Timeline
- ✓ 2021 - 2023

Engaged Stakeholders
- ✓ Bank: Xac Bank
- ✓ Insurance: Tenger Insurance
- ✓ Validation Entity: Ureka

Scan Me

Visit www.gosafe-esi.com

Thank you for your attention!

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101033691

How does GoSafe with ESI work (1)?

1. PREPARATION PHASE

An energy efficiency technology provider offers a project with guaranteed energy savings.

2. CONTRACT ACTIVATION

A a third-party validation entity evaluates the project's energy savings.

The insurance company covers the validated energy savings and the contract is activated.

3. IMPLEMENTATION PHASE

The technology provider installs the energy efficient equipment and the validation entity validates it is according to the contract.

How does GoSafe with ESI work (2)?

4. OPERATION PHASE

The operation of the new equipment results in reduced energy costs and improved productivity.

Maintenance services by the technology provider ensures that the equipment is operating optimally.

5. SAVINGS MONITORING

The energy savings are measured and reported by the technology provider via a simple online system where they are checked and can be approved.

6. INSURANCE COVERAGE

In case of disagreements on the savings achieved, the validation entity steps in as an arbiter.

If the savings are not achieved, and the technology provider is not able to pay back, the insurance covers the guaranteed savings.

How do we implement the ESI model

Project activities include:

Conducting a Market Assessment and identify **prioritised sectors and technologies** within the country

Develop the ESI model elements and **engage key market actors** (insurance companies, validation entity and financial institutions)

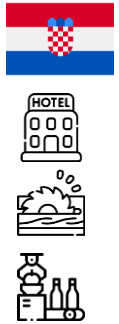
Deliver **capacity building** and establish **partnerships** with associations

Develop **communication and marketing material** to promote the uptake of ESI model/GoSafe with ESI solution

Build a pipeline of EE projects and **mobilise investments** making use of the ESI model/GoSafe with ESI solution.

Dissemination of **results and long lasting tools** for further replication of the model in Europe.

ESI market Europe key sectors



Croatia

HOTELS
- ✓ 811 hotels
- ✓ 112 hotels with +40 rooms; 3 and more stars

WOOD INDUSTRY
- ✓ 2,087 business in the wood sector
- ✓ 223 potential SME's

FOOD INDUSTRY
- ✓ 2,535 companies in the food sector
- ✓ Around 300 SME's potential market

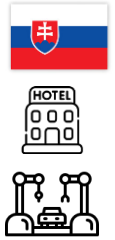
MARKET PROJECTIONS
- ✓ 9M€ mobilised investment after project implementation

Greece

HOTELS
- ✓ 9,971 Hotel units
- ✓ 4000 hotels as Potential market:
  - Hotels with 3 star or higher
  - Not new or renovated after 2017

FOOD INDUSTRY
- ✓ 15.118 companies in the food sector
- ✓ 2.654 as Target market in processing subsectors:

MARKET PROJECTIONS
- ✓ 20M€ mobilised investment after project implementation



Slovakia

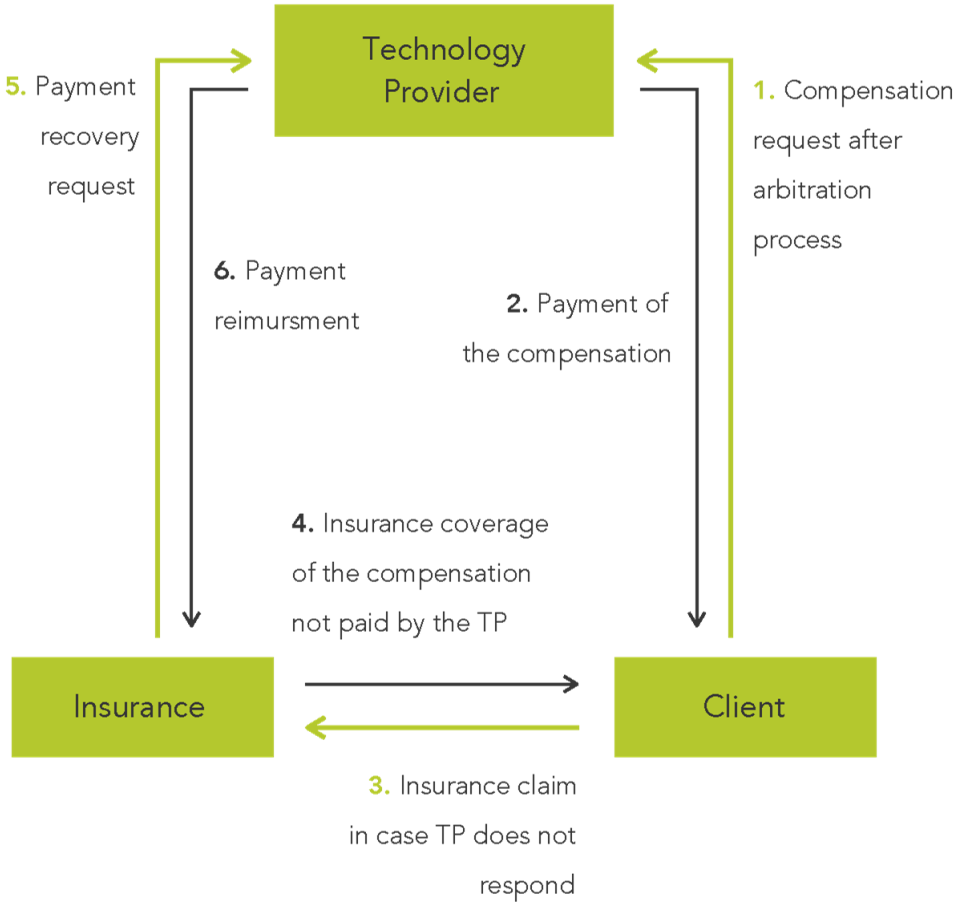
HOTELS
- ✓ 4487 establishments
- ✓ 233 Potential market

MOTOR VEHICLES INDUSTRY
- ✓ 350 supply plants Total market
- ✓ 35 plants estimated potential

MARKET PROJECTIONS
- ✓ 13M€ mobilised investment after project implementation

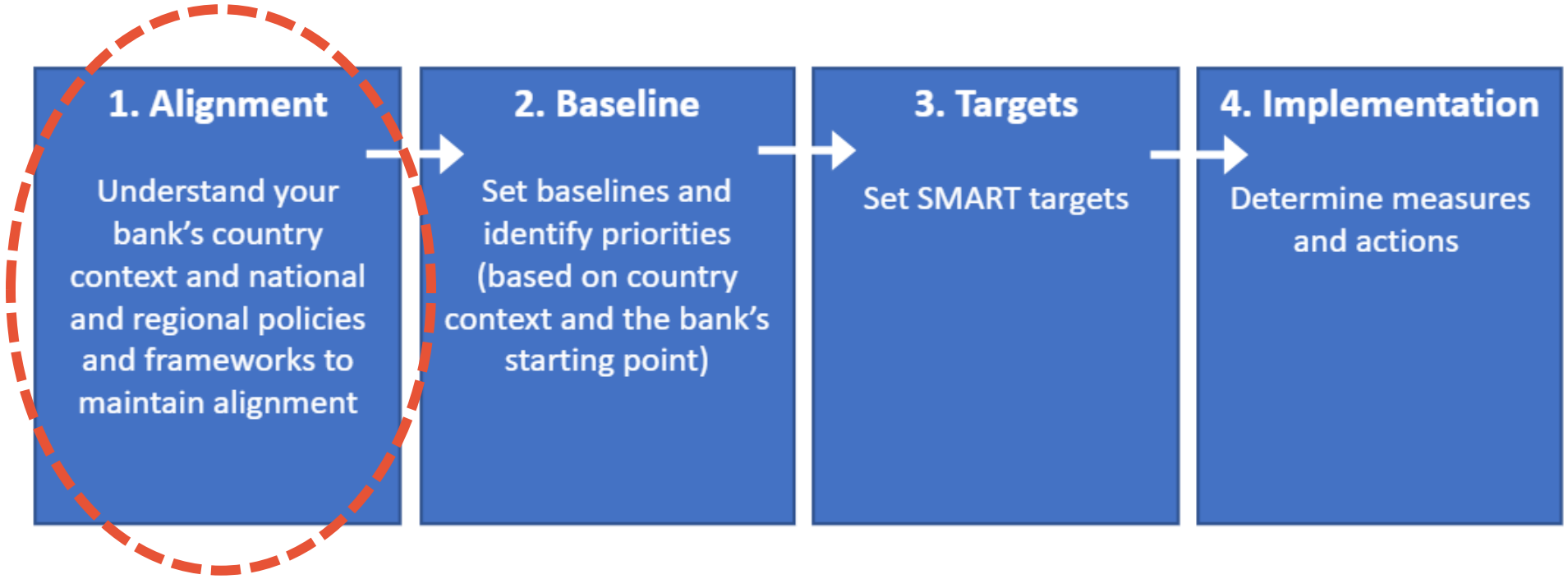
Energy Savings Insurance: claim operative

- ✓ Is linked to the GoSafe with ESI contract and triggered if specific clauses of the contract are not met.
- ✓ In case of the reported energy savings are not agreed by Client and TP, an arbitration process is initiated.
- ✓ The Validation Entity carries out the arbitration procedure, assessing potential energy savings defaults to be compensated to the Client.

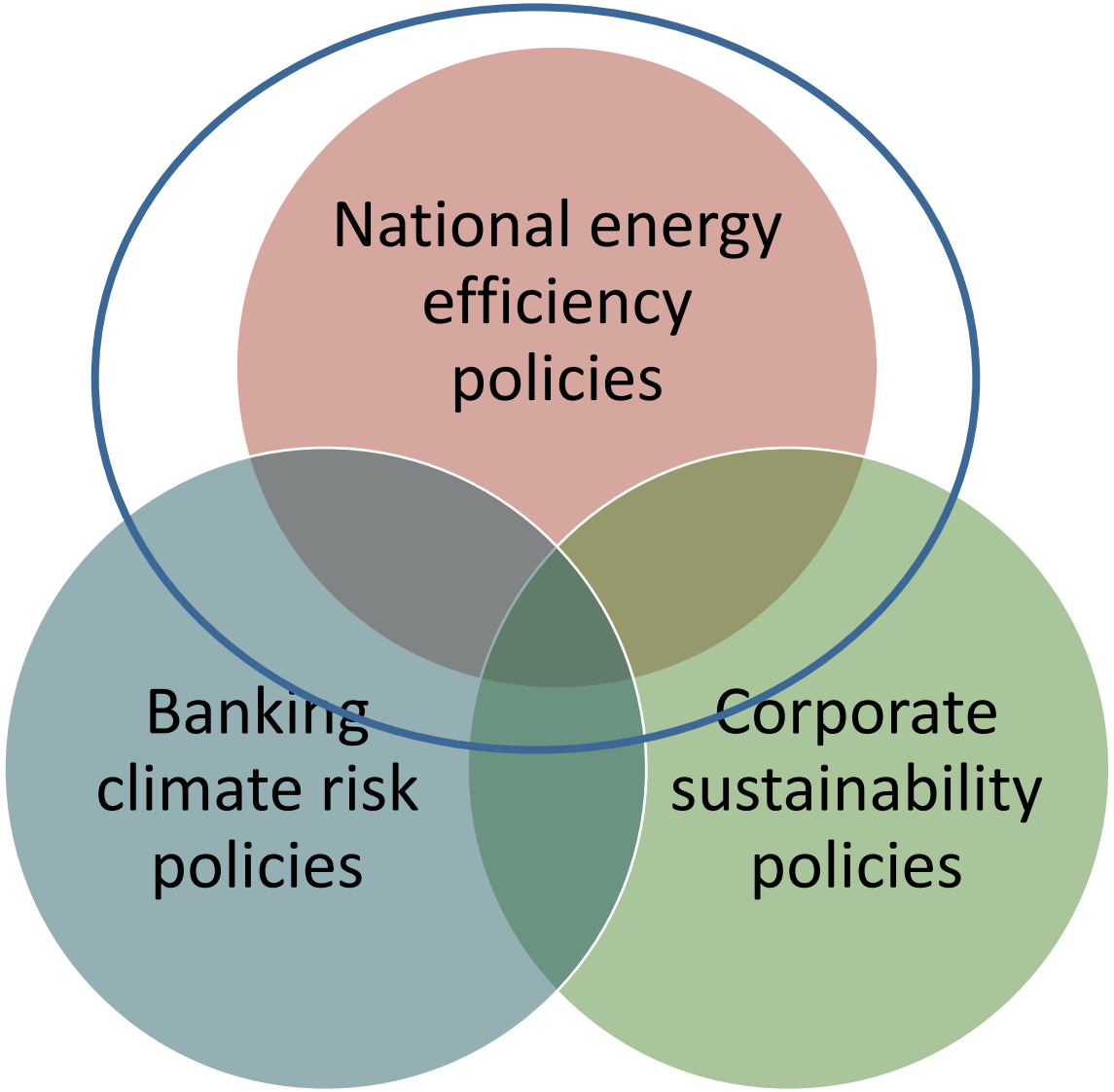


The first step of EE Target setting: Alignment

The target setting process (climate or resource efficiency)



Policy environment – what to look for?



Recommended resource for your context analyis

Policies 1573 | Asia Pacific ×

Filter

Policy	Country	↑ Year	Status	Jurisdiction
Fuel Economy Standards on Light-Duty Vehicles	Japan	2030	Ended	National
Enhancements to Minimum Energy Performance Standards (MEPS)	Singapore	2023	Planned	National
Increase in 2023 electricity access enhancement budget	Indonesia	2023	In force	National
(Inner Mongolia) Coal Industry Development 14th Five-Year Plan - Coalbed Methane Development and Utilization Supporting Scheme	People's Republic of China	2022	In force	State/Provincial
2022 Comprehensive emergency measures to address soaring crude oil and commodity prices	Japan	2022	In force	National
2022 Critical Minerals Strategy	Australia	2022	In force	National
2022 Electricity price stabilisation	Cambodia	2022	In force	National
2022 Energy-crisis support to vulnerable households and sectors	Korea	2022	In force	National
2022 Expansion of fertiliser subsidy	India	2022	In force	National
2022 Extension of energy affordability measures : additional GST Voucher – U-Save & Household Utilities Credit	Singapore	2022	In force	National
2022 Increase in petroleum product subsidies and Cooking Oil Stabilisation Scheme	Malaysia	2022	In force	National

Policies database

International Energy Agency

www.iea.org/policies

Example: Malaysia

KeTTHA
KEMENTERIAN TENAGA, TEKNOLOGI HIJAU DAN AIR

NATIONAL ENERGY EFFICIENCY ACTION PLAN

- The target of National Energy Efficiency Action Plan is to save electricity and reduce electricity demand growth. The effective and efficient implementation of the National Energy Efficiency Action Plan supported with sufficient resources will be able to save 52,233 GWh of electricity over the plan period against a business-as-usual (BAU) scenario.
- The corresponding electricity demand growth reduction at the end of the plan is 8.0 %

Initiative 1: Promotion of 5-Star Rated Appliances;

Initiative 2: Minimum Energy Performance Standards (MEPS);

Initiative 3: Energy Audits and Energy Management in Buildings and Industries;

Initiative 4: Promotion of co-generation

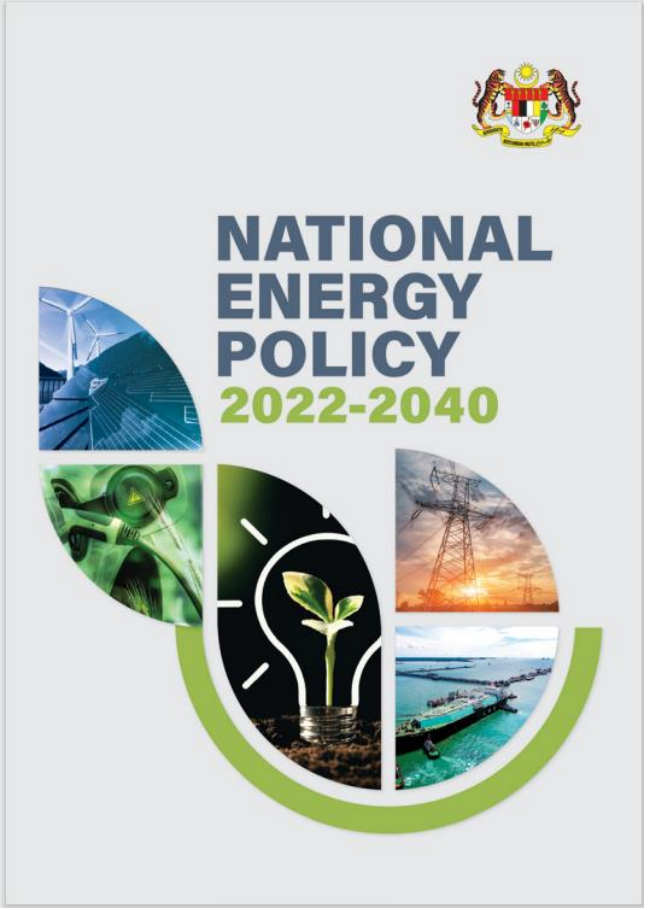
Initiative 5: Energy Efficient Building Design

Source: Pelan Tindakan Kecekapan Tenaga Negara - Pejabat Perdana Menteri Malaysia (pmo.gov.my)

Example: Malaysia

Summary Item	Unit	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total	Lifetime
Annual Savings	GWh	87	386	1,101	2,286	3,783	5,475	7,161	8,909	10,653	12,391	52,233	122,543
Residential	GWh	50	123	219	350	522	712	921	1,184	1,468	1,772	7,320	16,677
Commercial	GWh	28	107	307	626	1,018	1,460	1,908	2,395	2,889	3,391	14,130	31,767
Industrial	GWh	9	156	574	1,310	2,243	3,303	4,332	5,330	6,296	7,228	30,783	74,099
Cumulative Savings	GWh	87	473	1,574	3,859	7,643	13,118	20,279	29,188	39,842	52,233	52,233	122,543
Demand Savings	MW	14	63	179	373	617	893	1,168	1,453	1,737	2,021	2,021	
Capacity Savings	MW	18	79	224	466	771	1,116	1,460	1,816	2,172	2,526	-	
Benefits	RM (Million)	28	135	378	799	1,336	1,947	2,552	3,173	3,790	4,401	18,538	42,548
Public Funding	RM (Million)	24	39	59	60	61	52	53	54	44	45	493	**493**
Private Funding	RM (Million)	207	303	493	496	596	628	672	755	791	840	5,781	**5,781**
Administration	RM (Million)	5	5	5	5	5	5	5	5	5	5	50	50
Total Payments	RM (Million)	236	347	557	562	662	685	730	814	840	890	6,324	6,324
BCR												**2.9**	**6.7**
Cash Flow	RM (Million)	- 208	- 212	- 180	237	674	1,261	1,821	2,359	2,950	3,511	12,214	36,224
Total fuel savings	TJ	964	4,225	11,932	24,534	40,204	57,609	74,600	91,892	108,796	125,289	540,045	1,266,995
Gas Savings	TJ	443	1,943	5,489	11,286	18,494	26,500	34,316	42,271	50,046	57,633	248,421	582,818
Coal Savings	TJ	395	1,732	4,892	10,059	16,484	23,620	30,586	37,676	44,606	51,368	221,418	519,468
GHG savings	ktCO2eq	62	273	771	1,585	2,597	3,721	4,819	5,936	7,028	8,094	34,886	81,847
BAU	GWh	117,110	121,431	125,885	130,474	134,830	139,206	143,326	146,992	150,657	154,142	1,364,053	
NEEAP	GWh	117,023	121,045	124,784	128,188	131,047	133,731	136,165	138,082	140,004	141,751	1,311,820	
Savings	Pct	0.1%	0.3%	0.9%	1.8%	2.8%	3.9%	5.0%	6.1%	7.1%	**8.0%**	3.8%	

Example: Malaysia

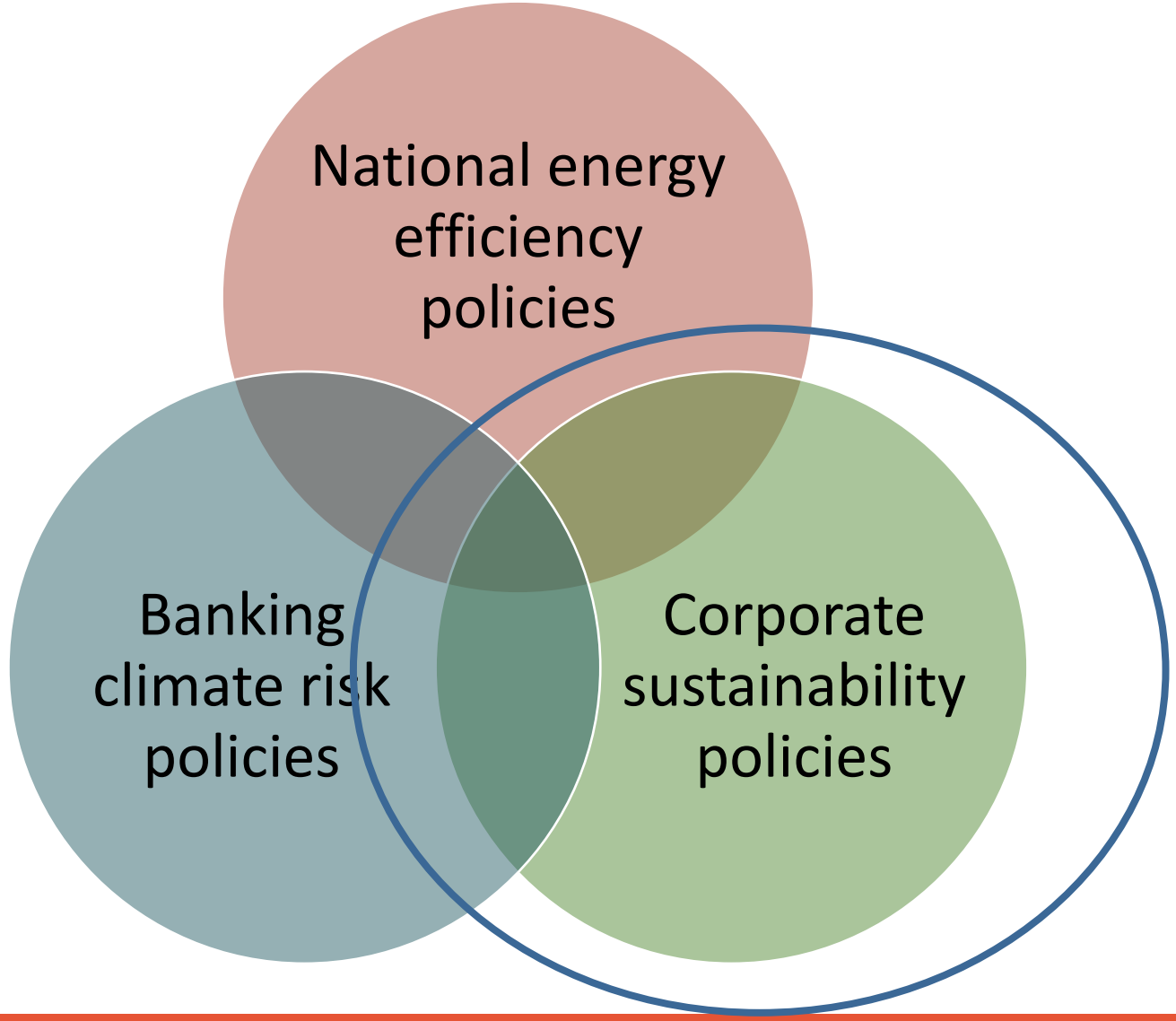


Selected Targets	2018	Low Carbon Nation Aspiration 2040
1. Percentage of urban public transport modal share	20%	50%
2. Percentage of electric vehicle (EV) share	<1%	38%
3. Alternative fuel standard for heavy transport	B5	B30
4. Percentage of Liquefied Natural Gas (LNG) as alternative fuel for marine transport	0%	25%
5. Percentage of industrial and commercial energy efficiency savings	<1%	11%
6. Percentage of residential energy efficiency savings	<1%	10%
7. Total installed capacity of RE	7,597 MW	18,431 MW
8. Percentage of coal in installed capacity	31.4%	18.6%
9. Percentage of RE in TPES	7.2%	17%

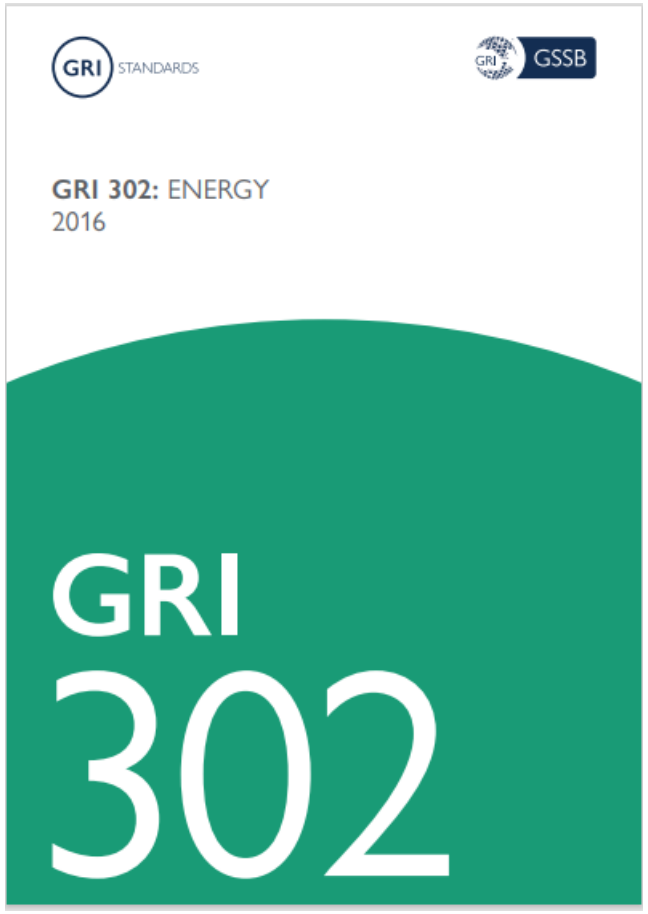
Legend: Energy security · Energy affordability · Environmental sustainability

Source: National Energy Policy_2022_2040.pdf (epu.gov.m

Policy environment – what to look for?



Energy Efficiency in corporate sutainability disclosures

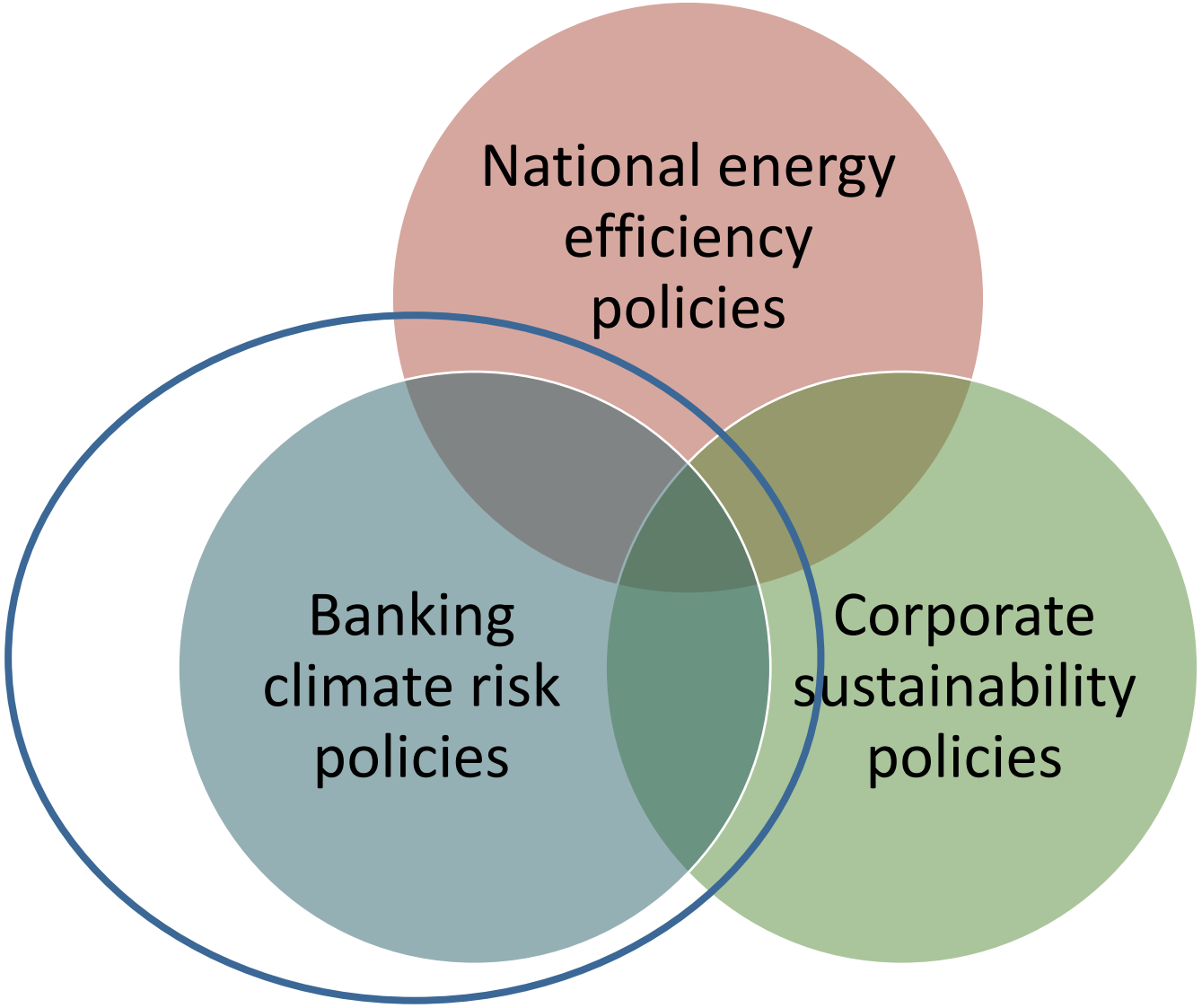


- Disclosure 302-1 Energy consumption within the organization
- Disclosure 302-2 Energy consumption outside of the organization
- Disclosure 302-3 Energy intensity
- Disclosure 302-4 Reduction of energy consumption
- Disclosure 302-5 Reduction in energy requirements of products and services

Energy Efficiency and TCFD reporting

1. **Transition Risks:** Energy efficiency measures can help mitigate risks associated with the transition to a low-carbon economy. Organizations can disclose the potential financial impacts of energy efficiency improvements on their operations, including reduced energy costs, improved resource efficiency, and the adoption of energy-efficient technologies.
2. **Physical Risks:** Energy efficiency can contribute to building resilience against physical climate risks. Organizations can report on how energy efficiency measures, such as efficient building design or cooling systems, are implemented to adapt to changing climatic conditions and reduce vulnerability to extreme weather events.
3. **Opportunities:** Energy efficiency initiatives can create business opportunities and competitive advantages. Organizations can disclose their investments in energy-efficient technologies, projects, or infrastructure that contribute to cost savings, operational efficiency, and market differentiation.
4. **Metrics and Targets:** TCFD reporting encourages organizations to disclose relevant metrics and targets related to climate change. Energy efficiency metrics, such as energy intensity, energy savings, or greenhouse gas emissions reductions resulting from energy efficiency measures, can be included in TCFD disclosures.

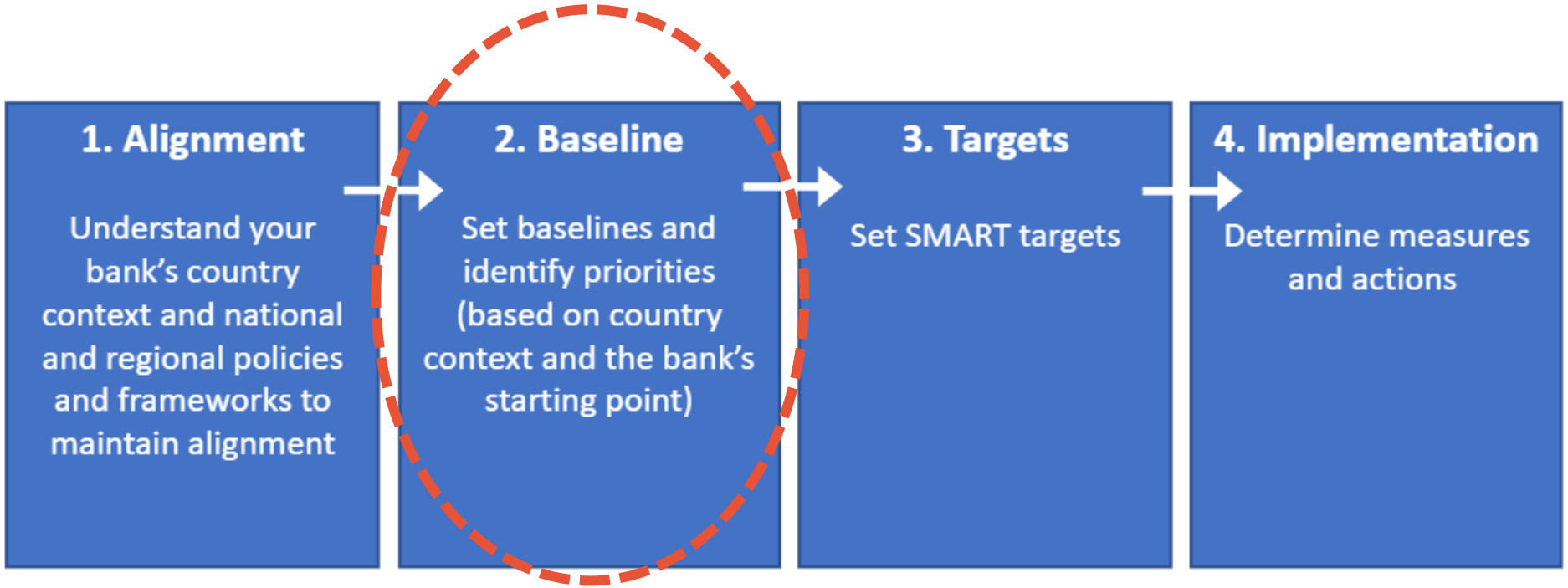
Policy environment – what to look for?



Banking policies - examples

- A growing number of countries require banks to assess and manage climate risks.
- This often includes assessing energy efficiency of properties (transition risks)
- In China, the Green Credit Policy, introduced by the China Banking Regulatory Commission (CBRC) in 2012, requires banks to incorporate environmental factors into their risk management systems and lending practices. Banks are encouraged to prioritize lending to **energy-efficient** projects and environmentally friendly industries.
- In South Korea, the Financial Services Commission (FSC) introduced the Green Finance Initiative, which includes guidelines for banks and financial institutions to integrate environmental and sustainability factors into their operations. Banks are encouraged to provide financial support to green projects, including **energy efficiency** initiatives.
- In Singapore, the Monetary Authority of Singapore (MAS) has also introduced guidelines on environmental risk management for banks. These guidelines encourage banks to incorporate environmental factors, including **energy efficiency**, into their risk assessments and lending practices.

The target setting process (climate or resource efficiency)



Measuring your baseline and monitoring your progress

- Your bank needs to select enough relevant indicators to measure its current baseline and to monitor and report its progress towards achieving targets.
- The goal is understand how resource efficient and/or climate-friendly your clients' activities are and how those can be improved, through an energy efficiency lense.
- You are encouraged to use a core set of indicators including both practice indicators and impact indicators.

Practice indicators
Portfolio composition and financial flows indicators
Client engagement indicators
Impact indicators

Portfolio screening is key to baseline measurement

Thus, screening your portfolio against a categorisation system will allow your bank to identify:

(i) the activities screened positively, for which your bank should increase its support and exposure,

(ii) the activities screened negatively, for which your bank should engage with its clients and support them to materialise the circular opportunities, and

(iii) the activities screened negatively with no improvement opportunities, for which your bank should decrease exposure and consider exiting the relationship. It will rarely be the case that an activity or a business has no possibility to improve its energy efficiency and circularity (or GHG emissions). Hence, exiting a relationship is thus the solution of last resort.

Screening criteria: an example from Europe – the Taxonomy of sustainable activities

- Some activities are directly linked to EE
  - Manufacture of energy efficiency equipment for buildings
  - Installation, maintenance and repair of energy efficiency equipment
  - Installation and operation of electric heat pumps
- But also embedded in many other activities
  - e.g. Manufacture of low carbon technologies for transport, Renewal of waste water collection and treatment etc., Data processing, hosting and related activities, etc.
- **For most banks, *Construction and real estate activities* will be most relevant**
  - **7.1 Construction of new buildings**
  - **7.2.Renovation of existing buildings**

EU Taxonomy Navigator (europa.eu)

Screening criteria: ASEAN Taxonomy

Common climate change mitigation Activities include, but are not limited to; renewable energy generation, rehabilitation, **retrofitting and/or replacement of energy-inefficient technology**, **production of energy-efficient technologies**, as well as maintenance and strengthening of landbased carbon stock and sinks, above and below ground.

An Activity may be considered as meeting this EO through one or both of the following:

1. Adjusting business operations to conserve raw materials, **energy**, water, and other natural resources; or
2. Implementing circular economy principles via adapted products, production, technologies, and processes

Source: ASEAN Taxonomy

We continue the program on Wednesday

2.00 PM* Opening

2.05 **EE Underwriting toolkit** (Steven Fawkes/EEFIG)

3.00 **How to finance energy efficiency investments in industries** (Carsten Glenting / EEFIG)

3.45 Break

4.00 **Using ESCOs to scale up energy efficiency investments** (Alexander Ablaza / Asia-Pacific ESCO Industry Alliance)

4.45 **Energy efficiency target setting & implementation** (UNEP FI)

5.00 Closing

*China Standard Time

UN environment programme | finance initiative

Principles for Responsible Banking

UNEP Finance Initiative

Energy Efficiency Finance capacity building for Asia Pacific Banks

5-8 June 2023

UNEP Finance Initiative

Energy Efficiency Finance capacity building

5-8 June 2023

Workshop 2#

Financing energy efficiency

7 June 2023

MINISTERO DELL'AMBIENTE
E DELLA SICUREZZA ENERGETICA

We would like to thank the Italian Ministry of Environment and Energy Security for supporting the UN system's contribution to a green and inclusive recovery by harnessing the power of financial systems to support the SDG Decade of Action, access of developing countries to sustainable finance and Multilateral Environmental Agreements.

The outline of the capacity building program

5 June – Workshop 1#: Why energy efficiency?

- Understanding impacts: Energy efficiency (EE), the SDGs and the Circular Economy
- The business opportunity - EE in the Buildings, Transport, Equipment, Industry sectors
- Focus on SMEs
- Key EE regulations and policies for bank lending in the respective region
- UNEP FI's guidance for banks to set EE targets

7 June – Workshop 2#: Financing energy efficiency

- Finance instruments overview
- Risk management perspective
- Focus on ESCOs

8 June - Workshop 3#: Financing renovations/new constructions in the buildings sector

- The emerging EE and green building concepts
- Deep dive on conventional lending and innovative financing instruments
- Focus on green mortgages
- Bank examples
- Putting the pieces together

After the workshops possibility to request **further individual technical assistance**.

2.00 PM* Opening

2.05 **EE Underwriting toolkit** (Steven Fawkes/EEFIG)

3.00 **How to finance energy efficiency investments in industries** (Carsten Glenting / EEFIG)

3.45 Break

4.00 **Using ESCOs to scale up energy efficiency investments** (Alexander Ablaza / Asia-Pacific ESCO Industry Alliance)

4.45 **Energy efficiency target setting & implementation** (UNEP FI)

5.00 Closing

*China Standard Time

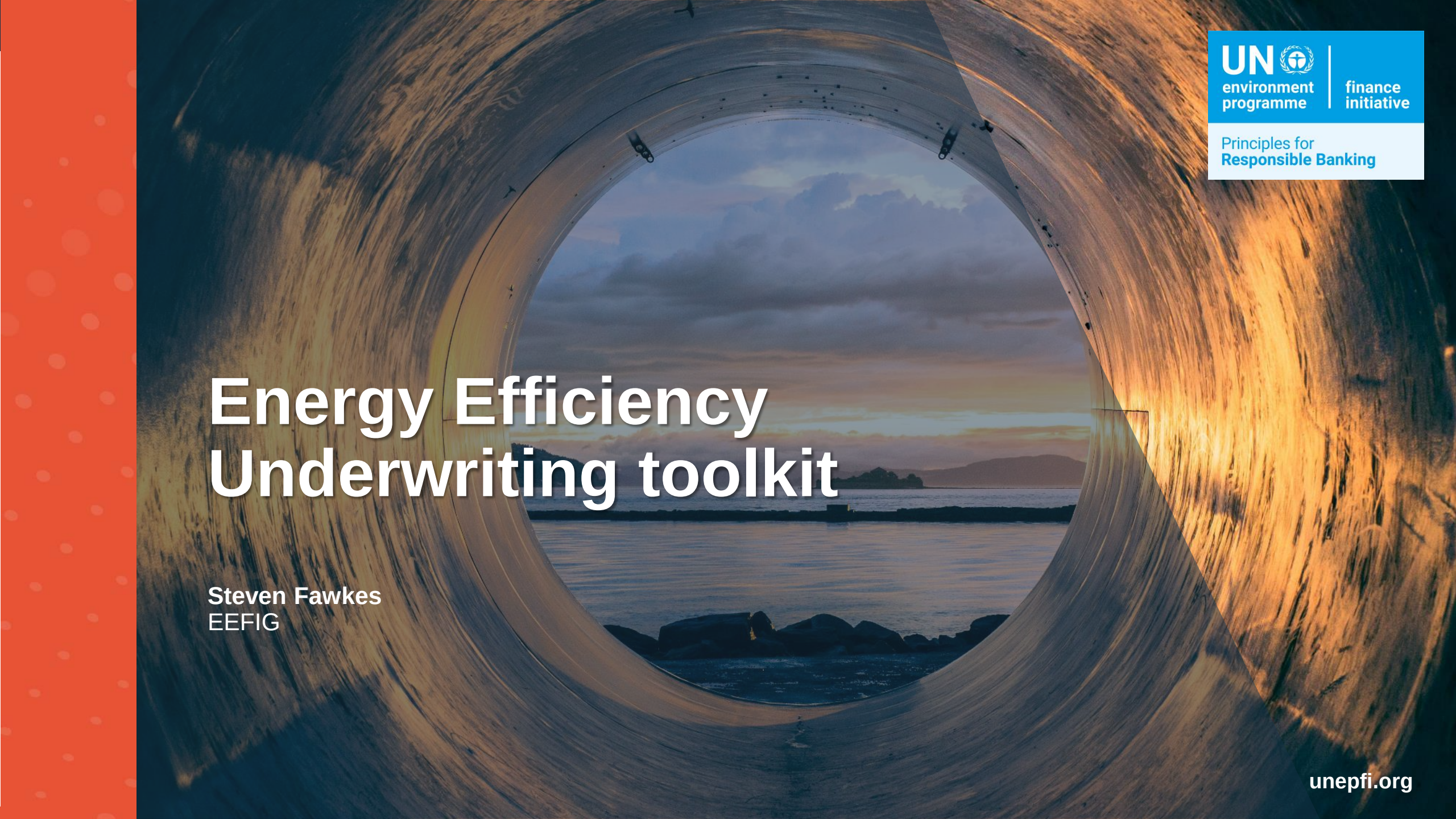
Questions, comments and thoughts welcome!

Connect to Slido via the link posted in the chat

or go to **www.slido.com** and
enter code: **123 23 23**

or scan QR code:

- Post questions in Slido or Raise hands in Webex (if you want to speak up)
- Recordings and materials will be shared after the meeting to participants



UN environment programme | finance initiative

Principles for Responsible Banking

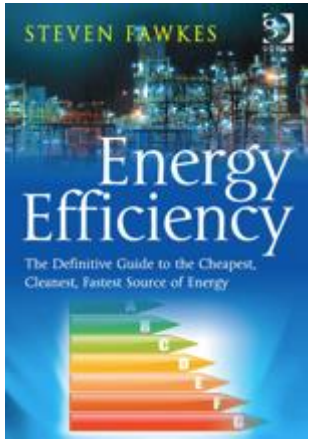
Energy Efficiency Underwriting toolkit

Steven Fawkes
EEFIG

unepfi.org

Introduction

- Dr. Steve Fawkes
  - PhD on the potential for energy efficiency in UK industries
  - 40+ years experience in energy efficiency
  - Advised corporates, investors, multi-lateral institutions and governments
  - Experience:
    - designing and implementing large-scale energy management programmes (up to 1,500 buildings)
    - Developing and implementing innovative energy outsourcing contracts for Sainsburys, Diageo, Corus
    - Introduced the Investor Confidence Project to Europe and secured €3.5m of H2020 funding
    - Corporate finance raising capital for energy transition and clean-tech companies
    - Co-leader EEFIG consortium 2016-2017 and leader of Working Groups in EEFIG 2019-2023
  - Current roles
    - Founder and Managing Partner ep group
    - Partner Cameron Barney
    - Independent member of IC for London Energy Efficiency Fund
    - NED for EESL EnergyPro Assets Ltd – JV with Indian state owned energy efficiency company
    - NED for Latvian and Baltic Energy Efficiency Fund
    - NED for ZPN Energy
  - More than 350 publications – mainly on energy efficiency & energy services – including 3 books and a blog called onlyelevenpercent.com



Contents

Workshop 1#

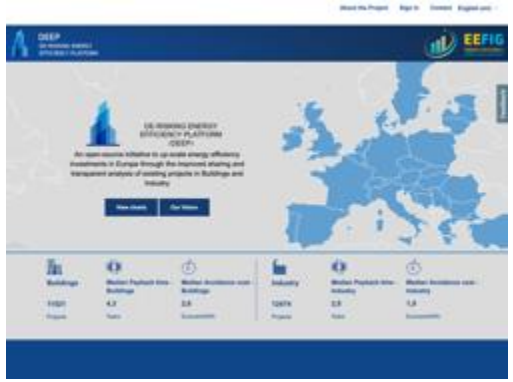
Introduction to the EEFIG Underwriting Toolkit

EEFIG Derisking project 2016-2017

- Phase II of EEFIG delivered two tools to help derisk energy efficiency:

Derisking Energy Efficiency Platform (DEEP)

An open source database of >11,500 energy efficiency projects in buildings and industry across Europe



Underwriting Toolkit

A guide for financial institutions better able to assess the value and risk of energy efficiency projects

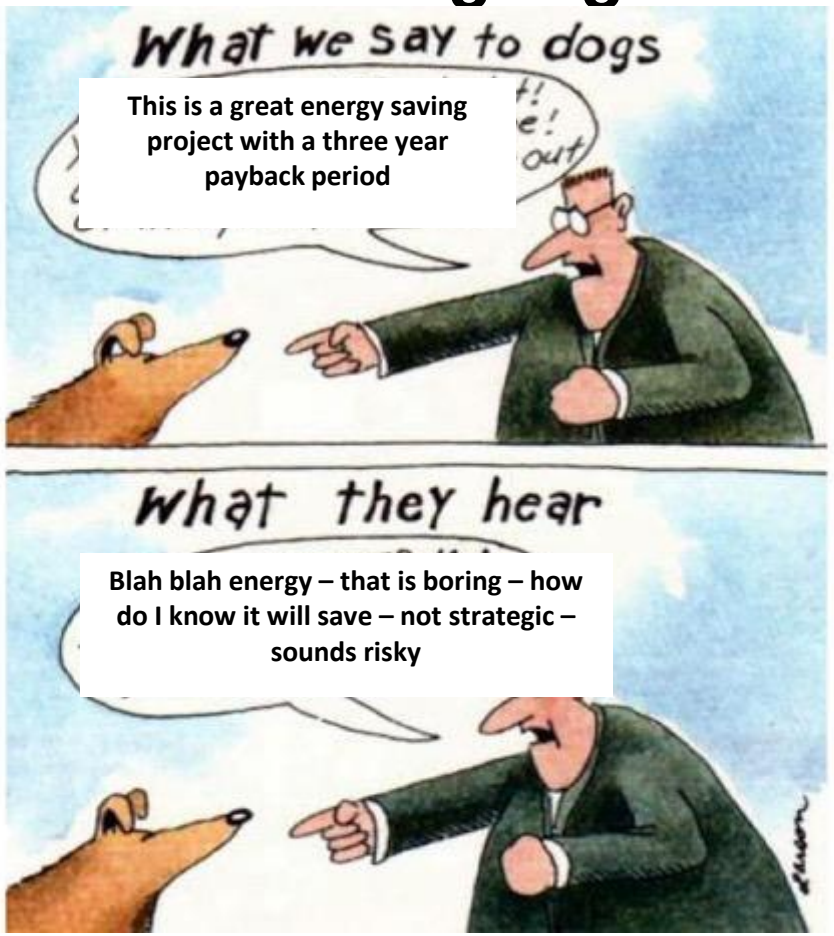
EEFIG Underwriting Toolkit

- **Designed to assist financial institutions to scale up their deployment of capital into energy efficiency.**

- **Objectives:**
  - to help originators, analysts and risk departments within financial institutions **better understand the nature of energy efficiency investments** and therefore better evaluate both their value and the risks.
  - to provide **a common framework for evaluating energy efficiency investments and analysing the risks** that will allow training and capacity building around standardised processes and understanding.
  - **to help developers and owners** seeking to attract external capital to energy efficiency projects to develop projects in a way that better addresses the needs of financial institutions.
  - **to foster a common language** between project developers, project owners and financial institutions.

- Although **the focus is on value and risk appraisal**, additional material on the size of the potential market, methods of financing and the project life cycle have been included to give a fuller picture and **help build capacity** within financial institutions.

The need for a common language



Structure of the Underwriting Toolkit

- Introduction
- Financial institutions and energy efficiency
  - Why?
- Financing energy efficiency
  - How?
- The project life cycle
  - Stages of a project
- Value and risk appraisal
  - How to assess value and risk
- Resources

Types of energy efficiency financing

Types of energy efficiency financing

- On Bill Recovery (OBR)
- Property Assessed Clean Energy (PACE) financing
- Energy efficient mortgages
- Specialised funds – public or blended
- Energy Service Companies (ESCOs)
- Bonds
- Yieldcos
- Normal lending taking into account energy efficiency (see Energy Efficiency First section)

On Bill Recovery (or On Bill Finance)

- Customer repays a loan for energy efficiency equipment through an additional line item on their electricity bill
- Advantages to financial institutions:
  - Uses existing electricity company billing system
  - Large customer base
  - Low default rate
  - Transferable as it is tied to property
- Used in several US states and was basis of UK Green Deal (which failed for other reasons)

Property Assessed Clean Energy (PACE)

- PACE is a way of repaying loans for energy efficiency improvements (and other measures including solar, water projects and in some cases earthquake protection measures)
- A PACE repayment is added to the property taxes and collected by the local authority
- Developed in US, also applied in Australia and Canada, Horizon 2020 project to introduce it to Europe
- Highly dependent on property tax system – the US property tax system puts local taxes above mortgages so minimal default risk
- Can be long-term – up to 20 years
- Can be residential (R-PACE) or commercial (C-PACE)
- R-PACE active in 3 states
- C-PACE active in 30 states
- In US $11.9 billion invested across 325,000 projects

Energy Efficient (or Green) Mortgages

- Mortgages where some portion of the loan funds energy efficiency (green) upgrades to the home
- Energy Efficiency Mortgages Initiative (an EU funded project) includes 70 lenders
  - Energy Efficiency Mortgage valuation checklist
  - Harmonised Disclosure Template for portfolio reporting
  - Energy Efficient Mortgage Label
- Green mortgages in Romania developed in conjunction with Romania Green Building Council

Specialised funds

- Can be private, public or blended (private/public)
- Can be debt or equity
- Can be focused on specific sectors eg property
- Examples
  - The European Energy Efficiency Fund
  - Carbon Neutral Real Estate Fund
  - Mayor of London's Energy Efficiency Fund
  - Credit Suisse European Climate Value Property Fund
- Experience shows that these kinds of funds are helped by having some Technical Assistance (TA) facility to help develop projects

Energy Service Companies (ESCOs)

- Much talked about – little understood
- An Energy Service Company (ESCO) develops and implements energy efficiency (and sometimes energy supply) projects and guarantees a level of energy performance through an Energy Performance Contract (EPC)
- Projects are usually financed by a financial institution
- Often the guaranteed level of savings will exceed the repayments, making the project cash flow positive for the client from the beginning

ESCOs and EPCs are useful but not *the* answer to every problem

- Complex
- Suitable for large projects (€ millions)
- High transaction costs
- Measurement and Verification issues
- Balance Sheet issues
- 80-90% of global ESCO EPC business is in the public sector – it has never caught on in other sectors

Note: ESCOs are not new – Boulton & Watt

Super ESCOs

- In some countries there are now Super ESCOs being promoted by IFIs as a way of accelerating uptake of energy efficiency
  - Etihad Super-ESCO
  - Tarshid
  - Kenya Super ESCO
- Super ESCOs develop projects at scale, using standardized approaches and contracts, arrange finance, and then let projects to ESCOs

Varieties of ESCOs and contracts

- Energy Performance Contract is the standard and most talked about
- Variations include:
  - Chauffage (supply of heat)
  - Efficiency Services Agreement (ESA)
  - Managed Energy Services Agreement (MESA)
  - Metered Energy Efficiency Transaction Structure (MEETS)
  - Lighting as a Service (LaaS)
  - Cooling as a Service (CaaS)
- With the exception of Chuaffage, the others are relatively new and emerging, reflecting the general growth of ‘as-a-service’ models

Bonds and yieldcos for energy efficiency

- Bonds often talked about in relation to energy efficiency but problem is one of scale and the fact that bonds are most often used for re-financing
- Berlin Hyp has used bonds to finance green, energy efficient commercial property
- Some energy efficiency focused yieldcos have appeared in the last few years
  - SDCL Energy Efficiency Investment Trust
  - Triple Point Energy Transition
  - Hannon Armstrong

Normal lending taking into account energy efficiency

- See section on Energy Efficiency First

The risks of energy efficiency projects

The old view of energy efficiency

"Energy efficiency has high returns and virtually no risk"

Energy efficiency text book from the 1980s

"The returns are tremendous, and there's virtually no risk," said Mark Orlowski, the founder and executive director of the Sustainable Endowments Institute"

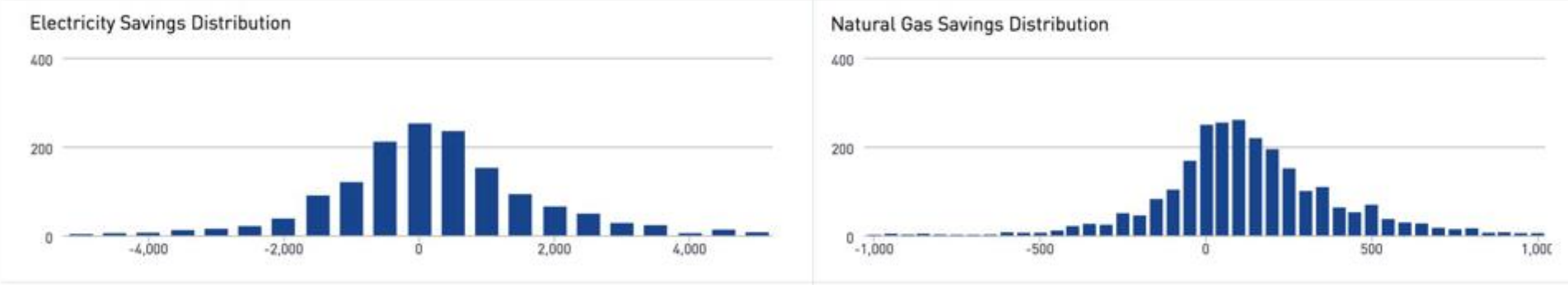
New York Times, 6 February 2015

Energy efficiency projects do have risks

- Energy efficiency projects, like all investments, have risks
- The main types of risk are:
  - Performance risks (NB the performance gap)
  - Equipment risks
  - Operation and Maintenance risks
  - Weather risks
  - Changes in production volume, production mix, patterns of building use (e.g. COVID!!)
- All these can be mitigated and transferred to the correct party
  - Contracts eg ESCO through an EPC
  - Insurance

In reality energy efficiency is low risk but not no risk

- Portfolios of projects perform – individual projects may not
- Only just beginning to get the actual performance data that allows us to measure this performance



Value of energy efficiency

The old view of energy efficiency

"Implement this project, spend €1,000 and save €300 a year"

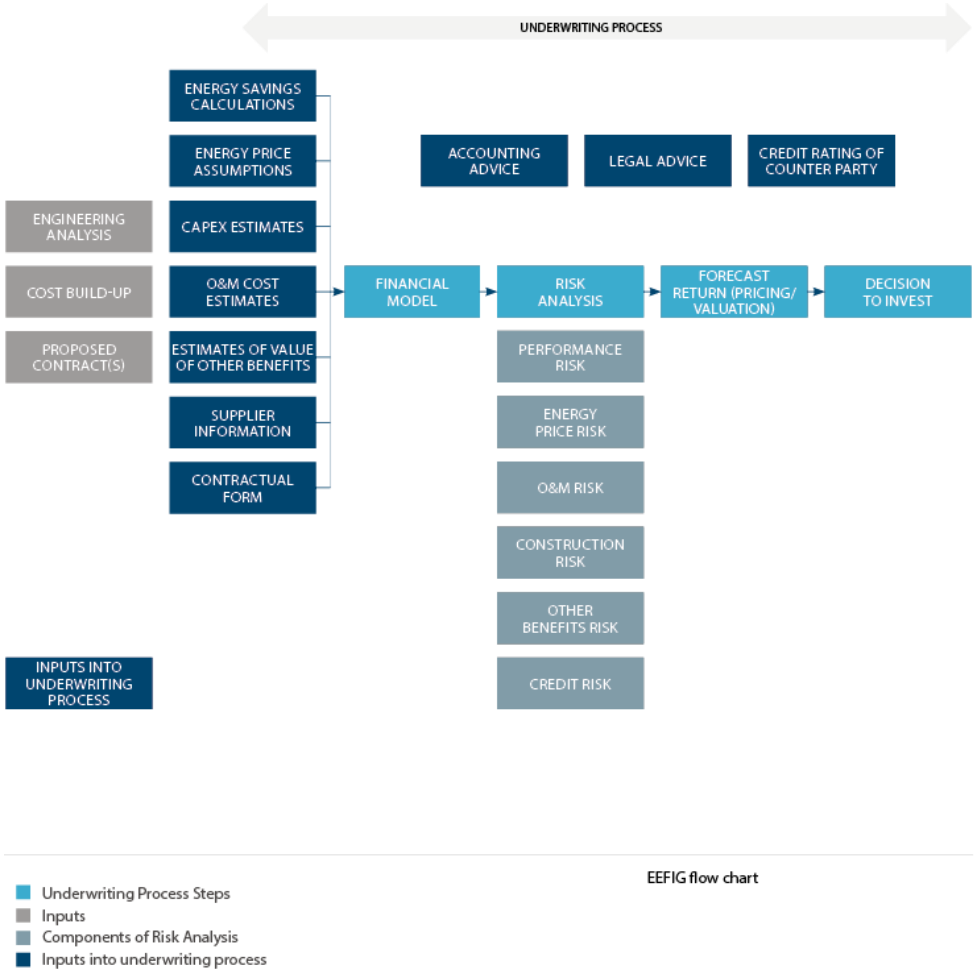
- Boring
- Non-strategic
- 'Defensive' spending versus 'offensive' spending
- Non-core

The new view of energy efficiency – multiple benefits

- Energy efficiency projects create multiple benefits
- Many of these benefits can be valued and included in investment case
- Many of them are much more strategic and interesting to decision makers than just energy cost savings e.g. improved health, improved customer experience
- Tools exist to help assess multiple benefits e.g. M-BENEFITS

The valuation and risk assessment process

Value and risk process



EEFIG flow chart

Energy Efficiency First

Energy Efficiency First

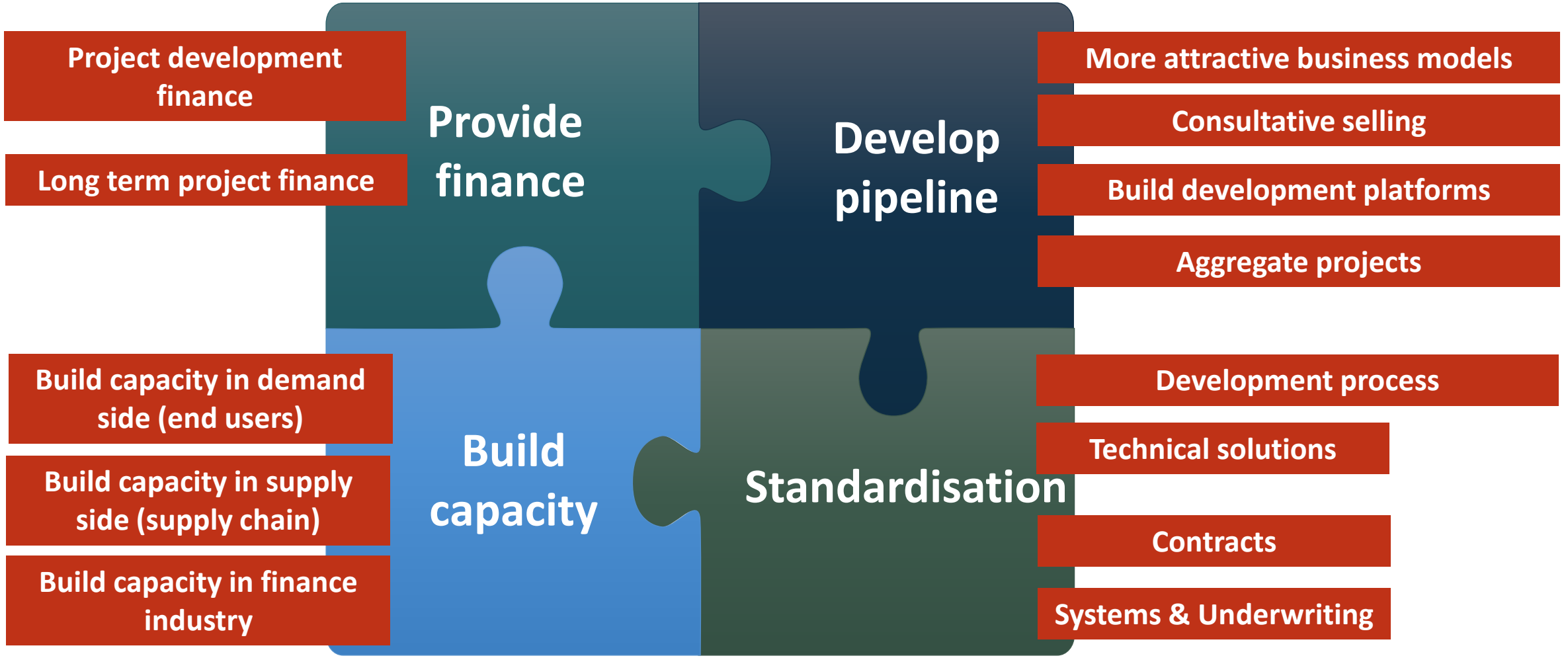
- Often implementing energy efficiency is cheaper, faster and cleaner than energy supply options
- Energy Efficiency First is a pillar of EU energy policy
- It means that energy efficiency options *should* always be considered as an alternative to energy supply options
- In practice they are not considered on most investment or lending options
- Every day buildings and assets are financed that don't even include the *cost-effective level of energy efficiency*
- Why?
  - Lack of capacity on supply side, demand side and finance industry
  - The need for speed
  - Standard supply side solutions are developed
  - Financial institutions don't want to add 'bureaucracy' and hamper themselves in relation to competition
  - Typically they review projects as they are delivered to them and are not proactive in their development

EEFIG Energy Efficiency First Working Group

- Final Report coming out soon
- Studied practices on energy efficiency within public and private financial institutions
- Identified processes and tools that could help financial institutions operationalize energy efficiency first
- Tools are required at 3 levels:
  - Policy and governance
  - Portfolio
  - Deal
- Examples:
  - CREFC Europe Due diligence questions
  - ING REF app for real estate owners
  - D-fine and SkenData portfolio tool
  - Green Technology Selector
  - Investor Confidence Project protocols
  - International Performance Measurement and Verification Protocol

The energy efficiency financing jigsaw

Scaling up EE needs more than just finance



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Principles for Responsible Banking

How to finance energy efficiency investments in industries

Carsten Glenting
EEFIG

unepfi.org

Viegand Maagøe

How to finance energy efficiency investments in industries

UNEP FI Energy efficiency capacity building, 7 June 2023

Carsten Glenting, partner at Viegand Maagøe

Viegand Maagøe

Energy efficiency investments

The investment gap

- Each day investment and lending decisions are made by financial institutions and firms that do not properly consider the potential for improved energy efficiency.
- Buildings are financed that only just meet minimum local building regulations but miss additional cost-effective energy efficiency opportunities.
- Many industrial investments do not consider the cost-effective potential for energy efficiency.
- Where cost-effective opportunities for energy efficiency are overlooked, a higher than necessary level of energy consumption is locked into the new asset for its remaining life.
- This has environmental and financial costs, as well as energy security implications and reduces the value of the asset to the enterprise, their financiers, and wider society.

The economics of energy efficiency in industry

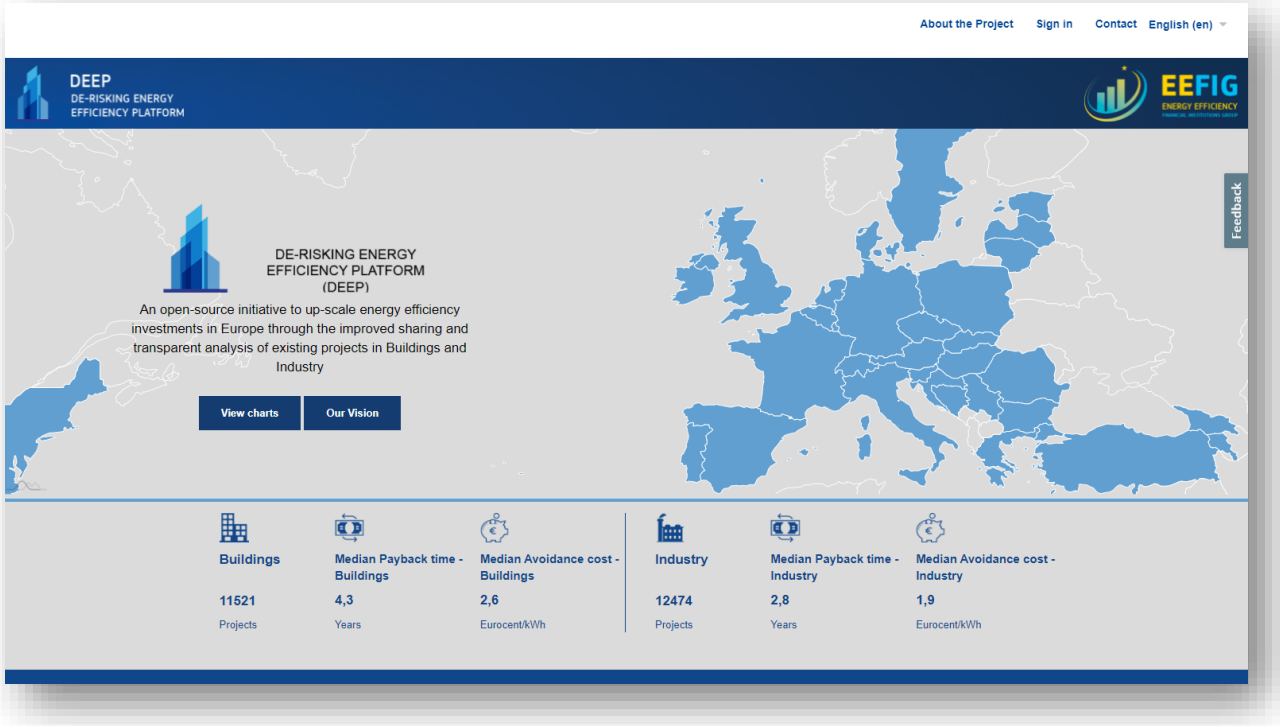
EE is the cheapest source of clean fuel for industry

The EEFIG De-risking Energy Efficiency Platform (DEEP) is an open-source database for energy efficiency investments performance monitoring and benchmarking.

The DEEP database currently includes 24,000 EE projects in industry and buildings.

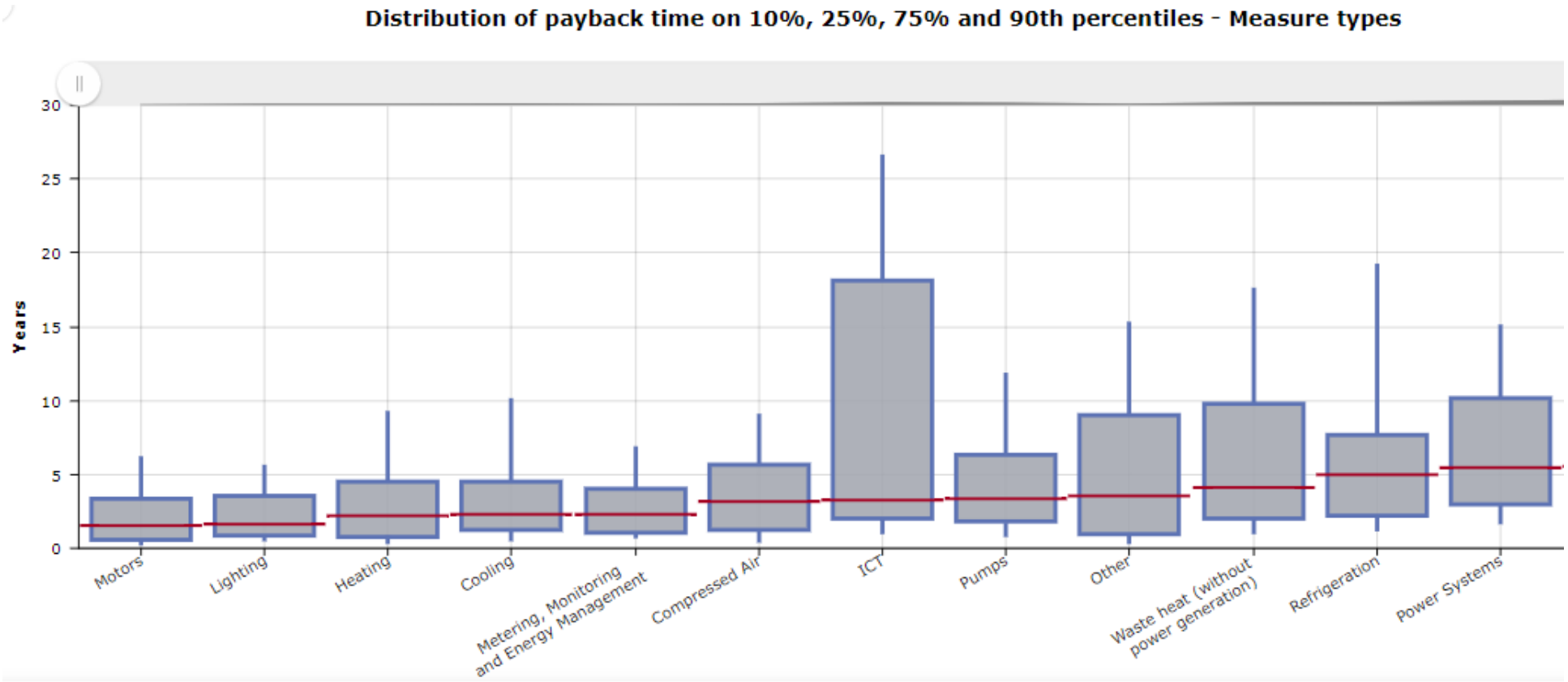
It clearly shows that energy efficiency is the cheapest source of clean fuel for industry and that many energy efficiency projects in industry in EU and US have payback times below 4 years.

DEEP can be accessed at deep.eefig.eu



The economics of energy efficiency in industry

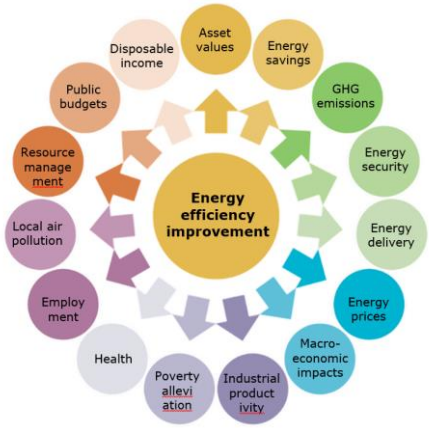
Data on actual EE projects in industry – 12,000+ projects in EU, UK and US



Source: deep.eefig.eu

The multiple benefits of energy efficiency

Additional benefits for which a monetary value is often not assigned



For enterprises, investments in energy efficiency will help reduce their energy costs, thereby improving their competitiveness.

But energy efficiency also creates additional benefits for which a monetary value is often not assigned.

For the enterprises implementing energy efficiency there are often additional benefits:

- Reduced maintenance costs
- Improved process productivity
- More efficient raw material use
- Contribution to a green corporate image

For the country, energy efficiency investments also mean:

- Job creation (in EMS, audits, energy consulting and ISO certification, and government administration)
- CO2 emission reduction
- Reductions in NOx and SO2 levels and particulate emissions
- Reduced investment pressure in new generation, transmission and distribution capacity
- Increased energy supply security
- Reduced foreign exchange spent on fuels import

Viegand Maagøe

Key obstacles to increased EE investments

Energy Intensive Industry

- Industry is reluctant to invest in EE measures with medium payback period (4-10 years) unless the company deems the measures to be of strategic importance to the company's objectives.
- Major energy savings necessitates rehabilitation of core manufacturing processes and utility structures requiring incorporation in corporate long-term investment planning.
- The non-energy benefits of EE investments (e.g. impact on capacity, quality, market etc.) are not recognized or financially quantified.
- The policy framework has until recently not adequately provided long-term signals to industry to prioritise investments in EE.
- Focus in EII has recently shifted from EE to broader sustainability and decarbonisation issues and EE investments increasingly have to be assessed in this context.

Key drivers for increased EE investments

Energy Intensive Industry

- Large companies have the financial and technical capacity to implement energy efficiency investments and will do so if the business case is compelling
- Large companies are increasingly adapting to sustainability related reporting requirements from customers, investors, banks and other stakeholders and they are well aware that these will be further strengthened with the implementation of the sustainable finance agenda in many countries
- More ambitious government EE objectives for 2030 and 2050 in order to meet Paris climate objectives are a factor
- National initiatives support such as voluntary agreements play an important role
- Implementing EMS, energy management systems can provide a positive impact on corporate culture towards energy efficiency improvements.

Key obstacles to increased EE investments

Small and Medium Enterprises (SMEs)

- Limited capacity to identify and implement them EE investments
- Limited capacity to finance energy efficiency investments
- Credit risk is the key risk category for banks and investors and often representing an unsurmountable hurdle for SMEs
- Many competing day-do-day challenges and high vulnerability to market shifts make long term planning more difficult
- EE projects in SMEs are smaller and the cost of project development and appraisal may outweigh investment returns unless mechanisms for standardisation and project aggregation are well established

Key drivers for increased EE investments

Small and Medium Enterprises (SMEs)

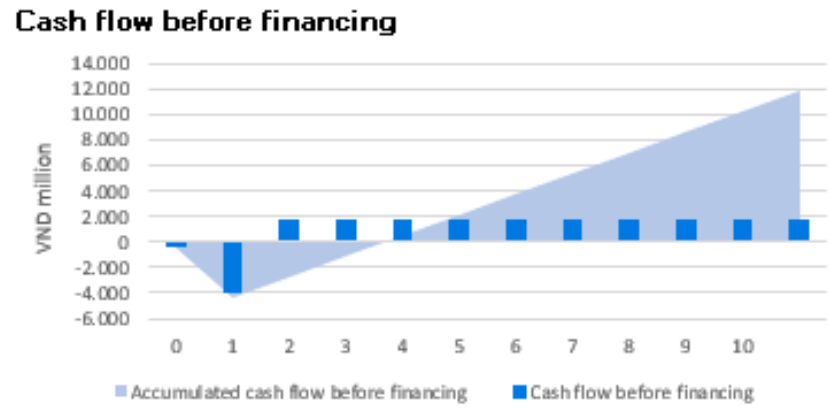
- SMEs in the B2B market are increasingly being met with requirements from their large corporate clients adopting scope 3 emission reduction targets to report emission data and mitigation plans.
- The national policy framework is important, including knowledge sharing through participation in energy efficiency networks (EENs), availability of investment incentives, and guarantee mechanisms.

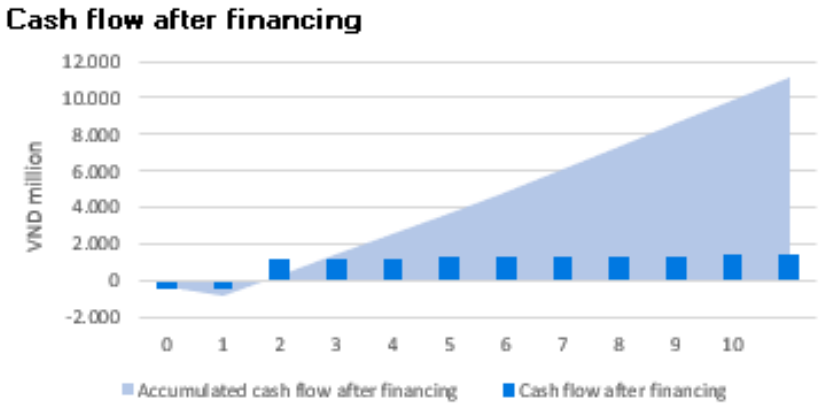
Benefits from scaling up EE investments

Enterprises implementing EE investments

Industries who implement EE projects may benefit from:

- Energy savings
- GHG emission reduction
- Compliance with national energy and climate legislation
- Improved competitiveness in export markets
- Attractive investment returns
- Improved access to finance





Source: Example calculation from Vietnam, December 2022

Sustainable finance

A global trend

- **Sustainable finance** refers to the process of taking **environmental, social and governance (ESG) considerations** into account when making investment decisions in the financial sector.
- In the **EU** this is vested in the Taxonomy Regulation (2019), the Sustainable Finance Disclosure Regulation (SFDR, 2019), the Corporate Sustainability Reporting Directive (CSRD, 2021), and the new Corporate Sustainability Due Diligence Directive (CSDD, draft 2022).
- The **Indonesia Green Taxonomy** (2022) was launched by the Financial Services Authority OJK as a guideline supporting the Sustainable Finance Program in Indonesia.
- The **ASEAN Taxonomy for Sustainable Finance** (2023) was launched by the ASEAN Taxonomy Board.
- The **State Bank of Vietnam's sustainable finance policies calls** for the mainstreaming of green growth objectives within the financial sector and the development of green financial products.

Benefits from scaling up EE investments

Financial Institutions providing financing for the EE investments

Financial Institutions who finance EE investments in industry can benefit from:

- Business opportunities in energy efficiency financing for existing and new customers
- Alignment with the national sustainable finance agenda
- In some countries also access to capacity building on sustainable finance

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Opportunities for financial institutions

1. Embed Energy Efficiency First principles in lending policies
2. Integrate energy efficiency in risk assessment of industrial clients
3. Provide clients dedicated energy efficiency finance lines
4. Access up-to-date knowledge on energy efficiency financing through the reports published by the Energy Efficiency Financial Institutions Group (EEFIG)
5. Use tools like the EEFIG underwriting's toolkit and the EEFIG DEEP database to support EE financing market development
6. Engage actively with the public sector on the challenge of SME's, including on blending of public guarantees and private funding for EE
7. Work with other stakeholders to promote the benefits of investing in EE.

Useful resources from EEFIG

Of relevance for energy efficiency in industry

EEFIG Reports

- Financing Practices for Energy Efficiency (2022)
- Multiple Benefits of Energy Efficiency Projects (2022)
- Energy Efficiency in Industry and SMEs (2022)
- Applying the Energy Efficiency First Principle in Financial Institutions (expected June 2023)
- Demand Activation for Energy Efficiency Investments (expected June 2023)

All are available through
https://eefig.ec.europa.eu/going-activities_en

EEFIG tools

- EEFIG De-risking Energy Efficiency Platform (DEEP) available at https://deep.eefig.eu/
- EEFIG underwriting toolkit available at https://eefig.ec.europa.eu/system/files/2020-11/EEFIG_Underwriting_Toolkit_June_2017.pdf

Viegand Maagøe

Many thanks!

Carsten Glenting, cag@vmas.dk

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Principles for Responsible Banking

Using ESCOs to scale up energy efficiency investments

Alexander Ablaza
Asia-Pacific ESCO Industry Alliance

Bridging the energy efficiency capital gap through ESCOs

Mobilizing debt finance and equity capital to grow ESCO markets

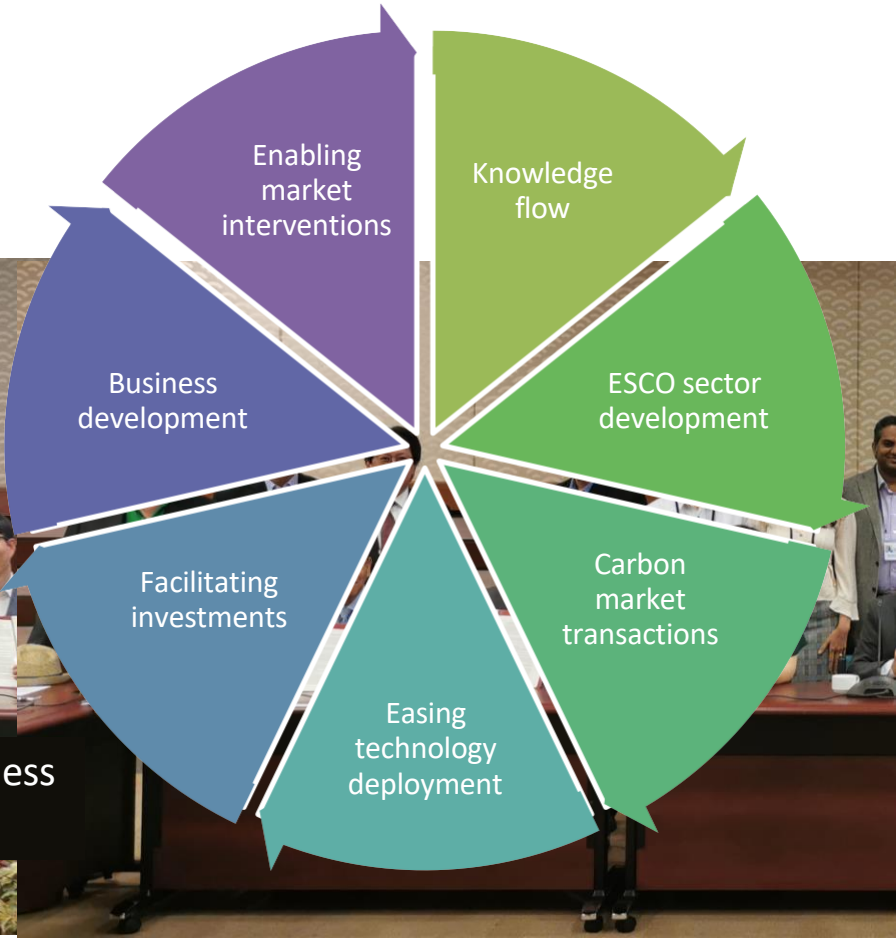
Alexander Ablaza

7 June 2023
PRB Energy Efficiency Capacity Building (Asia Pacific)
Part II - Financing Energy Efficiency

APEIA

Asia-Pacific ESCO Industry Alliance

A regional platform intended to facilitate the flow of knowledge, capacity building and business development resources with the end goal of growing ESCO markets in Asia-Pacific



China | India | Indonesia | Japan | Korea | Malaysia | Philippines | Singapore | Taiwan | Thailand

Global ESCO Network

The **Global ESCO Network** gathers ESCO associations of the world as well as international institutions and ESCO experts for the promotion of ESCOs and Energy Performance Contracting in response to the global climate change challenge and the goals set out by the Paris Agreement.

It is the **Vision** of the Global ESCO Network **to be the global driver and inspire government actions for scaling up the contribution of ESCOs to the global response for mitigating the threat of climate change and the goals set out by the Paris Agreement**. To realize this, it is the **Mission** of the Global ESCO Network **to add to and reinforce existing efforts of National and Regional ESCO Associations to promote increased activities by the ESCO Sector at a global scale**.

The Global ESCO Network **recognizes the regional role of APEIA** as convenor of ESCO associations under its membership and will work through APEIA to advance the Network's objectives in the Asia-Pacific region.

The Global ESCO Network has its Secretariat anchored in the **UNEP Copenhagen Climate Centre** and the **Efficiency Valuation Organization (EVO)**.

Mission Efficiency is a global collective of actions, commitmentsandgoals on energyefficiency by acoalition of governments, organizations and initiatives. Energy efficiency represents the largest share of cost-effective actions to achieve the Paris Agreement. Mission Efficiency unites these partners and actions to accelerate the transition towards energy efficient economies worldwide.

Learn more at missionefficiency.org

Mission Efficiency

Elevate. Support. Invest.

Photo: Energy efficiency financing charette hosted at the UNEP Copenhagen Climate Centre, June 2022

Emerging concepts: Role and growth of the ESCO industry

APEIA
Asia-Pacific ESCO Industry Alliance

There may be no distinction between being in a developed economy or emerging market as far as the evolution and growth of an ESCO industry is concerned

Mobilizing USD 24.5 trillion in EE investments through 2040 may require over USD 16.5 trillion flowing outside the balance sheets of end-users, such as through ESCO performance contracts

“60% of the global energy service company (ESCO) market is in Asia”

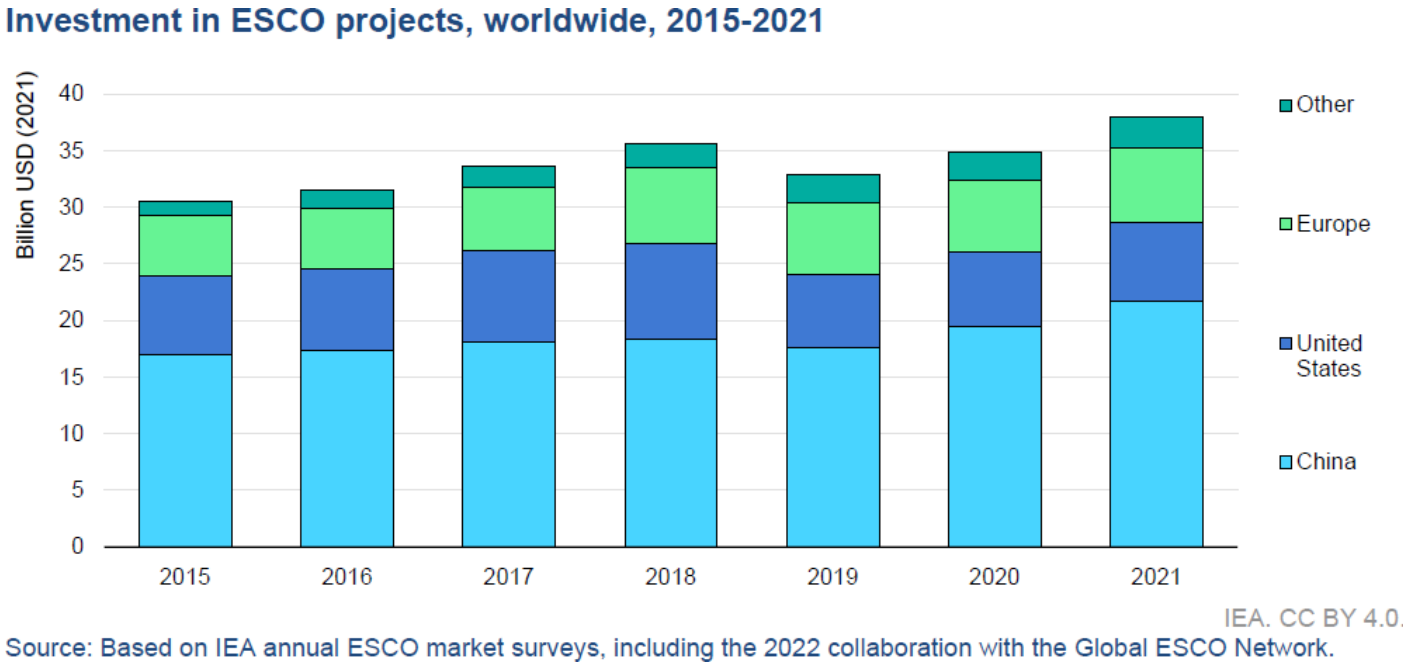
Asia-Pacific ESCO Industry Alliance, 5 June 2018, Asia Clean Energy Forum 2018

(based on IEA estimates, 2016)

ESCO market has been growing steadily since 2015

- The **global ESCO market** increased 9% to **USD 38 billion** in 2021.
- Investment in **China**, the biggest market, grew by 9% to **USD 22 billion**.
- Recent initiatives across the world include innovative and digital business models, and better **project aggregation**, including **portfolio approaches**, service packaging and **Super ESCOs**:
  - Both **Kenya** and **Senegal** have embarked on setting up Super ESCOs.
  - **Saudi Arabia** and **three of seven UAE emirates** have operative Super ESCOs.
  - Private Super ESCOs **SOFIAC** in Canada and **Climargy** in the Philippines recently became operational.

Global ESCO market growth, 2015-2021



Source: IEA Energy Efficiency 2022

Major policy and market barriers impeding ESCO market development across Asia

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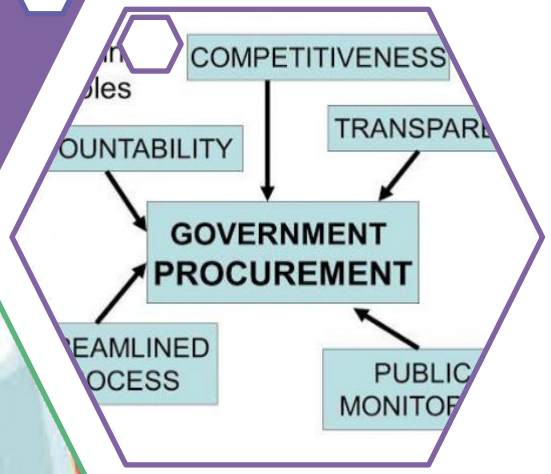
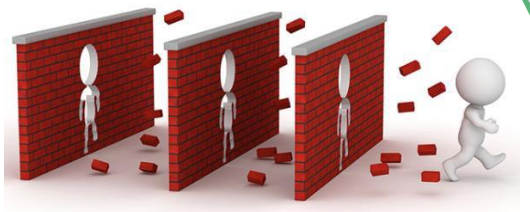
ESCO sector need to build technical (e.g.capacities

ESCO accreditation system needs to be strengthened

Government procurement and budgeting disallow ESCO contracts



EE consumption thresholds for EE obligations are too high



Removing ESCO policy and market barriers

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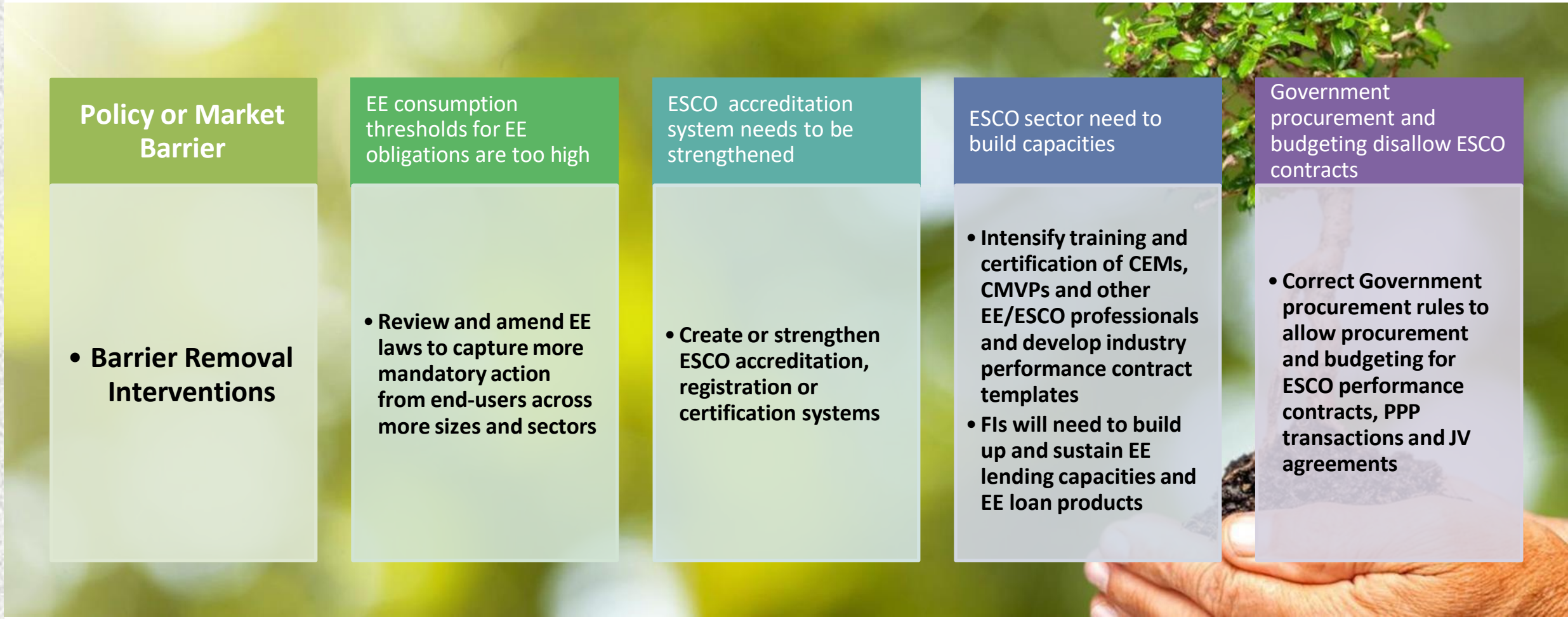

Policy or Market Barrier	EE consumption thresholds for EE obligations are too high	ESCO accreditation system needs to be strengthened	ESCO sector need to build capacities	Government procurement and budgeting disallow ESCO contracts
• **Barrier Removal Interventions**	• **Review and amend EE laws to capture more mandatory action from end-users across more sizes and sectors**	• **Create or strengthen ESCO accreditation, registration or certification systems**	• **Intensify training and certification of CEMs, CMVPs and other EE/ESCO professionals and develop industry performance contract templates** • **FIs will need to build up and sustain EE lending capacities and EE loan products**	• **Correct Government procurement rules to allow procurement and budgeting for ESCO performance contracts, PPP transactions and JV agreements**

Key Lessons

Government policies, incentives and donor capacity building have effectively evolved ESCOs and enabled market growth

ESCO Associations play a valuable role of accelerating policy reforms and sustaining market development

Further ESCO market growth will be driven by **digitalization and Government procurement** of ESCO services

EE Investment Gap

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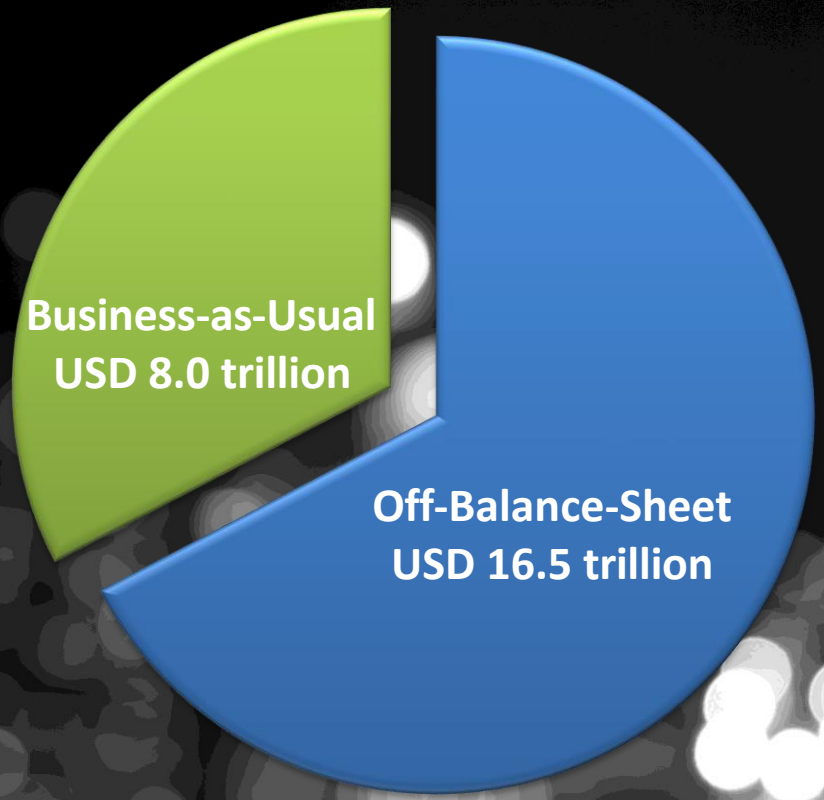
- Self-Financed
- Debt-Financed
- Lease-Financed



- ESCO Performance Contracts
- PPP Transactions
- Risk-Sharing Facilities
- Budget Financing
- Other modalities

Global EE Investments Needed through 2040 to Meet
IEA's Efficient World Scenario (EWS)
by Financing Modality

Role of the Public Sector

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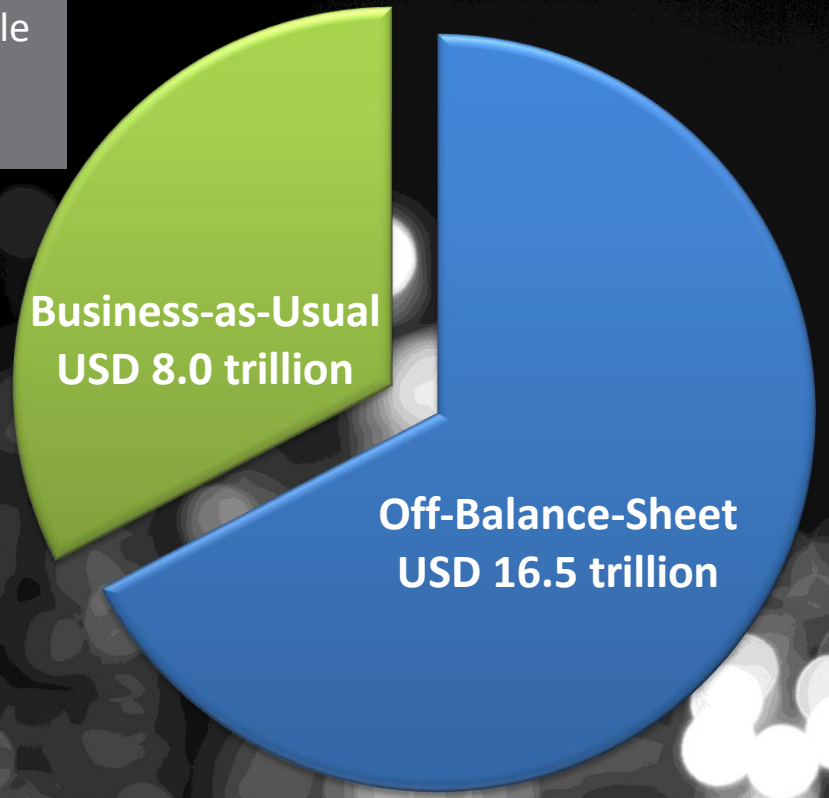
Public agencies and facilities represent scalable EE opportunities that are largely untapped



Public policies can enable off-balance-sheet mechanisms that will support EE investment

Global EE Investments Needed through 2040 to Meet IEA's Efficient World Scenario (EWS) by Financing Modality

Energy Efficiency Financing and Investment Modalities

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Business-as-Usual (BAU) Modalities

Self-financed

- Using own capital or operating budgets or credit lines to directly procure EE technologies

Debt-financed

- EE loans
- EE leasing

Innovative Modalities

Off-balance Sheet Investments

- ESCO performance contracting
- PPP / BOT
- Portfolio investments

Special Market Channels

- Utility-led DSM and Govt Programs
- LGU subsidies (eg PACE)
- Funds: EE, ESCO, Private Equity
- Guarantees (EE Performance and Customer Credit)

Major financing barriers impeding ESCO capital flows across Asia

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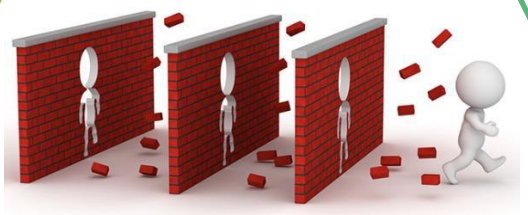
ESCO markets have no EE aggregators, equity and guarantee providers

ESCO project investments need access to fiscal incentives

MSMEs and ESCOs have limited access to EE debt finance

Delayed phase-out of energy subsidies



Removing ESCO financing barriers

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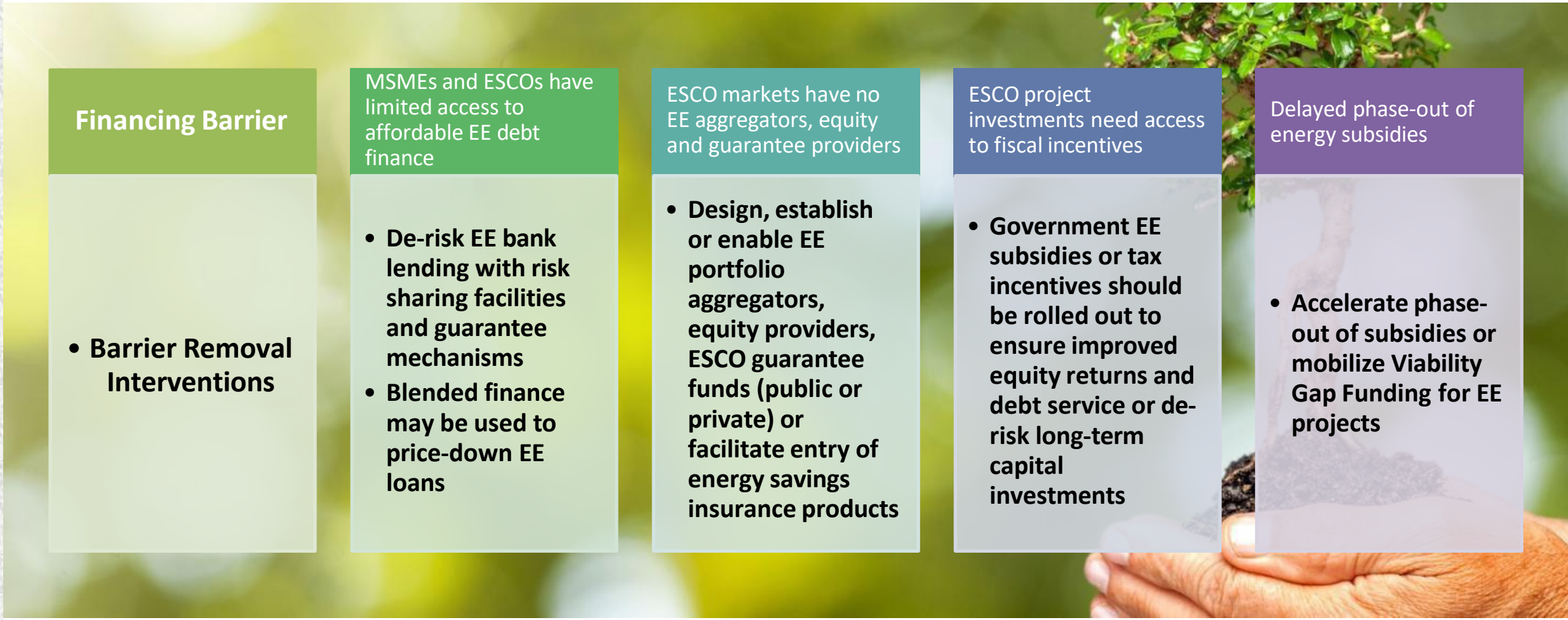


Financing Barrier	MSMEs and ESCOs have limited access to affordable EE debt finance	ESCO markets have no EE aggregators, equity and guarantee providers	ESCO project investments need access to fiscal incentives	Delayed phase-out of energy subsidies
• **Barrier Removal Interventions**	• **De-risk EE bank lending with risk sharing facilities and guarantee mechanisms** • **Blended finance may be used to price-down EE loans**	• **Design, establish or enable EE portfolio aggregators, equity providers, ESCO guarantee funds (public or private) or facilitate entry of energy savings insurance products**	• **Government EE subsidies or tax incentives should be rolled out to ensure improved equity returns and debt service or de-risk long-term capital investments**	• **Accelerate phase-out of subsidies or mobilize Viability Gap Funding for EE projects**

Self-financed EE projects

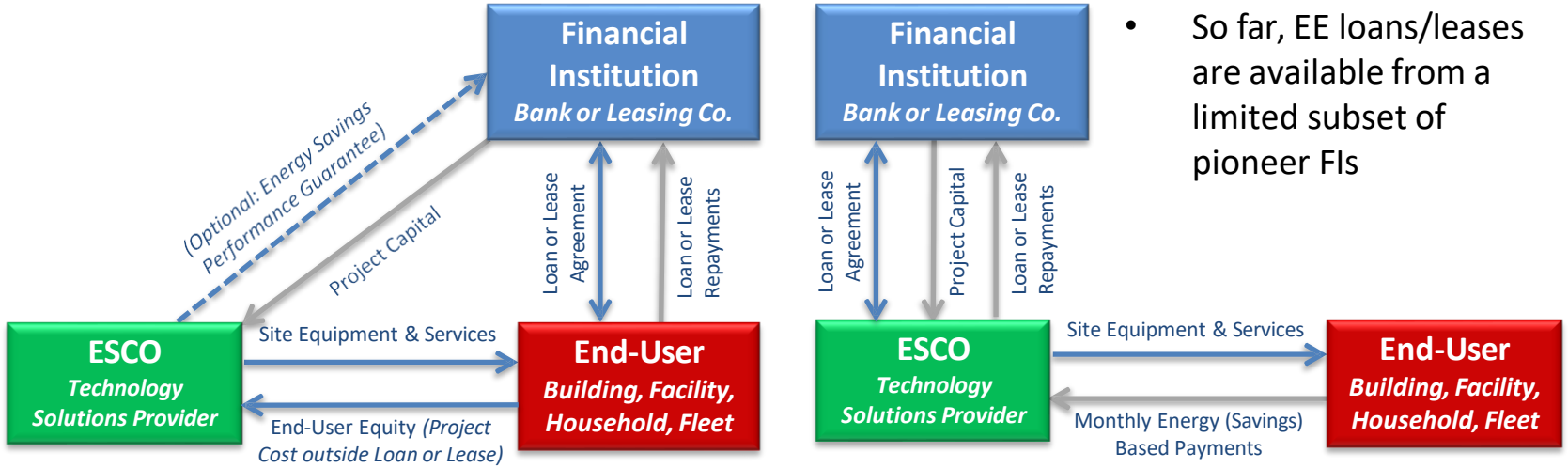
- On-balance sheet procurement.
- Typically, 100% of EE project cost is funded by end-user or facility owner (or through available credit lines).
- End-user or facility owner is the legal and “accounting” owner of the EE equipment assets from beginning. Applies to all energy end-use sectors: residential, commercial, industrial, transport, government.
- End-user enjoys 100% of savings or avoided energy purchases immediately. In isolated cases wherein the EE technology provider is an ESCO, the ESCO can issue an energy savings performance guarantee to the purchasing end-user.

Barrier: EE for end-users is typically a non-core activity, and therefore a low-priority expenditure for it to be using available cash budgets.

Debt- and lease-financed EE projects

- On-balance sheet procurement.
- 60-80% of EE project cost is typically financed by a bank or leasing company.

- For EE equipment leases, the leasing company remains the legal owner of the EE equipment assets through lease term. For both EE loans and leases, the borrower or lessee (end-user or ESCO) becomes "accounting" owner from the beginning.
- Applies to all energy end-use sectors: residential, commercial, industrial, transport, government.
- Credit cards are popular ways of financing smaller, non-ESCO EE (e.g. appliance purchase).



Guaranteed Savings Model *(End-User is borrower or lessee)* **Shared Savings Model *(ESCO is borrower or lessee)***

- So far, EE loans/leases are available from a limited subset of pioneer FIs

Barriers: Most ESCOs, MSMEs and households are not creditworthy enough to gain sufficient access to EE loan and leasing facilities. Many end-users (including C&I corporates) prefer not to use available credit/ leasing lines for non-core activities like EE projects.

Third Party Investor (Project Company) provides capital through ESCO portfolio

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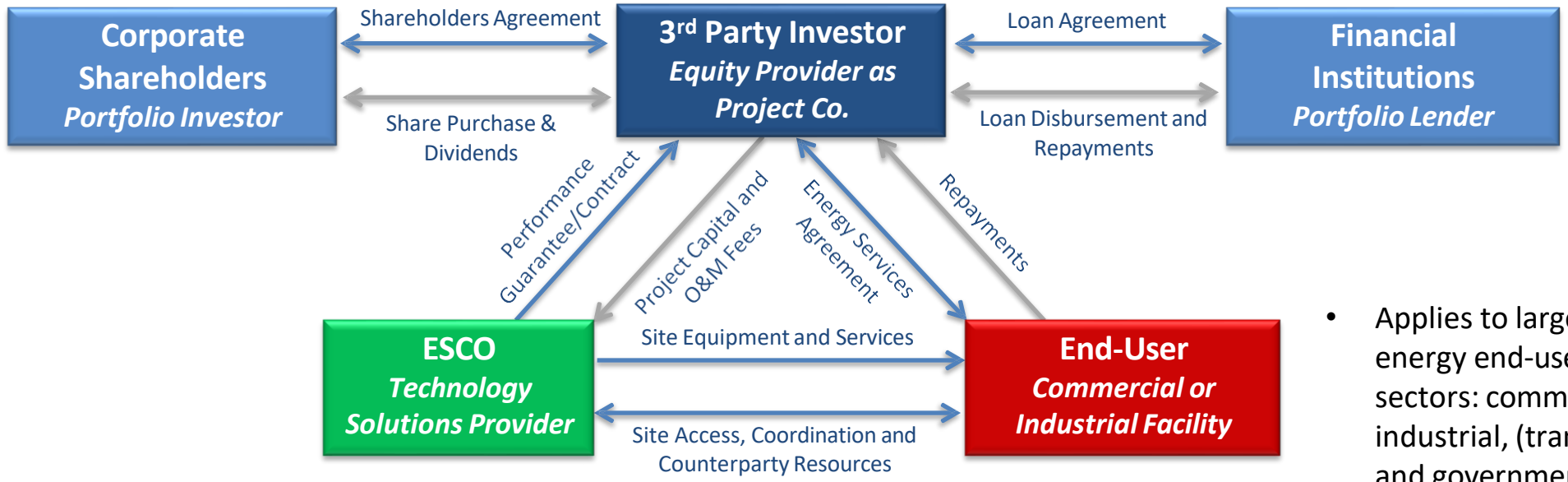
- Off-balance sheet procurement.
- In most cases, up to 100% of EE project cost is financed by a third party investor through a special purpose **Project Company (e.g. Equity Provider, Fund, Super-ESCO, SOE, Portfolio Investor)**

- The Project Company remains the legal and "accounting" owner of the EE equipment assets through contract term.
- Rationale: Over 98% of ESCOs in developing Asia have no adequate access to bank financing to grow their portfolio of performance contracts.



- Applies to larger energy end-use sectors: commercial, industrial, (transport) and government

Barriers: Third party investors find it difficult to capitalize EE projects unless after-tax returns are made commercially attractive (i.e. IRRs in upper teens) by a whole suite of fiscal incentives. Government procurement and PPP policies and guidelines will be needed to enable private investments in public sector EE projects.

Key Lessons

APEIA
Asia-Pacific ESCO Industry Alliance

Asia will need to bridge its EE capital gap through 2040 by **enabling off-balance sheet equity flows and ESCO-responsive debt finance** through steadily **growing ESCO markets**

Further ESCO market growth will be driven by **innovative financial structures such as portfolio aggregation through Super-ESCOs**

Climargy®

~~Among the world's firsts in private sector~~

ESCO project portfolio investments

Asia's pioneer private Super-ESCO aggregator of ESCO project assets in emerging markets

Equity and Debt Partners

Climargy

Project / Portfolio Vehicles

ESCO / Tech Providers
Host Entity/ End-user
Energy Efficiency Project

ESCO / Tech Providers
Host Entity/ End-user
Energy Efficiency Project

ESCO / Tech Providers
Host Entity/ End-user
Energy Efficiency Project

Climargy's unique market position as the **pioneer and lone equity vehicle** for off-balance sheet capital to energy management projects of the Philippine C/I energy end-use market **catalyzes private equity and debt flow and even developmental grants to the sector**

Thank You

Alexander Ablaza
CEO, Climargy
Founding Convenor and Co-Chair, Asia-Pacific ESCO Industry Alliance (APEIA)
Co-founder and Member of the Advisory Board, Global ESCO Network
Co-chair, Marketplace Taskforce, Mission Efficiency
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APEIA
Asia-Pacific ESCO Industry Alliance

China India Indonesia Japan Korea Malaysia Philippines Singapore Taiwan Thailand

Annex

Public Financial Mechanisms that Enhance the Viability of ESCO Projects

Utility Programs: On-Bill Financing

PUBLIC UTILITY

- **Electricity services**
- **EE services for qualified customers**

Bundled payment for electricity and EE services

RATEPAYERS

Global examples

- Brazil (Contribuição para Custeio do Serviço de Iluminação Pública)

Positive impact on project viability

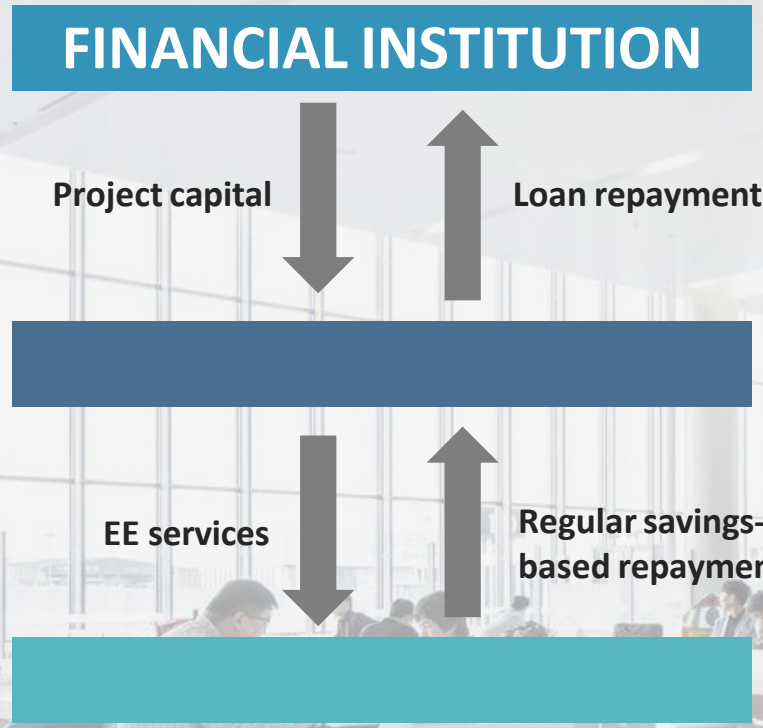
- Lower customer credit risk from bundling project repayments with utility bills
- Leveraging ratepayers' consumption behaviors to tailor-fit EE offerings
- Scalability of EE offerings across customer base

Enabling conditions

- Public utilities must be allowed to implement and profit from EE projects
- Billing infrastructure should be able to accommodate bundling of EE project repayments
- Public utilities must have a sizeable asset base or financing access to fund EE projects

Energy Performance Contracting for Public End Users

SHARED SAVINGS MODEL



Global examples

- United States, Canada, Belgium, Croatia, Denmark, Italy, Slovenia

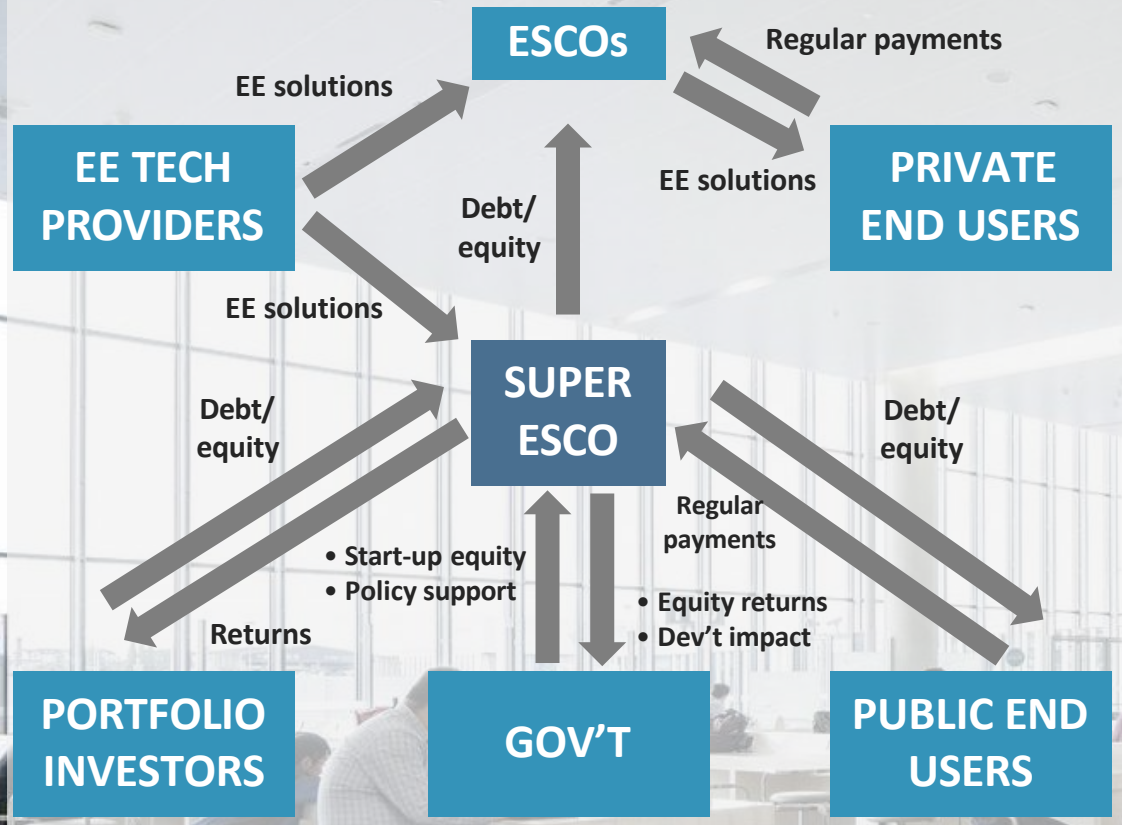
Positive impact on project viability

- Project and financial risks are distributed more efficiently across the contract parties
- Upfront costs for the end users are reduced
- More public end users can be included in ESCO project pipelines

Enabling conditions

- Public procurement processes must allow public agencies to engage in EPCs
- Public agencies must not be deterred from taking on multi-year contracts that could span beyond one election cycle

Government-Owned EE Service Providers as Super ESCOs



Global examples

- Armenia (R2E2), Belgium (FEDESCO), Croatia (HEP ESCO), Saudi Arabia (Tarshid)

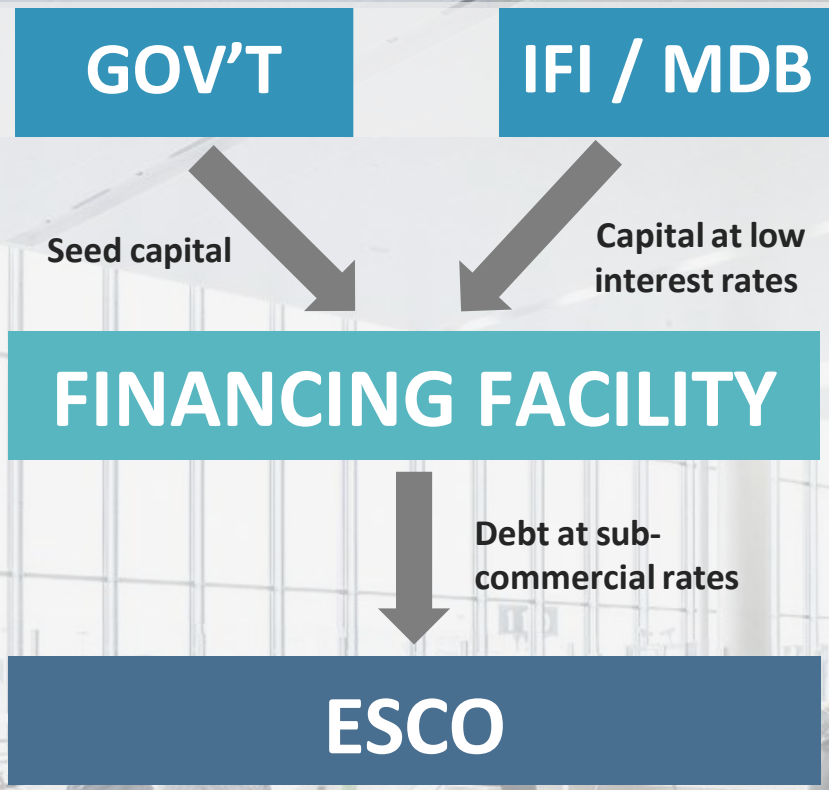
Positive impact on project viability

- The public nature of Super ESCOs facilitates taking on large-scale public EE projects.
- The large asset base allows Super ESCOs to provide financing to smaller ESCOs.
- Super ESCOs can implement capacity-building activities.

Enabling conditions

- The local ESCO industry is typically in its early stages.
- Super ESCOs would not behave competitively against other ESCOs.
- Supportive policies and financial resources must be made available by the government to the Super ESCO.

Long-term Concessional Financing



Positive impact on project viability

- Lower financing cost would lead to more prospective projects meeting minimum return thresholds.
- Long-term investment horizon of the financing facility would allow funding of entire project pipelines.

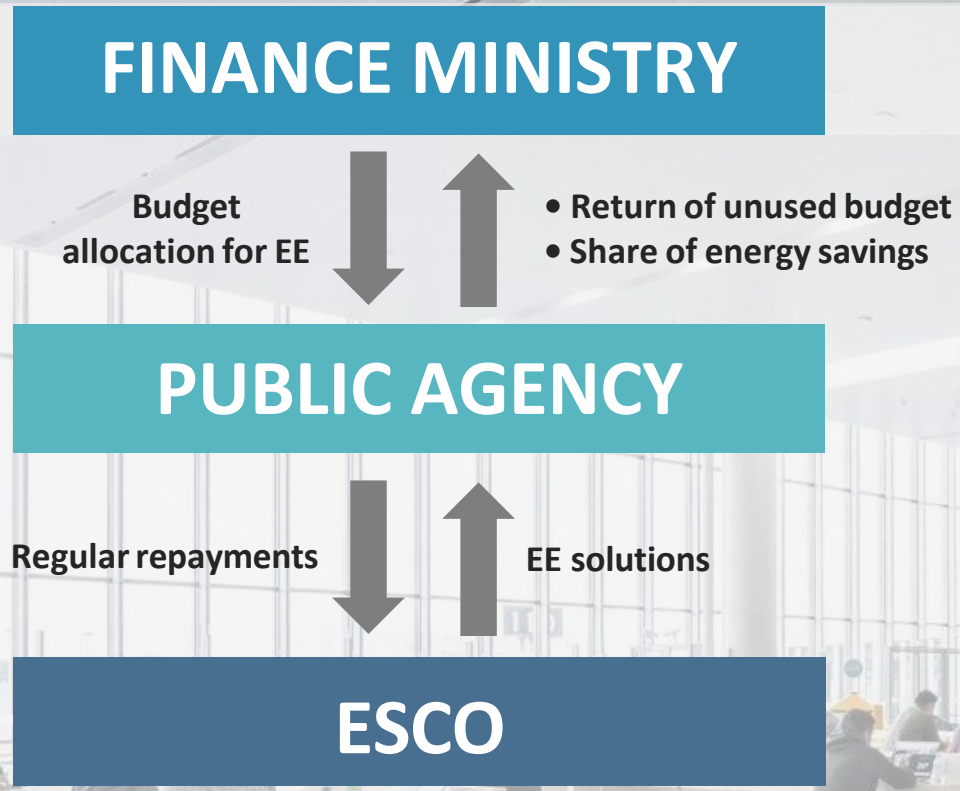
Enabling conditions

- Governments should establish relationships with IFIs and MDBs to provide supplementary capital.
- Achieving sustainability and climate goals should be a national priority to entice IFI/MDB funding.

Global examples

- China (Shandong Green Development Fund), Haiti (Green Climate Fund)

Fiscal Tools and Policies: Budget Financing with Capital Recovery



Global examples

- Macedonia (Municipality Services Improvement Project)

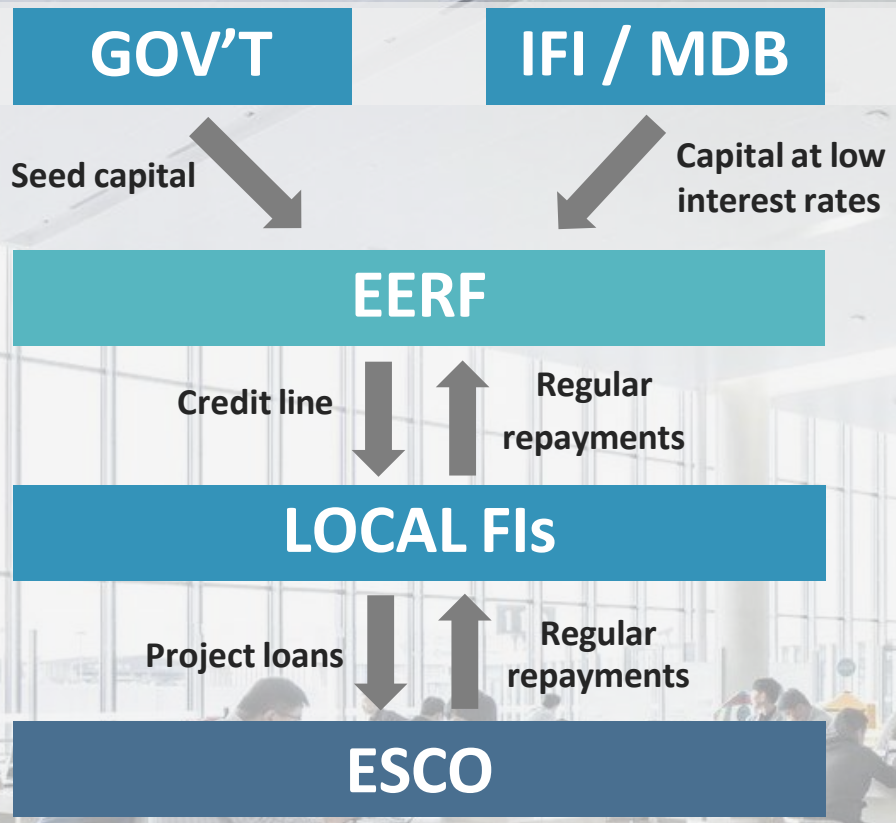
Positive impact on project viability

- Less credit-worthy public agencies gain access to financing for their EE projects.
- Typical restrictions on public agencies' use of public funds and incurrence of debt are addressed.

Enabling conditions

- Government agencies should be subject to mandates to reduce energy consumption.
- Public agencies should be allowed to retain a portion of realized energy savings to incentivize pursuit of EE projects.

Energy Efficiency Revolving Fund



Global examples

- Thailand (Thai EERF)

Positive impact on project viability

- EERFs help create a sustainable local funding source for ESCOs through involving local FIs.
- Participating FIs would lower risk premiums as they better understand ESCO business models.

Enabling conditions

- Marketing campaigns on the merits of EE investments to encourage participation of local FIs
- Participating local FIs should eventually increase investment exposure as support from the EERF tapers off

UN environment programme | finance initiative

Principles for Responsible Banking

PRB EE Target setting

UNEP FI

unepfi.org

Baseline measurement for resource efficiency target setting - indicators

UN environment programme | finance initiative
Principles for Responsible Banking

Practice baseline

Portfolio composition and financial flows

Percentage of portfolio that meets a set of energy efficiency (circularity) criteria (e.g. green mortgages, defined based on a taxonomy)

Example: 2% of our current mortgages are energy efficient

Client engagement

Number/percentage of clients engaged to collect data (energy consumption, EPC ratings etc.) and identify energy efficiency (circular) opportunities

Example: we engage on avarage 0 clients/month about energy efficiency opportunites

Impact baseline

Circularity impact

In addition to energy usage, use of primary raw material in the construction of the buildings / water usage, waste recycling, etc. in the existing building stock (use phase) etc.

Example: houses financed by our loans use on avarage 70 m3 water/year

Environmental impact

Energy consumption / net revenue
Energy consumption / balance sheet total
Energy consumption / unit of production
Real estate assets by energy efficiency classes
Real estate energy consumption / m2

Example: our sample of SME clients consume electricity of 0,075 kWh/dollar net revenue

+Renewable energy installed capacity

Social impact

Energy poverty related indicators

Example: 10% of our current mortgage clients can be considered energy poor

Exemplary baselines

See later slides about target setting explaining out links to renewable energy (mandatory), circularity (optonal) and social (optional) targets

Briefly about energy poverty

In 2018 over 200 million people in Asia Pacific still had no access to electricity, around 5% of the region's population, and around 1.8 billion people, or nearly 40% of the population, relied on polluting and unhealthy cooking fuels and technologies.

No single definition for energy poverty, but the four common primary indicators include:

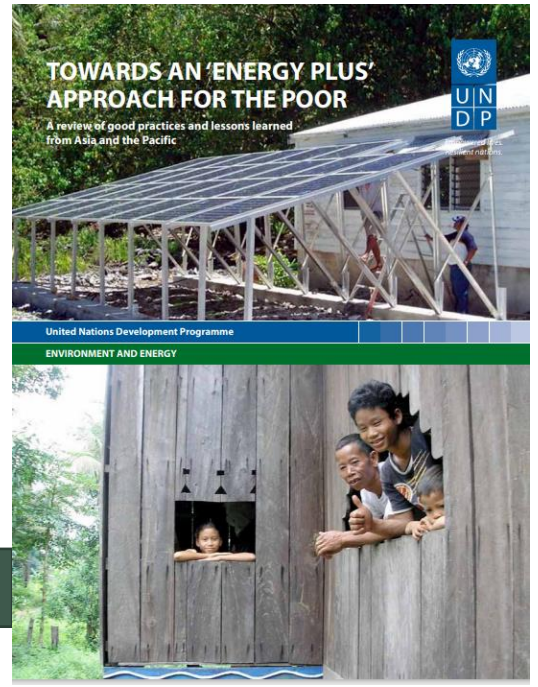
1) Arrears on utility bills;

2) Low absolute energy expenditure;

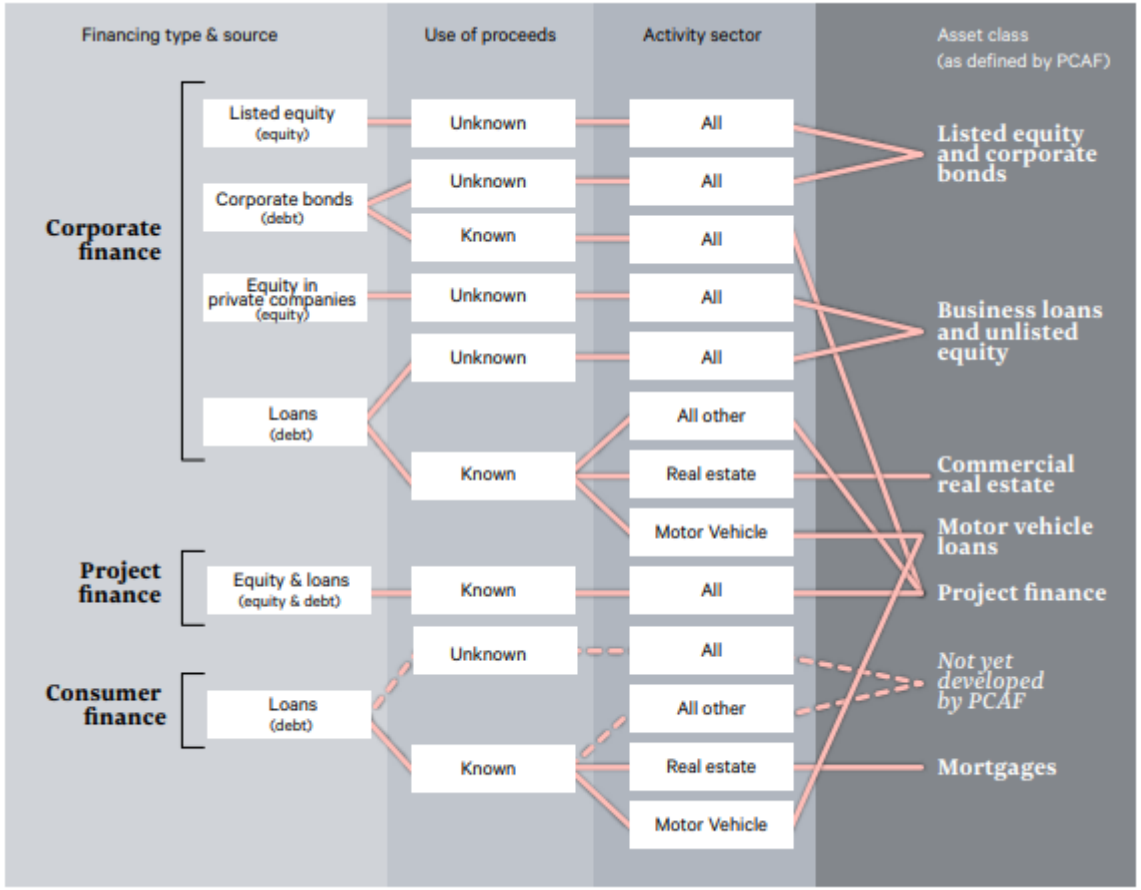
3) High share of energy expenditure in income;

4) Inability to keep home adequately warm

See further insights on energy poverty in UNDP's research:

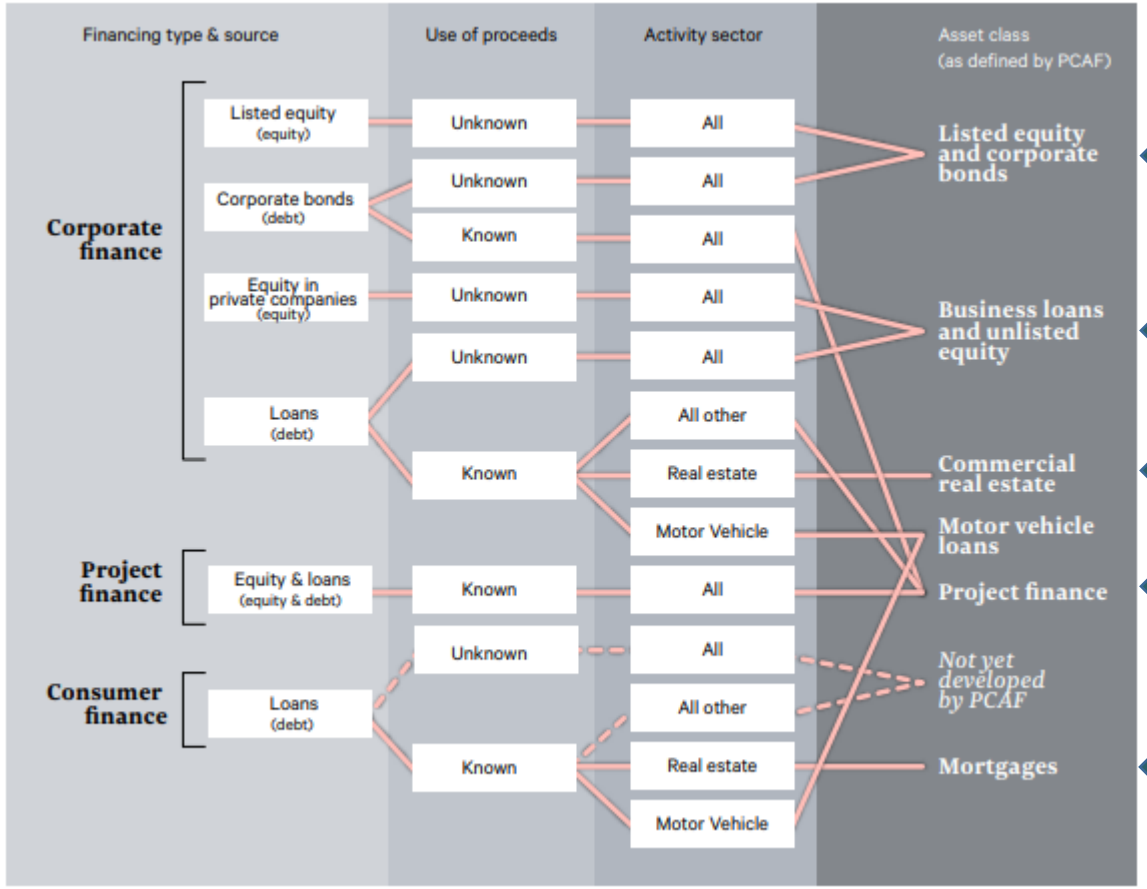


Measuring your baseline for climate target setting – financed emissions and EE



Please refer to PCAF's website for detailed guidance on GHG accounting. Our workshop just flags the most important links between EE and financed emission calculations.

Measuring your baseline for climate target setting – financed emissions and EE



In some cases the company's energy consumption can be used as a proxy to estimate emissions

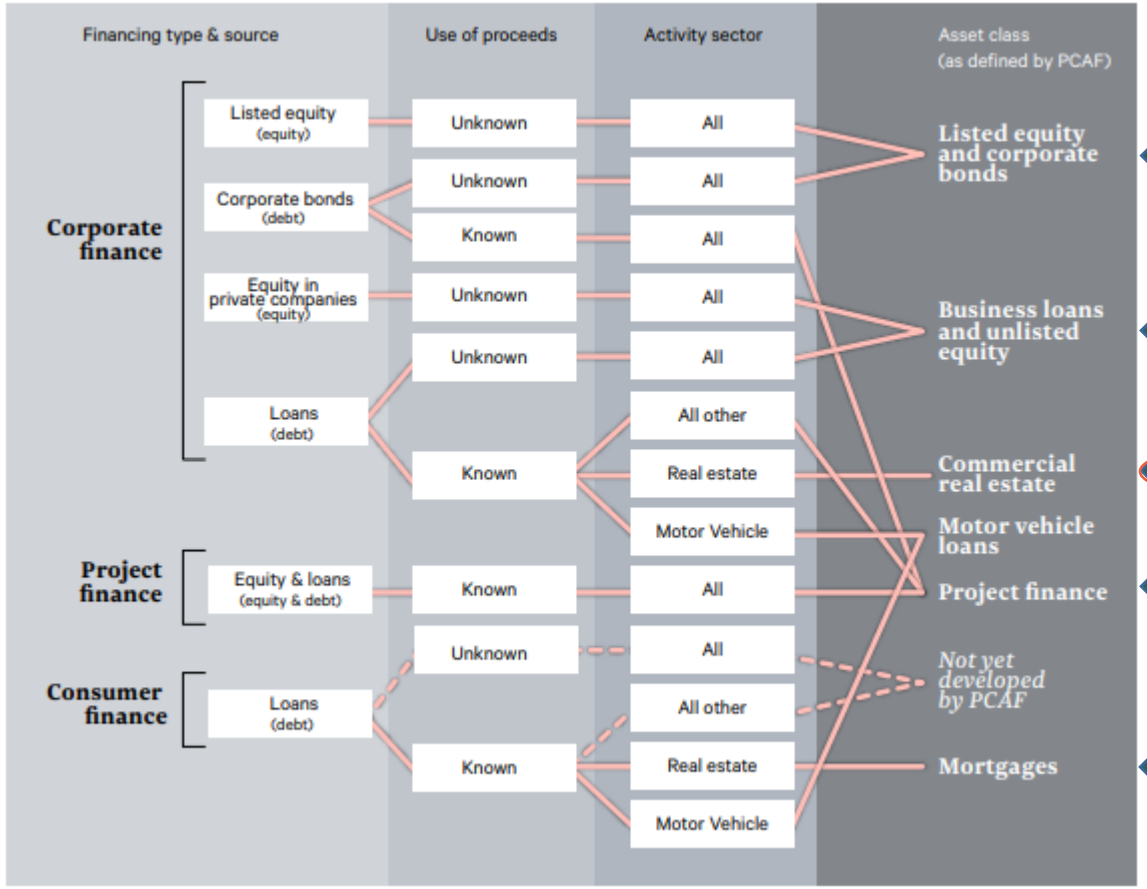
Emissions are mainly calculated based on energy consumption

EE project loans: calculation of avoided emissions are allowed by the Standard

Emissions are mainly calculated based on energy consumption

Please refer to PCAF's website for detailed guidance on GHG accounting. Our workshop just flags the most important links between EE and financed emission calculations.

Measuring your baseline for climate target setting – financed emissions and EE



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Emissions are mainly calculated based on energy consumption

EE project loans: calculation of avoided emissions are allowed by the Standard

Emissions are mainly calculated based on energy consumption

Please refer to PCAF's website for detailed guidance on GHG accounting. Our workshop just flags to most important links between EE and financed emission calculations.

Measuring your baseline for climate target setting – financed emissions and EE

PCAF's Data quality score table for Commercial Real Estate

(score 1 = highest data quality; score 5 = lowest data quality)

Data Quality	Options to estimate the financed emissions		When to use each option
Score 1	Option 1: Actual building emissions	1a	Primary data on **actual building energy consumption** (i.e., metered data) is available. Emissions are calculated using actual building energy consumption and **supplier-specific emission factors**[129] specific to the respective energy source.
Score 2		1b	Primary data on **actual building energy consumption** (i.e., metered data) is available. Emissions are calculated using actual building energy consumption and **average emission factors** specific to the respective energy source.
Score 3	Option 2: Estimated building emissions based on floor area	2a	**Estimated building energy consumption per floor area based on official building energy labels AND the floor area** are available. Emissions are calculated using estimated building energy consumption and **average emission factors** specific to the respective energy source.
Score 4		2b	**Estimated building energy consumption per floor area based on building type and location-specific statistical data AND the floor area** are available. Emissions are calculated using estimated building energy consumption and **average emission factors** specific to the respective energy source.
Score 5	Option 3: Estimated building emissions based on number of buildings	3	**Estimated building energy consumption per building based on building type and location-specific statistical data AND the number of buildings** are available. Emissions are calculated using estimated building energy consumption and **average emission factors** specific to the respective energy source.

PCAF's Data quality score table for mortgages

Data Quality	Options to estimate the financed emissions		When to use each option
Score 1	Option 1: Actual building emissions	1a	Primary data on **actual building energy consumption** (i.e., metered data) is available. Emissions are calculated using actual building energy consumption and **supplier-specific emission factors**[136] specific to the respective energy source.
Score 2		1b	Primary data on **actual building energy consumption** (i.e., metered data) is available. Emissions are calculated using actual building energy consumption and **average emission factors** specific to the respective energy source.
Score 3	Option 2: Estimated building emissions based on floor area	2a	**Estimated building energy consumption per floor area based on official building energy labels AND the floor area** are available. Emissions are calculated using estimated building energy consumption and **average emission factors** specific to the respective energy source.
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Score 5	Option 3: Estimated building emissions based on number of buildings	3	**Estimated building energy consumption per building based on building type and location-specific statistical data AND the number of buildings** are available. Emissions are calculated using estimated building energy consumption and **average emission factors** specific to the respective energy source.

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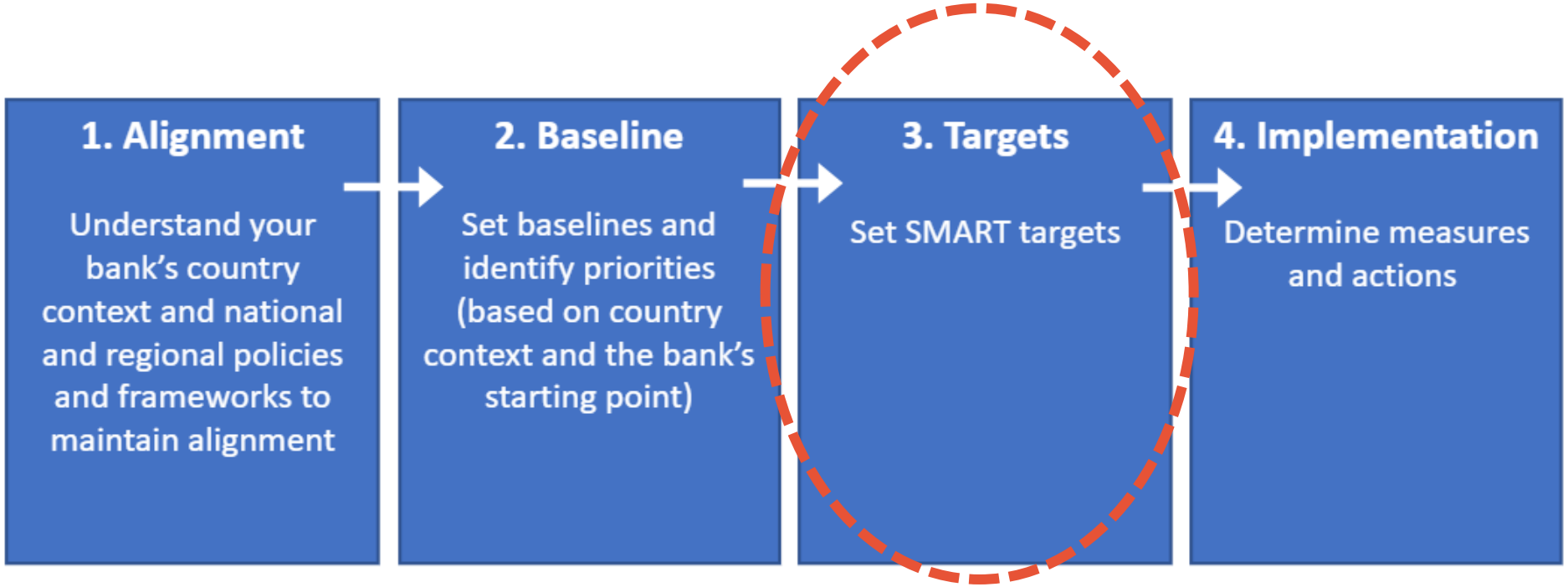
The target setting process (climate or resource efficiency)



Target setting – climate focus

- Your bank should ultimately set impact targets, i.e. targets to increase positive impact and decrease negative impact.
- If your key impact area is **climate change**, your impact targets will be financed GHG emission targets, and energy efficiency will be a key driver

Climate Change

1 Understand the landscape

Energy production / consumption is a huge source of GHG emissions in many sectors

2 Measure & disclose financed emissions

In certain asset classes energy consumption is the main proxy for the calculation of financed emissions

3 Set robust, science-based targets

Energy efficiency is a key driver of Paris Aligned decarbonization scenarios. In some sectors banks' climate targets will be based on EE targets.

4 Implement the targets

In line with your targets, implementation will in many sectors be centered around offering your clients EE advice and investment finance.

Target setting – climate – theoretic example

- Residential mortgages – impact target as GHG emissions:

Baseline (2022)	Intermediate target (2028)	Long term target (2050)
12.500 tCO2e	9700	1300

- CRE loans – impact target as GHG emissions:

Baseline (2022)	Intermediate target (2028)	Long term target (2050)
61.000 tCO2e	40.000	2560

Target setting – climate – theoretic example

Impact targets

- Residential mortgages – impact target as GHG emissions:

Baseline (2022)	Intermediate target (2028)	Long term target (2050)
12.500 tCO2e	9700	1300

- CRE loans – impact target as GHG emissions:

Baseline (2022)	Intermediate target (2028)	Long term target (2050)
61.000 tCO2e	40.000	2560

Practice targets

Portfolio composition and financial flows

By **2026,** ensure that at least 30% of new mortgages meet the EU Taxonomies criteria.

Client engagement

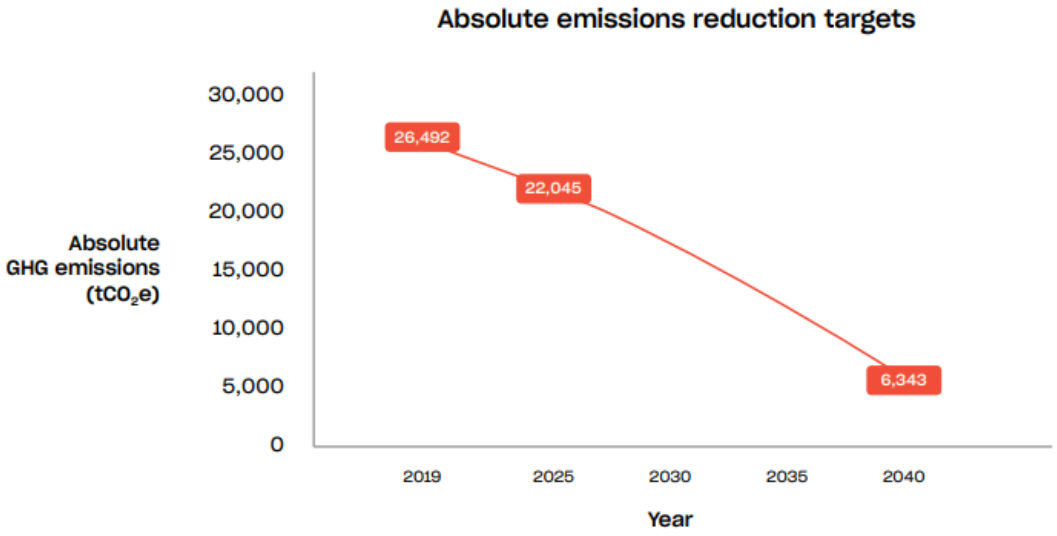
By **2024,** ensure that every year at least 5% of clients are advised about behavioral and renovation opportunities to improve energy efficiency.

Public examples from banks for climate targets with EE focus (Canada, Vancity

Residential buildings

- A 17% reduction in absolute emissions by 2025 from base year
- A 76% reduction in absolute emissions by 2040 from base year

Year	Target emissions (tCO2e)
2019 (base year)	26,492
2025	22,045
2040	6,343



- To establish our 2025 targets, we used the Science Based Targets initiative Sectoral Decarbonization Approach (SBTi's SDA) tool for residential and service buildings. The SBTi defines and promotes best practice in science-based target setting,
- This tool uses data from the International Energy Association's Energy Technology Perspectives (IEA's ETP) 2017 and applies a 'beyond 2 degrees' scenario (B2DS), which falls within the Paris Agreement range of ambition: >50% probability of limiting global warming to 1.75°C above pre-industrial levels.
- While the scenario we used meets the *Guidelines for Climate Target Setting for Banks*, it does not meet the NZBA's ambition of >50% probability of limiting global warming to 1.5°C.
- However, we believe our targets meet the NZBA's ambition for two main reasons: our pathway and endpoint were modified to meet 2050 targets by 2040; and the SBTi's SDA tool resulted in more aggressive targets than the CRREM's Carbon Risk Assessment 1.5 degree aligned tool. This is because the SBTi tool uses global data whereas the CRREM tool considers a cleaner grid in Canada.
- Once updated SBTi tools become available based on a net-zero scenario, we will revisit our approach and look at updating targets if needed.

Explaining scenario choice

[See details in Vancity's Technical Report]

Public examples from banks (Canada) - Vancity

PCAF data quality score	Mortgage balance ($ million CAD)	% loan balance	% emissions
5	683 (A)	5%	6%
4	12,381 (B)	95%	94%

Emission factors and external data used

Grid factors	British Columbia	Ontario[1]	Year	PCAF database	Source	Publication date
Generation intensity gGHG/kWh electricity generated	18.6	30	2019	Same source but more recent year[2]	BC: National Inventory Report 1990-2019 Part 3 – Page 70[3] Ontario: Page 66 of the same report	2021

[1] We applied this emission factor to commercial real estate residential homes located on Ontario (see commercial real estate section)
[2] PCAF uses 2018 data that references the National Inventory Report. We used 2019 data, drawing directly from the National Inventory Report 1999-2019
[3] https://publications.gc.ca/collections/collection_2021/eccc/En81-4-2019-3-eng.pdf

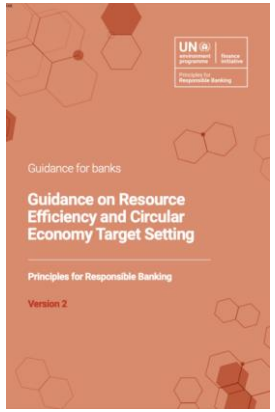
Energy use by building type in British Columbia	Energy use/GHG emissions	Year	PCAF database	Source
Electricity use	**PJ**	2018	Same source but more recent year	Office of Energy Efficiency, Natural Resources Canada and Statistics Canada Tables 32, 34 and 36[1].
Detached homes	44.0			
Attached homes	8.2			
Apartments	15.4			
GHG emissions – non electricity	**Mt of CO_2e**			
Detached homes	2.8			
Attached homes	0.5			
Apartments	0.8			
Data quality 5: Building stock in British Columbia	**# Buildings (thousands)**	**Year**	**PCAF database**	**Source**
Detached homes	959.9	2018	Same source but more recent year	Office of Energy Efficiency, Natural Resources Canada and Statistics Canada Table 14[1].
Attached homes	250.7			
Apartments	689.9			
Data quality 4: Floor area by building type in British Columbia	**Million m^2**	**Year**	**PCAF database**	**Source**
Detached homes	189.0	2018	Same source but more recent year	Office of Energy Efficiency, Natural Resources Canada and Statistics Canada Table 18[1].
Attached homes	36.6			
Apartments	69,8			

[1] https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/menus/trends/comprehensive/trends_res_bct.cfm. At the time of writing, data for energy use by building type is now available for 2020. We understand that 2019 building stock data will be published in 2022. We will formalize our approach to applying updated emission factors in 2022.

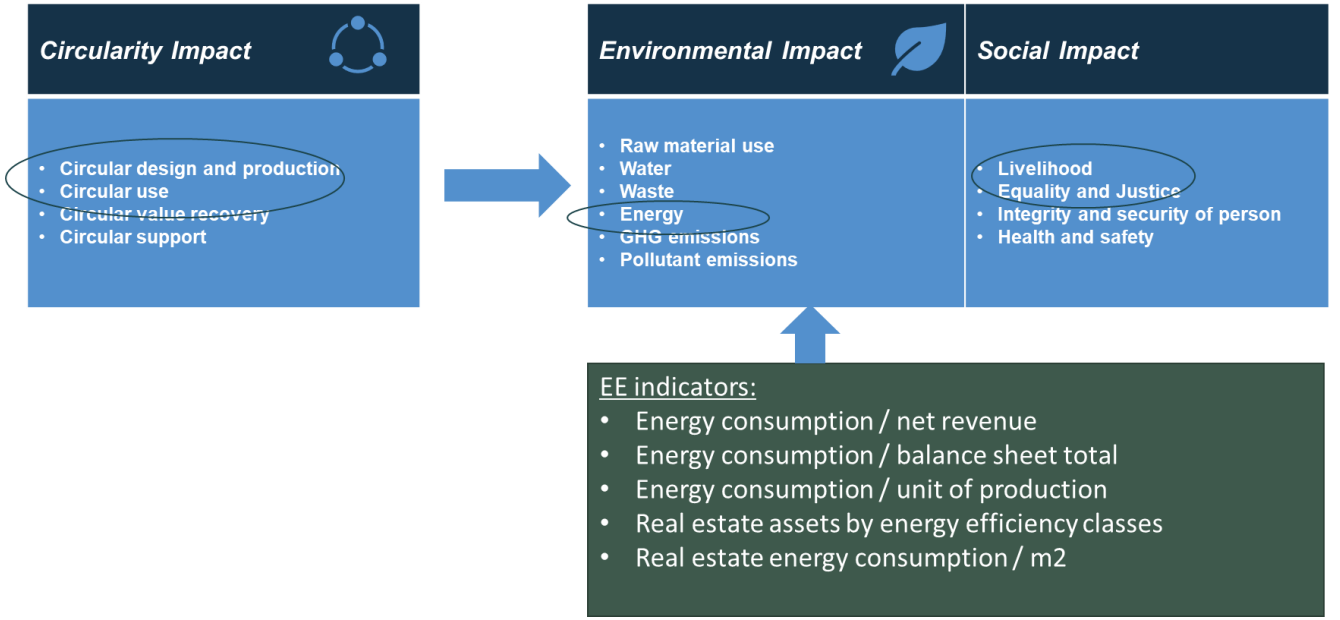
Explaining energy use/ GHG estimation data sources

Target setting – circular economy/resource efficiency focus

- You should set both long term targets (e.g. 10 years or longer), and interim targets (to be delivered in 1-5 years).
- Impact targets should be set using the impact indicators set in the Guidance (see also previous slide!), adjusted as needed by your bank.
- It is recommended to use EE indicators together with increase in **renewable energy**
- Ideally, your bank should set impact targets on environmental impact (energy efficiency + renewable energy) and circularity impact.
- You are also encouraged to set social impact targets.



Resource efficiency & Circular economy



Target setting – circular economy/resource efficiency focus - Example

	Circularity Impact	*Environmental Impact*	*Social Impact*
Impact targets		Mandatory Mortgage portfolio **EE target** for avarage primary energy consumption 290 kWh/m2 for **2026** and 200 kWh/m2 for **2033** (baseline 2022: 320 kWh/m2). The bank also set a **renewable energy production** target (solar and wind): 1250 MW installed capacity for **2026** and 2700 MW for **2033** (baseline 2022: 600 MW)	

Target setting – circular economy/resource efficiency focus - Example

Impact targets

Circularity Impact	*Environmental Impact*	*Social Impact*
(Optional, but recommended) The bank considered setting also a circular impact target for the residential buildings portfolio, but due to the lack of data, the bank ultimately decided to postpone target setting until the baseline can be established. *(Reaching out to a sample of clients, it started to gather data about raw material use and construction waste.)*	Mandatory Mortgage portfolio **EE target** for avarage primary energy consumption 290 kWh/m2 for **2026** and 200 kWh/m2 for **2033** (baseline 2022: 320 kWh/m2). The bank also set a **renewable energy production** target (solar and wind): 1250 MW installed capacity for **2026** and 2700 MW for **2033** (baseline 2022: 600 MW)	(Optional, but recommended) At least 3000 borrowers affected by energy poverty benefiting from retrofit loans by 2026, bringing down their energy cost/income ratio by 15pp (baseline 2022: avarage ratio is 40%)

Target setting – circular economy/resource efficiency focus - Example

Impact targets

Circularity Impact	*Environmental Impact*	*Social Impact*
(Optional, but recommended) The bank considered setting also a circular impact target for the residential buildings portfolio, but due to the lack of data, the bank ultimately decided to postpone target setting until the baseline can be established. *(Reaching out to a sample of clients, it started to gather data about raw material use and construction waste.)*	Mandatory Mortgage portfolio **EE target** for avarage primary energy consumption 290 kWh/m2 for **2026** and 200 kWh/m2 for **2033** (baseline 2022: 320 kWh/m2). The bank also set a **renewable energy production** target (solar and wind): 1250 MW installed capacity for **2026** and 2700 MW for **2033** (baseline 2022: 600 MW)	(Optional, but recommended) At least 3000 borrowers affected by energy poverty benefiting from retrofit loans by 2026, bringing down their energy cost/income ratio by 15pp (baseline 2022: avarage ratio is 40%)

Practice targets

Portfolio composition and financial flows

By **2026,** ensure that at least 30% of new mortgages meet the EU Taxonomies criteria.

Can be similar as in the case of climate targets

Client engagement

By **2024,** ensure that every year at least 5% of clients are advised about behavioral and renovation opportunities to improve energy efficiency and make their buildings more circular.

We continue and finish the program on Thursday

2.00 PM **Opening** (UNEP FI)

2.05 **Towards a zero-emission, efficient and resilient buildings and construction sector in Asia Pacific** (Jonathan Duwyn / UNEP-GlobalABC and Autif Sayyed / IFC)

2.45 Break

4.00 **Energy efficiency target setting & implementation** (UNEP FI

- Recap key steps of target setting & implementation with bank examples

5.00 **Closing**

*China Standard Time

UN environment programme | finance initiative

Principles for Responsible Banking

UNEP Finance Initiative

Energy Efficiency Finance capacity building for Asia Pacific Banks

5-8 June 2023

UNEP Finance Initiative

Energy Efficiency Finance capacity building

5-8 June 2023

Workshop 3#

Financing energy efficiency in buildings

8 June 2023

MINISTERO DELL'AMBIENTE
E DELLA SICUREZZA ENERGETICA

We would like to thank the Italian Ministry of Environment and Energy Security for supporting the UN system's contribution to a green and inclusive recovery by harnessing the power of financial systems to support the SDG Decade of Action, access of developing countries to sustainable finance and Multilateral Environmental Agreements.

Questions, comments and thoughts welcome!

Connect to Slido via the link posted in the chat

or go to **www.slido.com** and
enter code: **123 23 23**

or scan QR code:

- Post questions in Slido or Raise hands in Webex (if you want to speak up)
- Recordings and materials will be shared after the meeting to participants

2.00 PM **Opening** (UNEP FI)

2.05 **Towards a zero-emission, efficient and resilient buildings and construction sector in Asia Pacific** (Jonathan Duwyn / UNEP-GlobalABC)

2.50 **IFC's experience with green buildings and its EDGE tool** (Autif Sayyed / IFC)

3.30 Break

3.45 **Energy efficiency target setting & implementation** (UNEP FI

- Recap key steps of target setting & implementation with bank examples

4.45 **Closing**

*China Standard Time

Photo credit: Junar Eliang

UN environment programme

Global Alliance for Buildings and Construction

Towards a zero-emissions, efficient and resilient buildings and construction sector

Key trends, concepts and solutions

8 June 2023

Agenda

1 **Why buildings?**
>Key trends

2 **Towards net zero buildings?**
>key concepts
>Solutions

3 **The Global ABC**

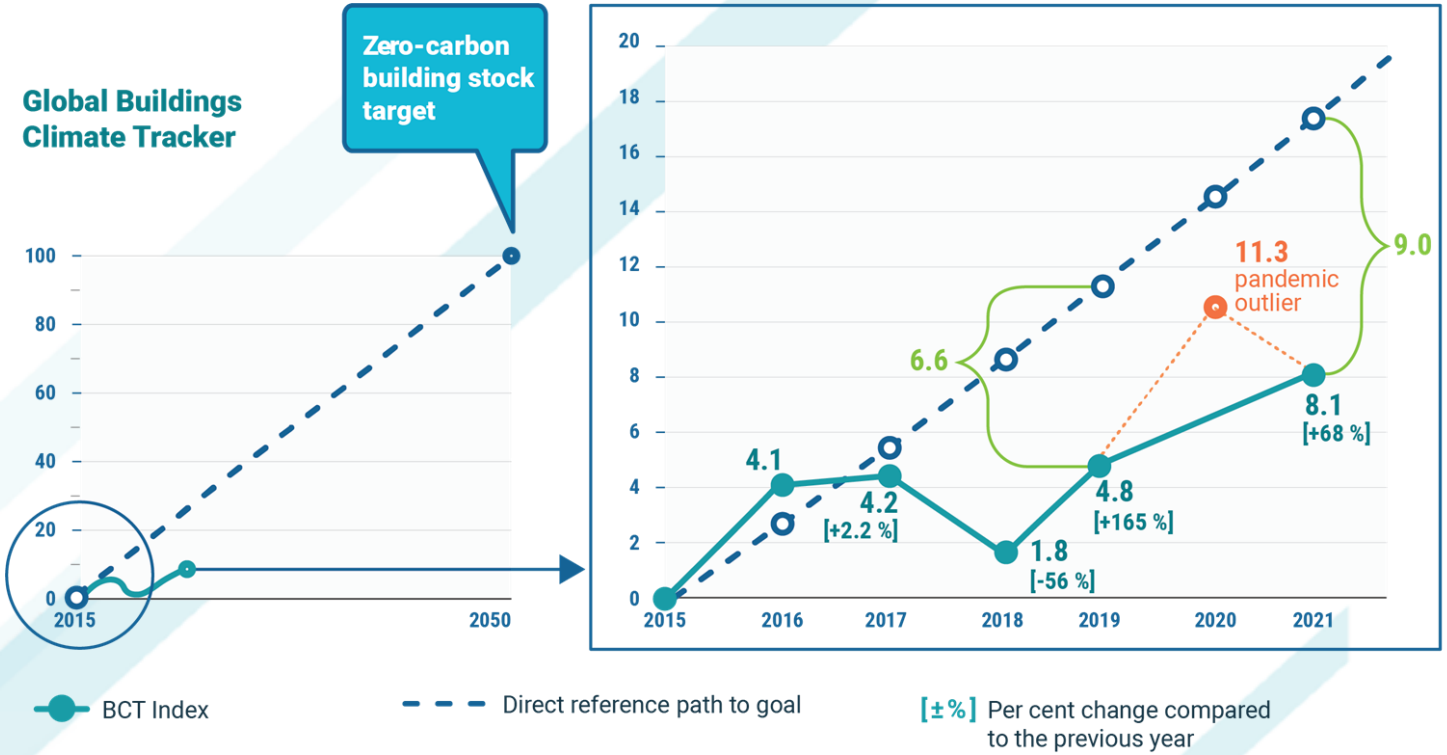
1. Why buildings?

- The equivalent of Paris is added in floor space **every 5 days**
- **Half of the buildings standing in 2060 have not yet been built**.
- Most **existing buildings need retrofitting** to increase energy efficiency and/or climate resilience
- **The most cost-effective mitigation potential of any industrial sector**. Co-benefits including job creation, improved climate resilience.

The Global Buildings Climate Tracker

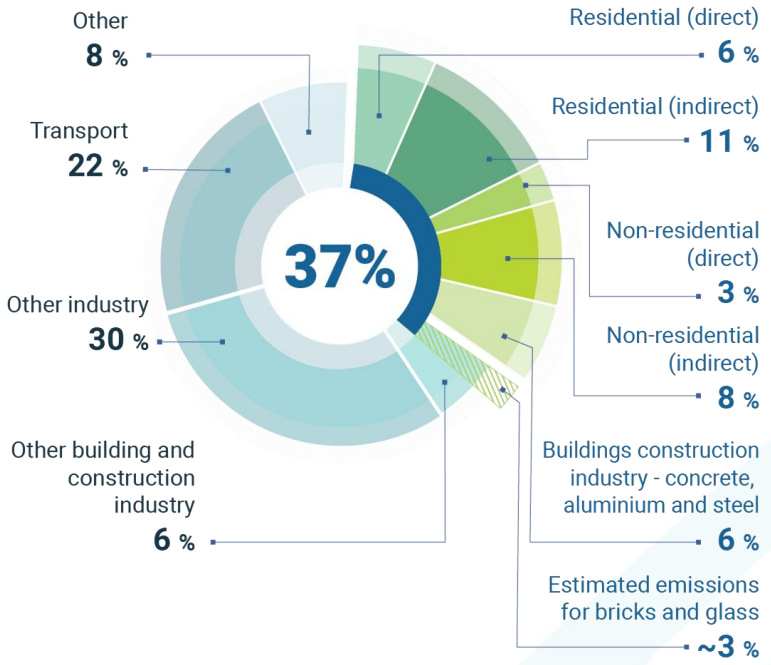
Decarbonisation index trend for buildings and construction

- **The BCT shows a negative rebound since 2020 in the decarbonization of the buildings sector, with increased energy intensity and higher emissions.**
- **No structural, systemic improvement was achieved in the buildings sector, leaving it vulnerable to external factors.**



Source: Adapted by the Buildings Performance Institute Europe.

EMISSIONS:
Global share of buildings and construction operational and process CO2 emissions, 2021



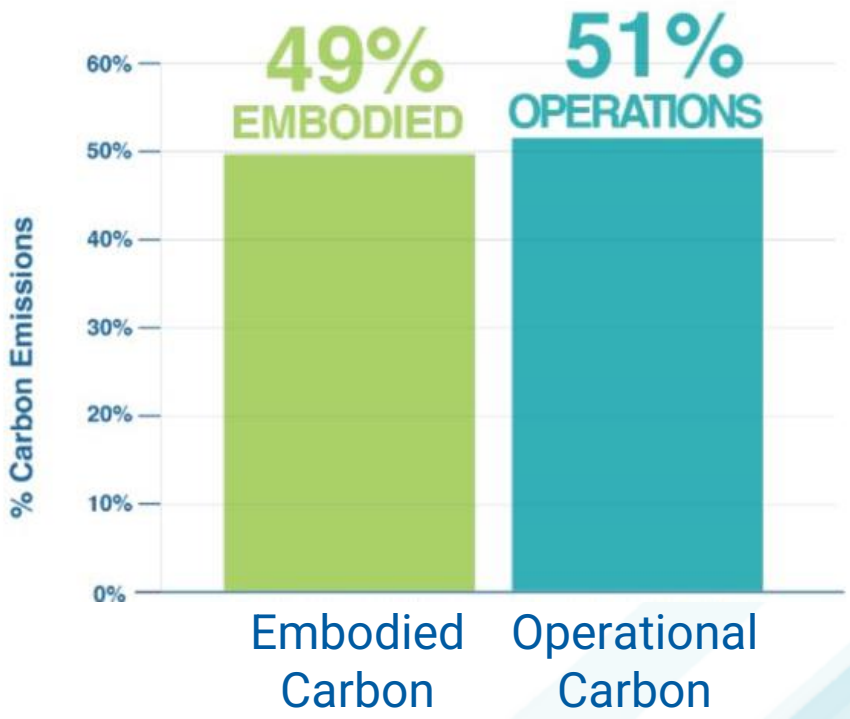
- **Operational energy-related CO_2 emissions from buildings grew by around 5% in 2021 compared to 2020 to around 10 $GtCO_2$, exceeding the previous 2019 peak of 9.6 $GtCO_2$ by 2%.**
- **Emissions from producing buildings materials are around 3.6 $GtCO_2$ (concrete, steel, aluminium, glass, and bricks).**
- **Together buildings represented around 37% of global emissions in 2021.**

Source: International Energy Agency (2022). Tracking Clean Energy Progress. Paris.

Pay more attention to embodied carbon

Embodied carbon will be responsible for almost half of total new construction emissions between now and 2050.

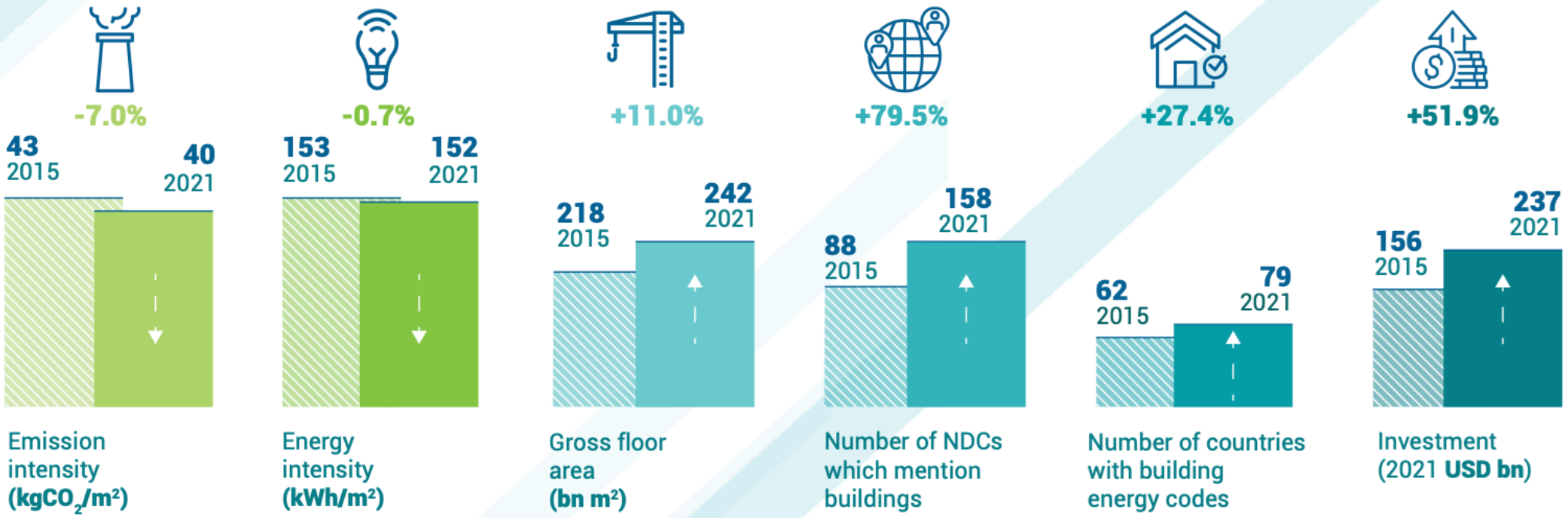
Total Carbon Emissions of Global New Construction from 2020-2050



"As building operations become more efficient, embodied impacts related to producing building materials become increasingly significant."

Source: IEA 2022. All rights reserved. Tracking Clean Energy Progress 2022.

Change in global drivers since 2015



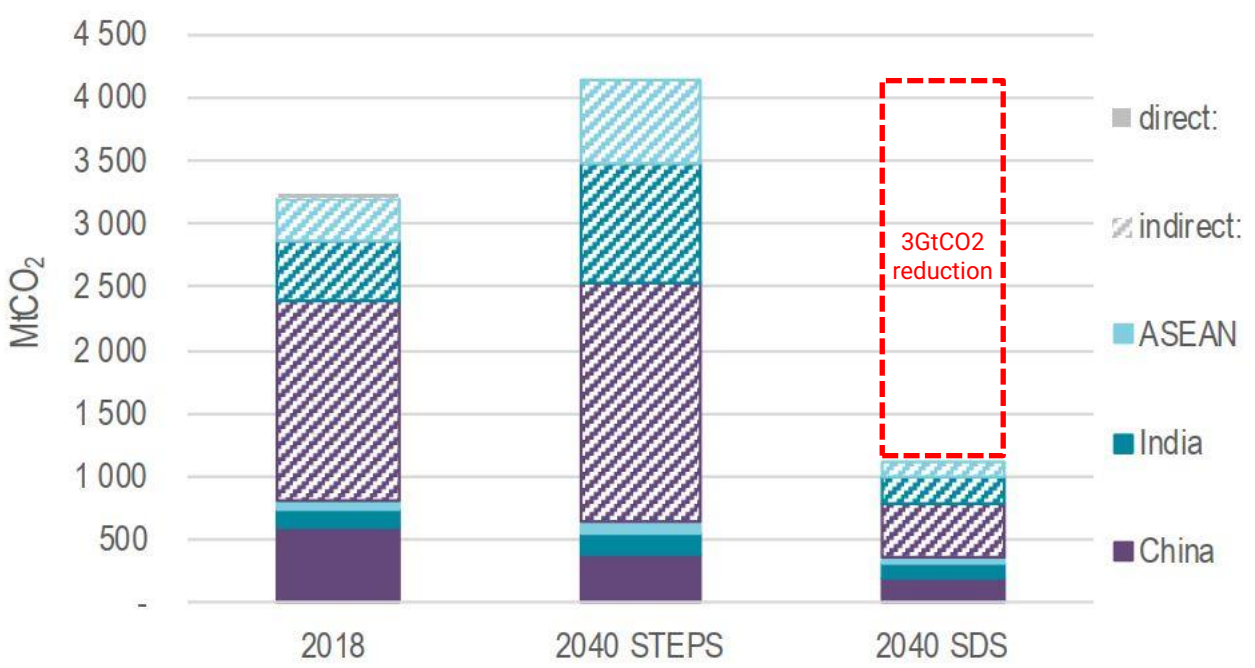
[1] Values included for the baselines have been updated from previous versions of the Buildings-GSR due to both historic input data updates for emissions and floorspace, and also deflation factors for USD. The proportional changes between previous years remains similar.

Regional Context in Asia Pacific

- With 4.5 billion people, the Asia Pacific region is home to **60% of the world's population** and is responsible for **almost half of global GDP** (IMF, 2019).
- **Another 65% floor area** will be added between now and 2050 in Asia, which is equivalent to **another 70 billion sqm** (IEA, 2017).
- The investment opportunity in green buildings is estimated at **USD 17.8 trillion** in East Asia Pacific and South Asia, representing **over 70% of the global total** (IFC, 2019).
- Most of the Asian growth in floor area will be in **the residential sector**.

Sustainable Building Scenario in Asia Pacific

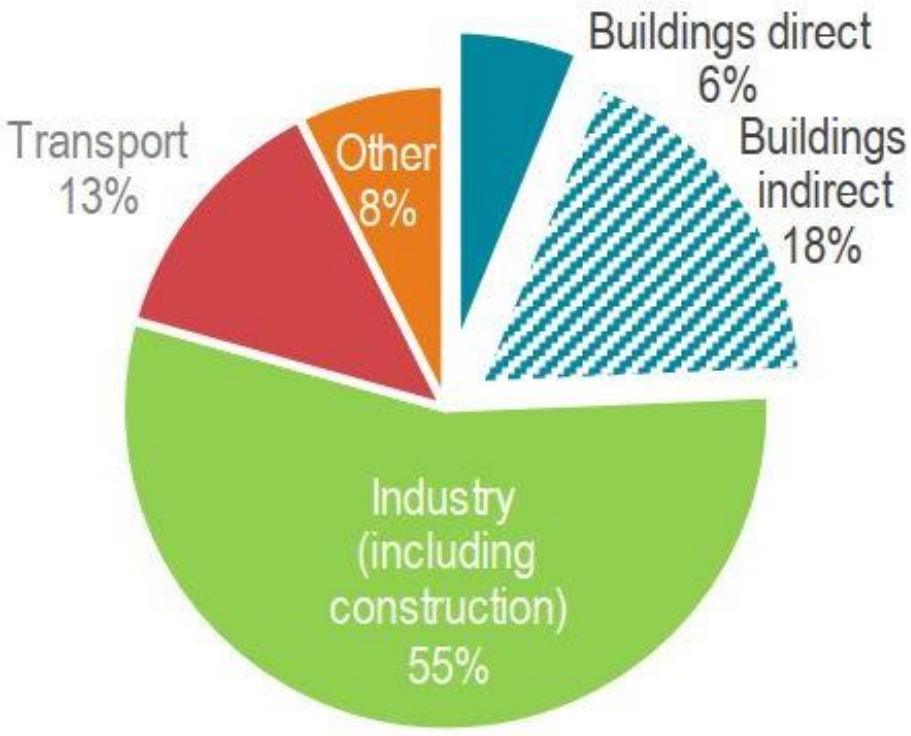
- Sustainable Development Scenario (SDS) proves that emissions from buildings in ASEAN, China and India in 2040 could be **3 GtCO2 per year lower** than they are on track to be in the Stated Policy Scenario (STEPS).
- The above scenario supports growth in GDP per capita of **over 200%** and an increase in floor area of about two-thirds.
- Annual emissions from buildings could even be **2 GtCO2 lower** than they are today. Emissions of 2 GtCO2 per year is equivalent to the emissions from almost **500 coal-fired power plants.**



Emissions from buildings in ASEAN, China and India in 2018 and in 2040 under the IEA STEPS and SDS

Source: Adapted from IEA (2019a), *World Energy Outlook 2019*

EMISSIONS: Buildings and construction operational and process CO2 emissions in Asia Pacific



Buildings' share of the total CO2 emissions in ASEAN, China and India (2018)

- **Emissions in buildings accounted for 24% of the total process and energy-related CO2 emissions in ASEAN, China and India**
- **The amount of the emission in buildings in ASEAN, China and India is equivalent to 3.2 GtCO2.**

Notes: "buildings" energy use and emissions refers to the operational energy consumption. and does not include the construction phase or the energy and emissions associated with the manufacture of materials. Direct emissions include those from coal, oil, natural gas and biomass. Indirect emissions are the emissions from power generation for electricity.

Source: Adapted from IEA (2019a), *World Energy Outlook 2019*

Regional Context in Asia Pacific

- **Building energy codes by jurisdiction, 2017-18**

- Mandatory for entire sector
- Mandatory for part of sector
- Mandatory for part of sector in major city
- Voluntary for part of sector
- Code in development
- No known code

- **Building energy certification programmes by jurisdiction, 2017-18**

- Partial mandatory with widespread voluntary
- Partial mandatory
- Widespread voluntary
- Voluntary with only a few projects
- No certification or no information

2. Towards net zero buildings?

Emission goals to achieve the Paris Agreement Goals - UNFCCC Marrakech Partnership for Global Climate Action (MPGCA)

- **By 2030, the built environment should halve its emissions, whereby 100 per cent of new buildings must be net-zero carbon in operation.**

- **By 2050, all buildings must be decarbonized along the lifecycle.**

Two Types of carbon emission in buildings and construction

Embodied Carbon

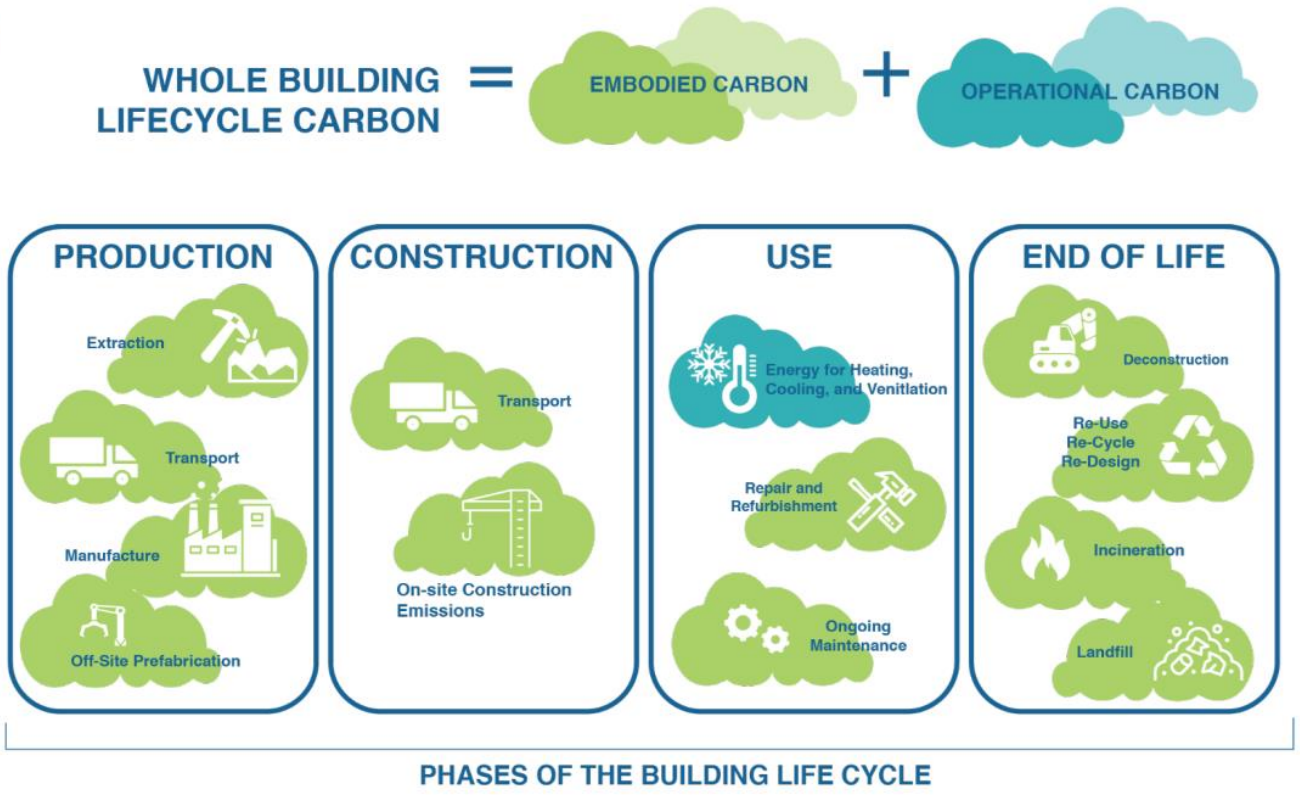
Manufacture, transport, and installation of construction materials

Operational Carbon

Building Energy Consumption

Image; Carbon Leadership Forum 2020

Decarbonizing along the lifecycle



A **Whole Building Life Cycle and Systems Approach** to decarbonization is essential to maximizing long-term sustainability.

To address embodied carbon, there's no one magic solution… but multiple measures must be combined

AVOID

CIRCULAR APPROACHES AND RESOURCE EFFICIENCY IN DESIGN AND CONSTRUCTION

- **Life-cycle analysis** to guide design decisions
- **Resource-efficient construction** techniques that save material
- **Adaptability and durability** for a long lifetime
- **Circular economy:** Recyclability and reuse of components („urban mining")
- **Local value chains** to lower transport emissions

IMPROVE

DECARBONISE CONVENTIONAL BUILDING MATERIALS

- **Energy-efficiency and decarbonising energy supply** in production
- **Process innovation** to reduce CO2
- **Substitution** with waste materials or natural fibres

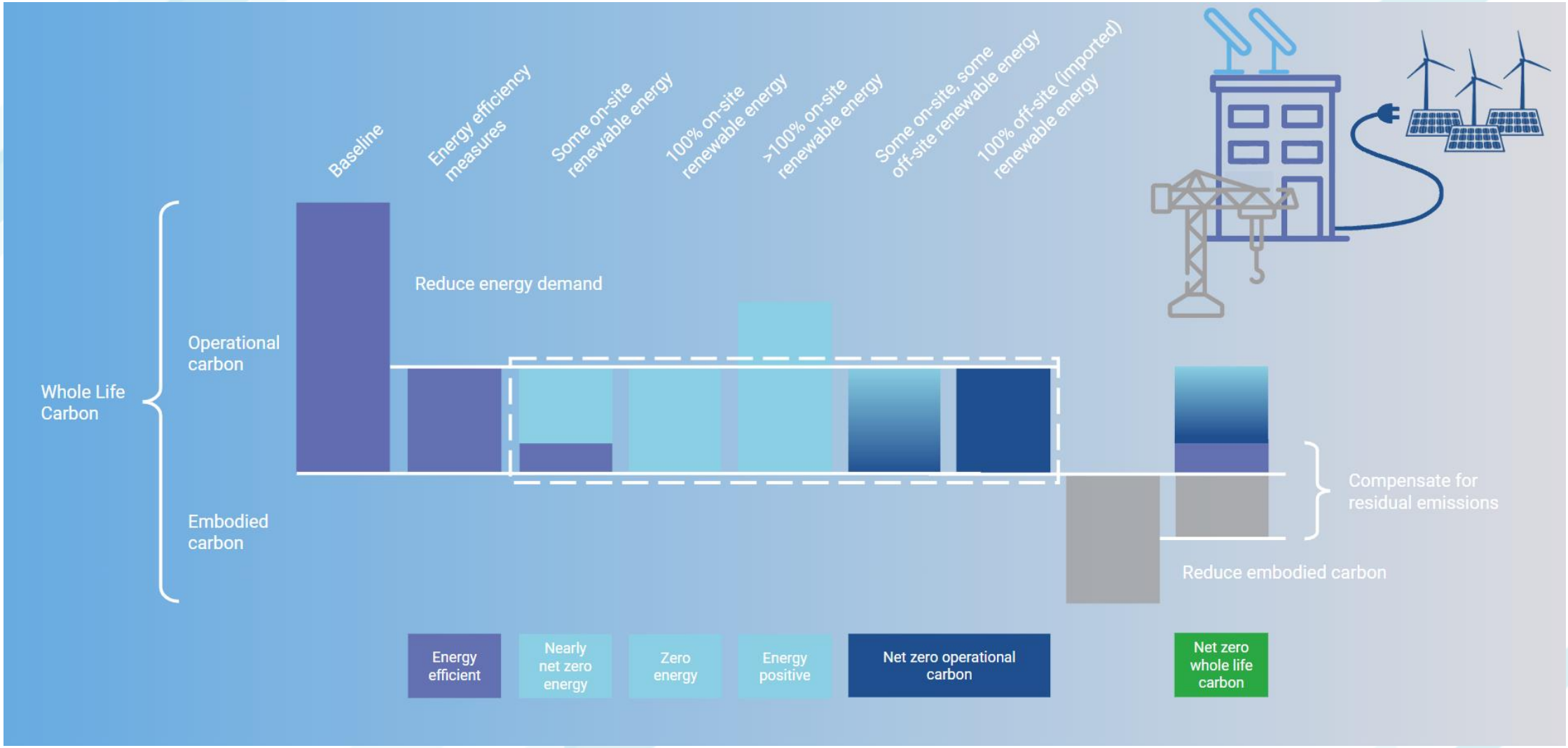
INCREASE THE SHARE OF ALTERNATIVE BUILDING MATERIALS

- **Develop supply chains** for locally available materials
- **Standardise and certify** materials, e.g. **bio-based** (clay, wood, natural fibres) and **recycled** materials
- **Use** in " conventional" construction

SHIFT

Global Alliance for Buildings and Construction (GlobalABC)

Net Zero Building Definition



Source: WorldGBC What is a net zero carbon building? - World Green Building Council (worldgbc.org)

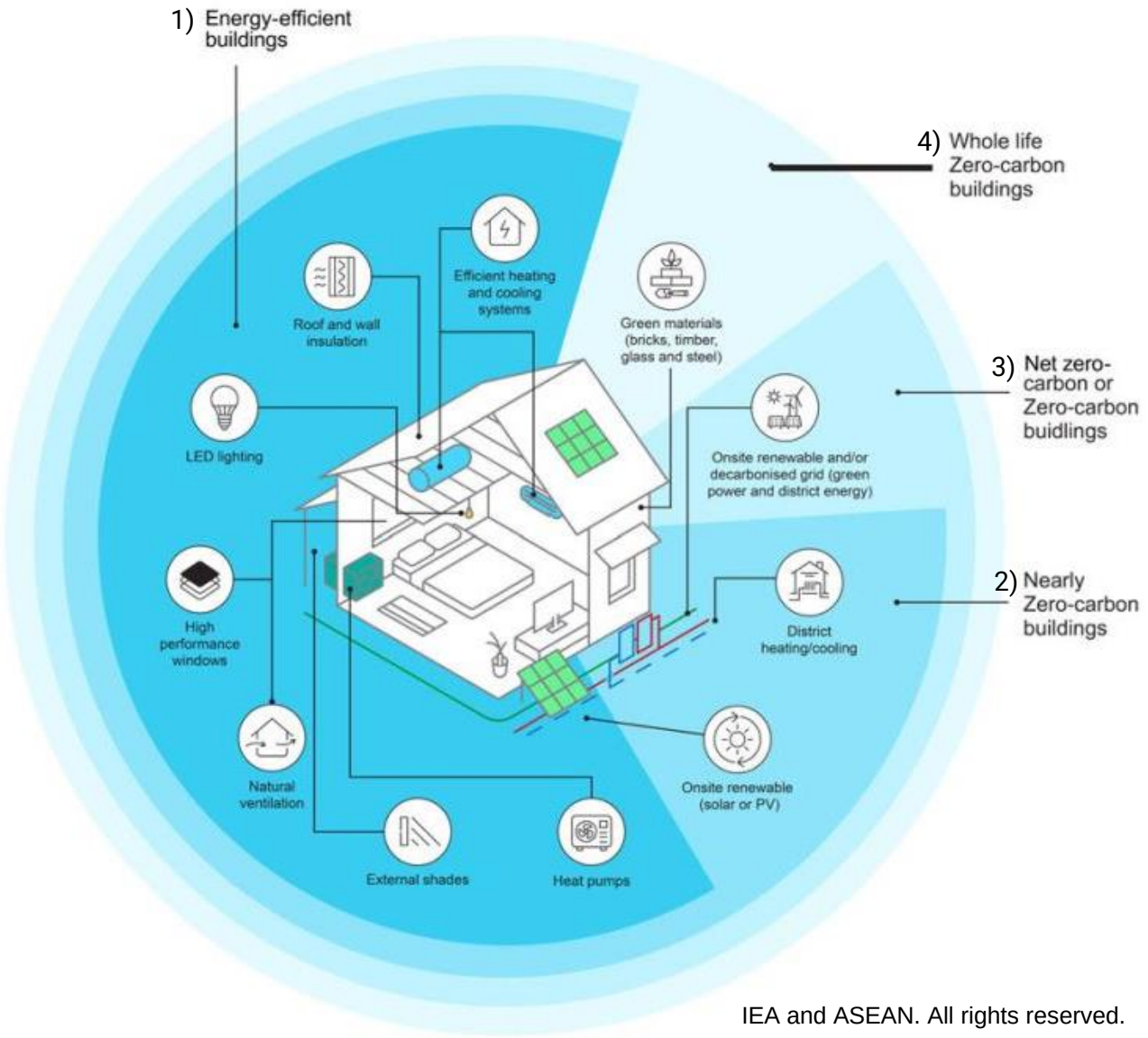
Key Green Building Concept

1) Energy-efficient Buildings :
a building with a high degree of energy efficiency in its fabric and building services that consume energy, e.g. heating, cooling, cooking, lighting, ventilation, hot water and appliances.

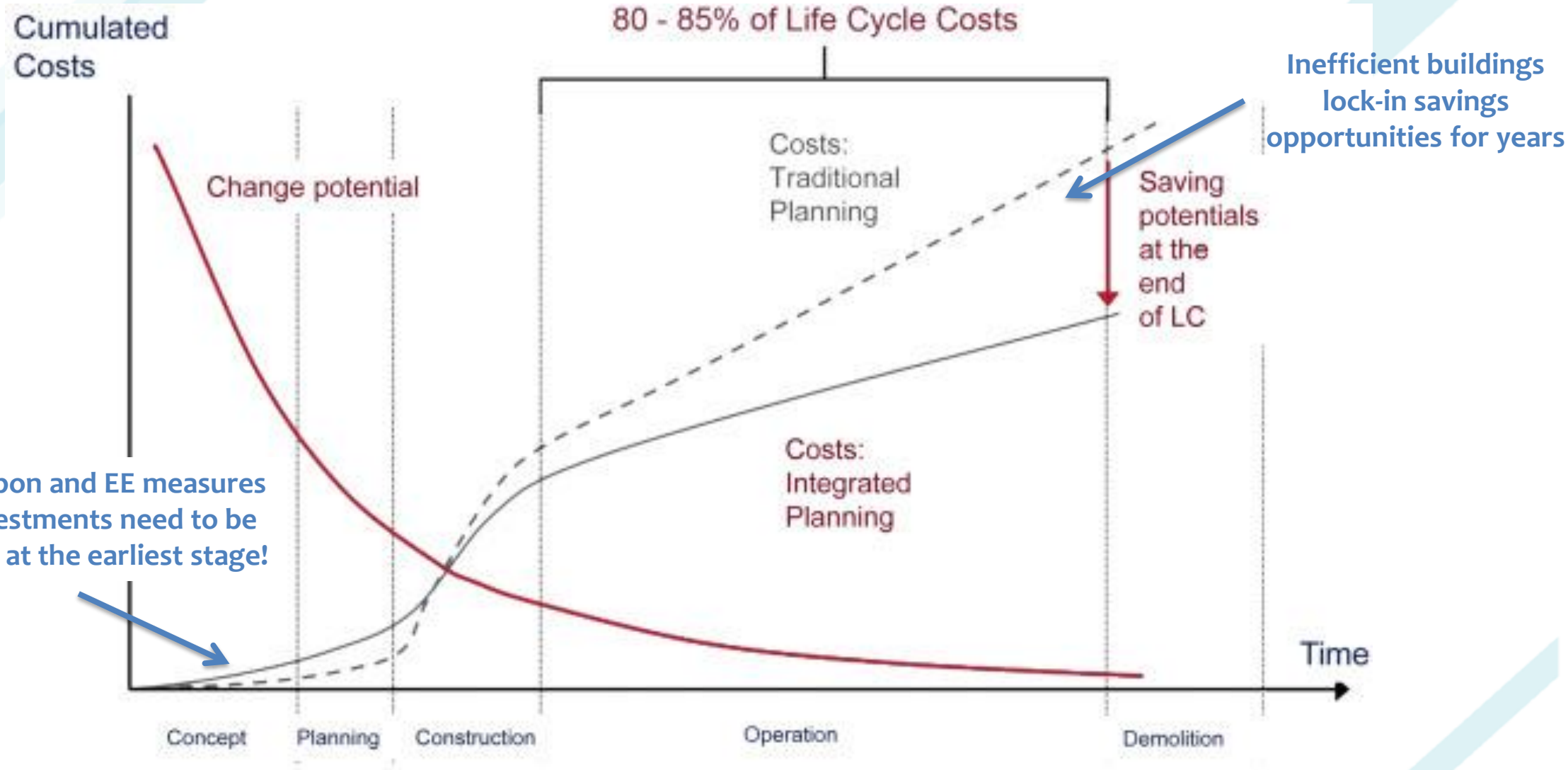
2) Nearly Zero-carbon Buildings:
a building that is energy-efficient and may have some available zero-emission energy supply (onsite or offsite), but that does not offset 100% of the building's energy demand.

3) (Net) Zero-carbon Buildings:
a building that is energy-efficient and has its energy demand completely met through zero-emission energy generated either onsite or offsite.

4) Whole Life Cycle, Zero-carbon Buildings:
zero-carbon buildings, in which embodied carbon emissions from the materials used in their construction are decarbonized and/or offset, alongside the operational carbon emissions, over the building's lifetime.



Whole Life Cycle Carbon approach – new buildings



Inefficient buildings lock-in savings opportunities for years

Low carbon and EE measures and investments need to be included at the earliest stage!

Source: Building life cycle optimization tools for early design phases, https://www.sciencedirect.com/science/article/abs/pii/S0360544215003217

Reducing carbon in buildings

Energy efficiency	 ***Building envelope*** • Best possible thermal insulation of façade, roof, windows, round floor • Effective shading • Air tightness and air leakage testing	 ***Heating, ventilation & air conditioning*** • Highly efficient heat pumps • Highly efficient biomass boilers • Building automation • Natural refrigerants or sorption cooling technologies • Highly efficient district heating • Mechanical ventilation heat recovery	 ***Lighting & appliances*** • Optimized lighting technology (LED) • Energy efficient appliances (A+++, Energy star) • Occupancy and daylight sensors

Source: PCAF https://carbonaccountingfinancials.com/financing-towards-net-zero-buildings

Reducing carbon in buildings

Efficiency in operation	***Efficient use*** • Awareness raising campaigns on efficient user behavior • Energy managementsystem (incl. sensors, controls, smart meters)	***Monitoring & Maintenance*** • Monitoring and evaluation of consumption • Benchmarking and performance guarantees • Optimization of building operation • Timely maintenance
Renewable energy	***On-site renewable energy*** • Solar thermal • Solar photovoltaics (PV) • PV thermal • Geothermal • Storage	***Renewable energy procurement*** • Renewable Energy Certificates (RECs) • Guarantees of Origin (GOs) • Power Purchase Agreements (PPAs) conveying RECs or GOs • Direct procurement

Source: PCAF https://carbonaccountingfinancials.com/financing-towards-net-zero-buildings

Reducing carbon in buildings

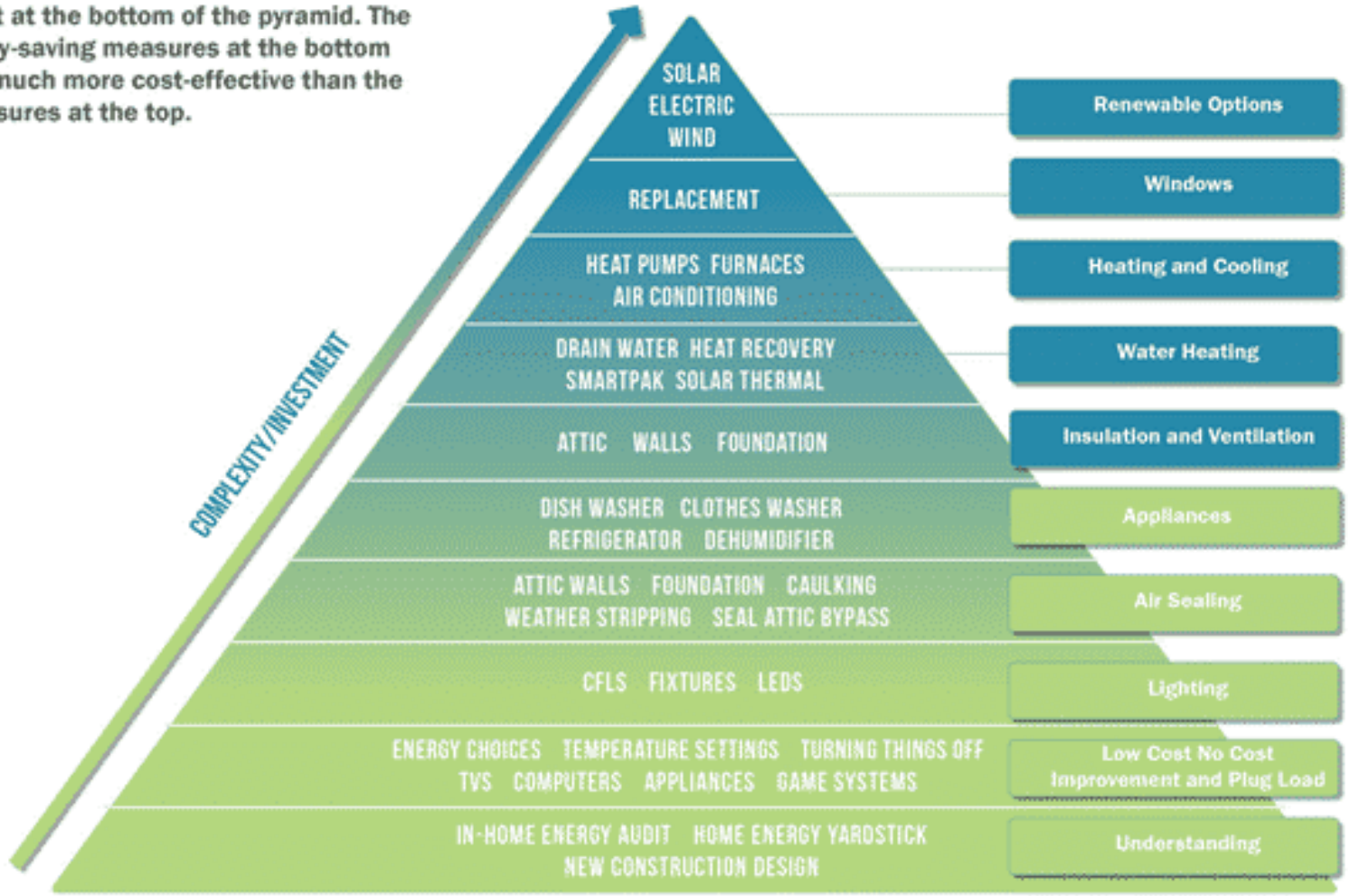
UN environment programme

Global Alliance for Buildings and Construction

Embodied carbon	***Transform & reuse*** • Maximize use of existing assets • Refurbishment as preferred option • Reuse materials • Review of material efficiency	***Build low carbon*** • Whole life cycle assessment (WLCA) • Smart design (e.g. lean construction, smart floor plan) • Natural and renewable materials (fostering carbon storage) from sustainable forestry • Building site selection (e.g. availability of locally sourced materials/structures) • Streamline delivery processes

Source: PCAF https://carbonaccountingfinancials.com/financing-towards-net-zero-buildings

Reducing carbon existing buildings



Source: Holland Home Energy Retrofit programme

→ Don't forget shading

→ Select low carbon materials

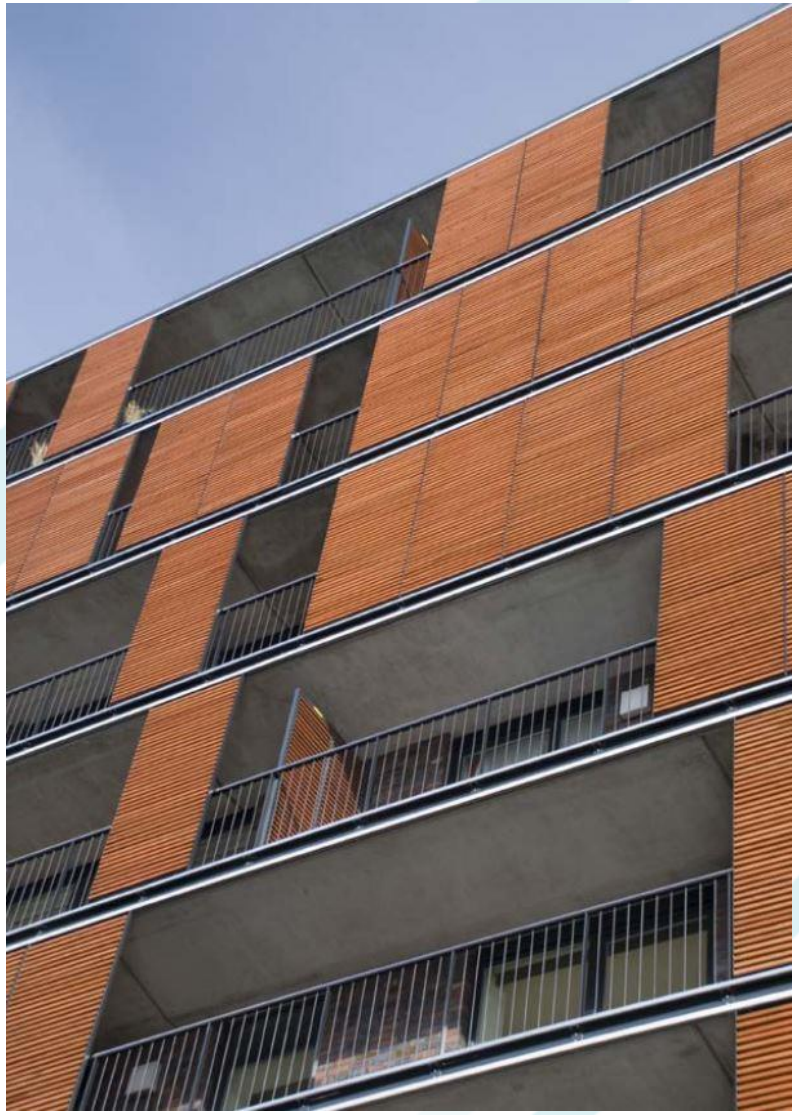
- *Quality **upgrade and up-size** buildings*
- ***Repurpose** vacant buildings*
- *Adapt under occupied buildings*
- *Nature based solutions and technology for climate adaptation*

Key Actions for Financiers toward Sustainable Buildings

Property and project developers:
Developers can make decisions about how property will be used, including cost-benefit assessments for different building and construction approaches. These early decisions can have **far-reaching impacts into what options are considered in a building or construction project.**

Upfront Investment for Sustainable Buildings

Financial institutions:
Financiers can provide mechanisms to make the **necessary upfront investments** for sustainable buildings and construction, with **repayment often coming from the energy saving benefits** that develop over several years.



Source; GlobalABC Regional Roadmap for Buildings and Construction in Asia

3. The GlobalABC

- Founded at COP21, hosted by UNEP and **with 267 members, including 38 countries**, the GlobalABC is the leading global platform for ALL buildings stakeholders committed to a common vision: **A zero-emission, efficient and resilient buildings and construction sector**.
- The GlobalABC aims to:
  - **Be a global advocate and a catalyst to action**
  - **Be a trusted platform to set targets and track progress**
  - **Support countries in setting priorities and measures based on their situation**

You have questions on buildings and construction?
Contact us at global.abc@un.org

GlobalABC :
https://globalabc.org/database
https://globalabc.org/index.php/roadmaps-buildings-and-construction

PEEB
https://www.peeb.build/knowledge-network/downloads
https://www.peeb.build/knowledge-network/external-ressources

IFC Edge
https://edgebuildings.com/

PCAF's Financing towards net-zero buildings closely on the project website:
https://carbonaccountingfinancials.com/financing-towards-net-zero-buildings

CCFLA
https://citiesclimatefinance.org/financial-instruments/

WorldGBC:
https://worldgbc.org/sustainable-building-certifications/
https://worldgbc.org/sustainable-finance/

Global Alliance for Buildings and Construction

Find out more:

www.globalabc.org

global.abc@un.org

Key buildings trends: The 2022 Global Status Report for Buildings and Construction

UN environment programme

A global reference document:

Seventh edition of this annual snapshot on the progress of the buildings and construction sector globally towards achieving the Paris Agreement goals:

- An update on the drivers of **CO_2 emissions and energy** demand globally and
- Status of **policies, finance, technologies, and solutions** that support a zero-emission, efficient, and resilient buildings and construction sector

A collaborative effort, building a global community.

This year's Buildings-GSR features contributions from:

BPIE UCL IEA Yale GEC

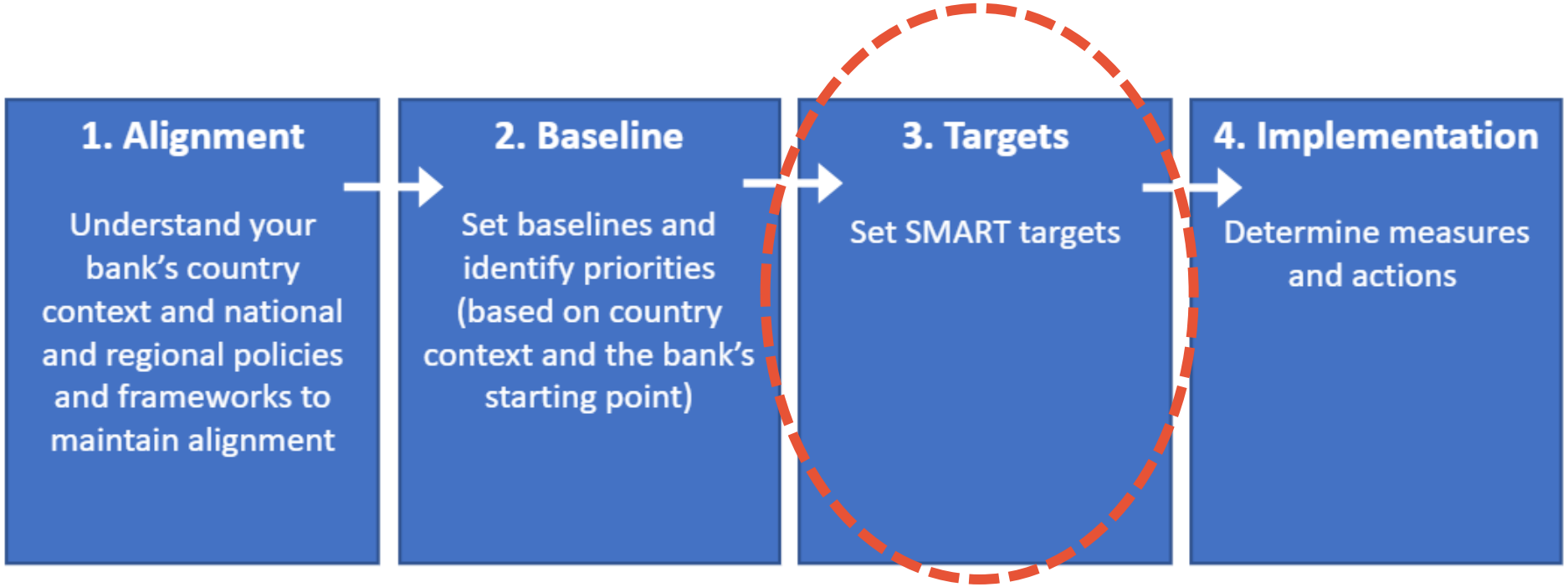
Input from over 70 GlobalABC members and experts.

Download the Buildings-GSR

Global Alliance for Buildings and Construction

EE target setting:
Target setting & implementation

The target setting process (climate or resource efficiency)



Target setting – climate focus

- Your bank should ultimately set impact targets, i.e. targets to increase positive impact and decrease negative impact.
- If your key impact area is **climate change**, your impact targets will be financed GHG emission targets, and energy efficiency will be a key driver

Climate Change

1 Understand the landscape

Energy production / consumption is a huge source of GHG emissions in many sectors

2 Measure & disclose financed emissions

In certain asset classes energy consumption is the main proxy for the calculation of financed emissions

3 Set robust, science-based targets

Energy efficiency is a key driver of Paris Aligned decarbonization scenarios. In some sectors banks' climate targets will be based on EE targets.

4 Implement the targets

In line with your targets, implementation will in many sectors be centered around offering your clients EE advice and investment finance.

Target setting – climate – theoretic example

- Residential mortgages – impact target as GHG emissions:

Baseline (2022)	Intermediate target (2028)	Long term target (2050)
12.500 tCO2e	9700	1300

- CRE loans – impact target as GHG emissions:

Baseline (2022)	Intermediate target (2028)	Long term target (2050)
61.000 tCO2e	40.000	2560

Target setting – climate – theoretic example

Impact targets

- Residential mortgages – impact target as GHG emissions:

Baseline (2022)	Intermediate target (2028)	Long term target (2050)
12.500 tCO2e	9700	1300

- CRE loans – impact target as GHG emissions:

Baseline (2022)	Intermediate target (2028)	Long term target (2050)
61.000 tCO2e	40.000	2560

Practice targets

Portfolio composition and financial flows

By **2026,** ensure that at least 30% of new mortgages meet the local green taxonomy criteria / certified as green using a recoginized scheme.

Client engagement

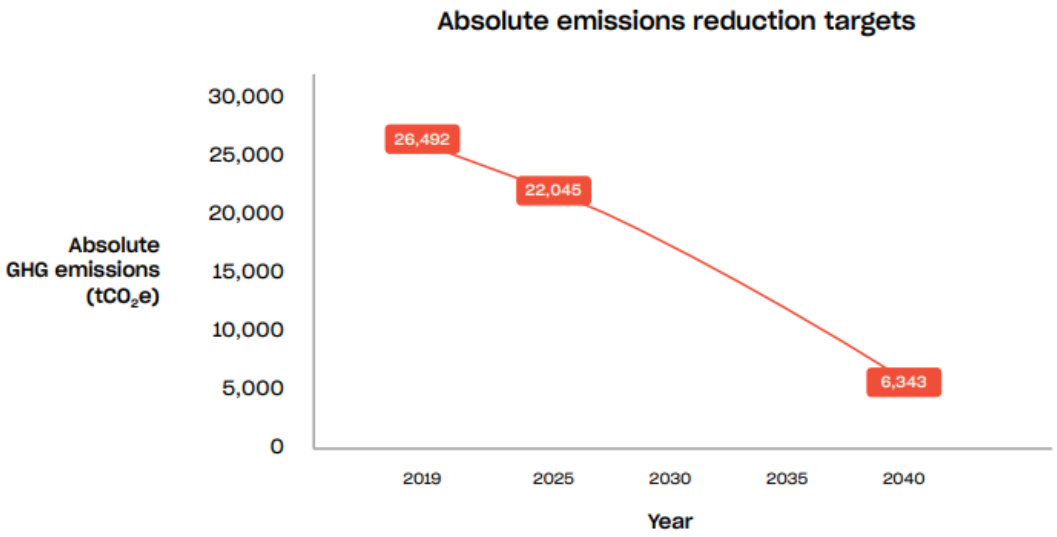
By **2024,** ensure that every year at least 5% of clients are advised about behavioral and renovation opportunities to improve energy efficiency.

Public examples from banks for climate targets with EE focus (Canada, Vancity

Residential buildings

- A 17% reduction in absolute emissions by 2025 from base year
- A 76% reduction in absolute emissions by 2040 from base year

Year	Target emissions (tCO2e)
2019 (base year)	26,492
2025	22,045
2040	6,343



- To establish our 2025 targets, we used the Science Based Targets initiative Sectoral Decarbonization Approach (SBTi's SDA) tool for residential and service buildings. The SBTi defines and promotes best practice in science-based target setting,
- This tool uses data from the International Energy Association's Energy Technology Perspectives (IEA's ETP) 2017 and applies a 'beyond 2 degrees' scenario (B2DS), which falls within the Paris Agreement range of ambition: >50% probability of limiting global warming to 1.75°C above pre-industrial levels.
- While the scenario we used meets the *Guidelines for Climate Target Setting for Banks*, it does not meet the NZBA's ambition of >50% probability of limiting global warming to 1.5°C.
- However, we believe our targets meet the NZBA's ambition for two main reasons: our pathway and endpoint were modified to meet 2050 targets by 2040; and the SBTi's SDA tool resulted in more aggressive targets than the CRREM's Carbon Risk Assessment 1.5 degree aligned tool. This is because the SBTi tool uses global data whereas the CRREM tool considers a cleaner grid in Canada.
- Once updated SBTi tools become available based on a net-zero scenario, we will revisit our approach and look at updating targets if needed.

Explaining scenario choice

[See details in Vancity's Technical Report]

Public examples from banks (Canada) - Vancity

PCAF data quality score	Mortgage balance ($ million CAD)	% loan balance	% emissions
5	683 (A)	5%	6%
4	12,381 (B)	95%	94%

Emission factors and external data used

Grid factors	British Columbia	Ontario[1]	Year	PCAF database	Source	Publication date
Generation intensity gGHG/kWh electricity generated	18.6	30	2019	Same source but more recent year[2]	BC: National Inventory Report 1990-2019 Part 3 – Page 70[3] Ontario: Page 66 of the same report	2021

[1] We applied this emission factor to commercial real estate residential homes located on Ontario (see commercial real estate section)
[2] PCAF uses 2018 data that references the National Inventory Report. We used 2019 data, drawing directly from the National Inventory Report 1999-2019
[3] https://publications.gc.ca/collections/collection_2021/eccc/En81-4-2019-3-eng.pdf

Energy use by building type in British Columbia	Energy use/GHG emissions	Year	PCAF database	Source
Electricity use	**PJ**	2018	Same source but more recent year	Office of Energy Efficiency, Natural Resources Canada and Statistics Canada Tables 32, 34 and 36[1].
Detached homes	44.0			
Attached homes	8.2			
Apartments	15.4			
GHG emissions – non electricity	**Mt of CO_2e**			
Detached homes	2.8			
Attached homes	0.5			
Apartments	0.8			
Data quality 5: Building stock in British Columbia	**# Buildings (thousands)**	**Year**	**PCAF database**	**Source**
Detached homes	959.9	2018	Same source but more recent year	Office of Energy Efficiency, Natural Resources Canada and Statistics Canada Table 14[1].
Attached homes	250.7			
Apartments	689.9			
Data quality 4: Floor area by building type in British Columbia	**Million m^2**	**Year**	**PCAF database**	**Source**
Detached homes	189.0	2018	Same source but more recent year	Office of Energy Efficiency, Natural Resources Canada and Statistics Canada Table 18[1].
Attached homes	36.6			
Apartments	69,8			

[1] https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/menus/trends/comprehensive/trends_res_bct.cfm. At the time of writing, data for energy use by building type is now available for 2020. We understand that 2019 building stock data will be published in 2022. We will formalize our approach to applying updated emission factors in 2022.

Explaining energy use/ GHG estimation data sources

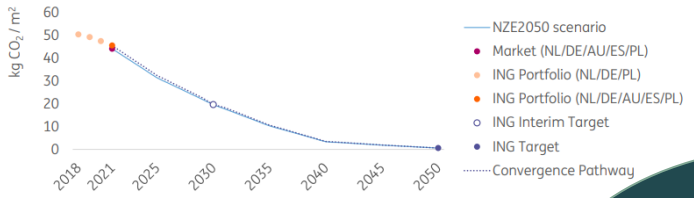
Some public examples from banks: ING

Residential real estate

€ 297 billion
Outstanding in scope

3.2%
Performance vs. 2021 net-zero benchmark

-57%
2030 reduction target vs. 2021



Buildings account for 40% of EU energy consumption and 36% o
direct and indirect GHG emissions, two-thirds of which can be at
housing. More than 95% of EU buildings are not energy efficient
1% of buildings undergo energy-renovation per year, according to
to reach the EU's climate ambitions and shows the need to addr
the existing building stock.

At year-end 2021 our combined mortgage port Netherlands, Germany, Australia, Spain, and Poland) reached a C sity of 45.7 kg per m². Belgium is not included in this total, as their w of calculating the emission intensity (including power generation) is not comparable with the other countries in our portfolio.

In previous years we compared our portfolio results with the Beyond 2°C Scenario (B2DS) for the EU. Starting this year, we can not only compare with the more ambitious IEA Net Zero by 2050 scenario, but also calculate a country weighted starting point, based on country level net-zero pathways, as published by Carbon Risk Real Estate Monitor (CRREM) in 2022. We have used the CRREM scenario to model the targets we describe below.

Clarifying science-based scenario used for target setting

Public sector engagement to ensure access to relevant data

In **Poland**, we noted a decrease in emission intensity, reaching 53.5 kg CO_2/m^2, an improvement of 7% from 2020. This is mainly related to new loan origination for buildings constructed with tighter energy efficiency norms. Slight improvement in national energy mix also contributed to this result. Data availability still remains one of the key challenges, where we continue working with other Polish banks to establish access to central EPC databases.

See further details: ING Climate Report 2022

Public examples from bank … SEE region: ING

Using proxies until granular data is available

In line with the recommendations for mortgages outlined by PCAF, we continue to use energy labels as a proxy for properties' energy performance. We continue to collect EPC labels for new mortgages in our markets, meaning each year we will have an increasingly accurate picture. However, data on energy labels is still not widely available in most of our markets outside of the Netherlands. We therefore continue to develop our own means of determining CO_2 intensity for those markets using other available data such as building year, modernisation, and subsidised loans. In all markets we aim to align these methods with local peers and stakeholders.

We have focused on tracking primary energy demand of the homes, but some of our markets are including other energy use at the home into account, such as that used for cooking. Recently published joint guidance from PCAF, CRREM, and GRESB on measuring GHG emissions for real estate suggests that over time we should expand our focus to all emissions from within the building boundary and not only of the building itself. As scenarios and data become available to do this, we will explore how our reporting can adapt to accommodate for this ambition.

In the Netherlands, we also started a pilot with other banks to explore the option of using real energy usage data, which can improve our methodology beyond the use of energy labels. Shifting to a methodology based on real-energy use is key to uncovering the real picture of housing emissions, and we continue to urge governments and other stakeholders to work together to make data available for this purpose.

countries where those homes are located. Meaning that governments and institutions steering and installing new renewable electricity capacity and shifting away from fossil fuels like natural gas, thereby greening the energy mix available to homeowners, is the most important factor for the residential real estate sector to …

Next to this the energy efficiency of those homes, as represented by t… label is likely to be the next largest factor. This is something which we … influence as a joint stakeholder with homeowners, where the willingnes… of the homeowners is critical to unlock progress. Finally, homeowners influ… additional factor, in terms of how much energy they use at home. This is likely to be the third most important element in reaching those milestones and requires the involvement of all members of a household to succeed.

Importance of combining EE and renewable energy

To show the significance of how these factors relate, even if all homes in our portfolio were label A or equivalent in the six markets by 2030, houses in our portfolio would not reach the milestone described above unless a significant and rapid greening of the grid continues in all countries, and homeowners consciously use less energy. At the same time, it is possible that a greening of the energy mix in many markets could carry the sector well towards the targets without major improvements to the energy label composition.

Like in other sectors, we take an inclusive approach in empowering our customers to improve their efficiency. We do not see our role as a bank to limit finance to customers with G and F label homes for example, where doing so may show positively in our portfolio reporting but would not create real-world change to helping homeowners' transition. Should a national government regulate minimum energy labels for example, in line with the EU's Energy Performance of Buildings Directive, such as barring G label properties from 2030 and F labels from 2033, then we as a bank can support customers with those labels, facilitating them in financing their renovations ahead of those deadlines, but for now it is not our place to directly exclude such houses from access to our lending.

Public examples from banks active in the CEE-SEE region: ING

Products and Services

In order to leverage our financing toward net zero, [illegible] alternatives for our key retail products will be offered in [illegible]

In 2022 in the Netherlands and Germany, we launched new Eco Mortgages, which offer a discount, of 10 basis points in Germany and 15 basis points (energy label A+ and higher) or 10 basis points (energy label A) in the Netherlands, for homes with energy labels of A and above. In the Netherlands this was offered to both new and existing customers with those labels. We also launched an Eco mortgage in our Italian market in 2022. This accompanies our Eco Mortgage in Poland, which was recently redesigned in order to adjust towards some of the requirements under the EU Taxonomy (EUT). ING is planning to roll out Eco Mortgages in all countries where we offer mortgages product model in all mortgage markets, and to align our definition of eco-mortgage products with the EUT definition of Green Mortgages.

However, in order to achieve net zero, we need to empower customers in homes wit[illegible] lower energy labels in their eco renovations. ING also continues to tackle this challenge, where we have lending products in place in both Belgium and Poland for customers that are renovating to improve the energy label of their home by for example improving insulation or adding solar panels. In the Netherlands, clients can also extend their mortgage loan to cover additional eco-renovations. Further eco-renovation products are planned for launch in Romania.

Internal training + Client engagement

We continue to build our customer advisory services. In the Netherlands, our mortgage advisors received external training on advising clients on how they can improve the sustainability of their homes. This is then discussed in every mortgage consultation. Furthermore, ING intensifies the use of a tool where people can not only become aware of the improvements they can make, but also can have them realised. ING also participates in the National Insulation Week programme of the Dutch government.

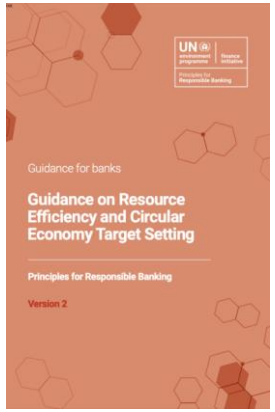
In Germany we launched a renovation calculator with KfW bank in September 2021, where ING customers are offered insights into what sustainability measures they can take in their homes. Traction since then has shown growing relevance for customers, where those taking part have mostly implemented the suggested measures. The calculator will now be rolled out gradually to all our brokers to reach larger customer groups.

While our products have shown the promise of change to come, we note that demand among clients is still not at the level required to drive the transition. We continue to call on governments to implement ambitious and consistent legislation that mandates [illegible] for residential real estate.

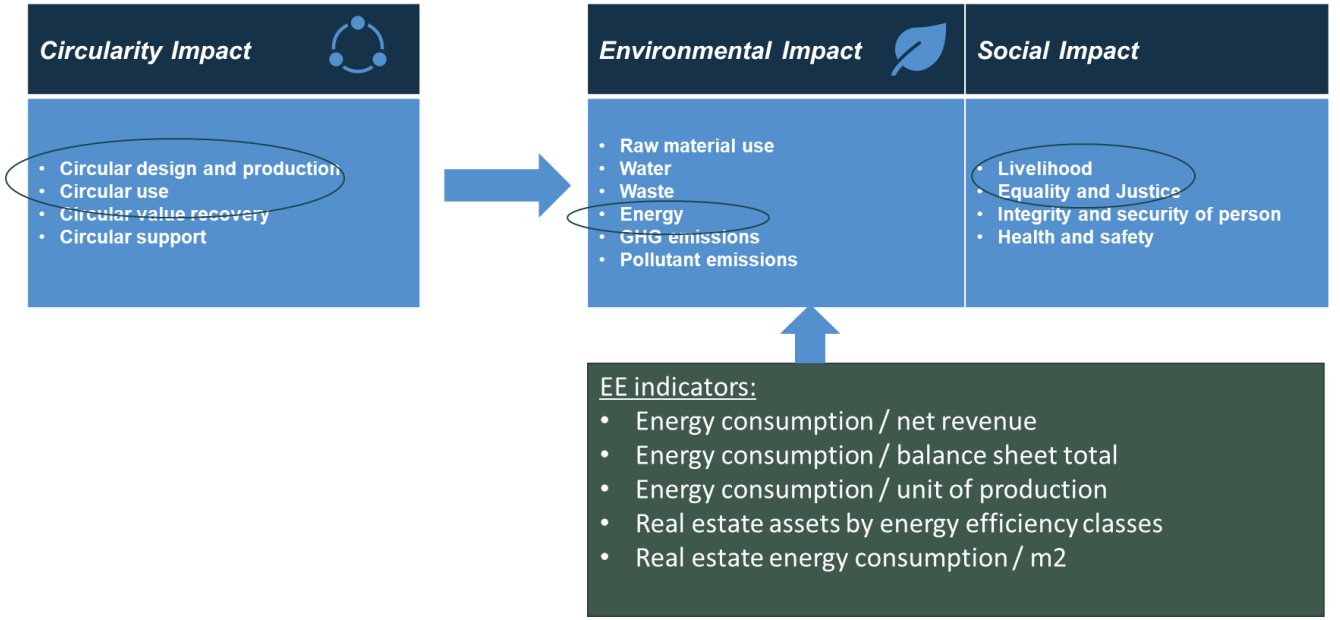
Product development for both new constructions and renovations

Target setting – circular economy/resource efficiency focus

- You should set both long term targets (e.g. 10 years or longer), and interim targets (to be delivered in 1-5 years).
- Impact targets should be set using the impact indicators set in the Guidance (see also previous slide!), adjusted as needed by your bank.
- It is recommended to use EE indicators together with increase in **renewable energy**
- Ideally, your bank should set impact targets on environmental impact (energy efficiency + renewable energy) and circularity impact.
- You are also encouraged to set social impact targets.



Resource efficiency & Circular economy



Target setting – circular economy/resource efficiency focus - Example

	Circularity Impact	*Environmental Impact*	*Social Impact*
Impact targets		Mandatory Mortgage portfolio **EE target** for avarage primary energy consumption 290 kWh/m2 for **2026** and 200 kWh/m2 for **2033** (baseline 2022: 320 kWh/m2). The bank also set a **renewable energy production** target (solar and wind): 1250 MW installed capacity for **2026** and 2700 MW for **2033** (baseline 2022: 600 MW)	

Target setting – circular economy/resource efficiency focus - Example

Impact targets

Circularity Impact	*Environmental Impact*	*Social Impact*
(Optional, but recommended) Increasing the share of recycled materials in the operation of our construction company clients to 25% by 2026 (baseline 2022: avarage share: 7%).	Mandatory Mortgage portfolio **EE target** for avarage primary energy consumption 290 kWh/m2 for **2026** and 200 kWh/m2 for **2033** (baseline 2022: 320 kWh/m2). The bank also set a **renewable energy production** target (solar and wind): 1250 MW installed capacity for **2026** and 2700 MW for **2033** (baseline 2022: 600 MW)	(Optional, but recommended) At least 3000 borrowers affected by energy poverty benefiting from retrofit loans by 2026, bringing down their energy cost/income ratio by 15pp (baseline 2022: avarage ratio is 40%)

Target setting – circular economy/resource efficiency focus - Example

Impact targets

Circularity Impact	*Environmental Impact*	*Social Impact*
(Optional, but recommended) Increasing the share of recycled materials in the operation of our construction company clients to 25% by 2026 (baseline 2022: avarage share: 7%).	Mandatory Mortgage portfolio **EE target** for avarage primary energy consumption 290 kWh/m2 for **2026** and 200 kWh/m2 for **2033** (baseline 2022: 320 kWh/m2). The bank also set a **renewable energy production** target (solar and wind): 1250 MW installed capacity for **2026** and 2700 MW for **2033** (baseline 2022: 600 MW)	(Optional, but recommended) At least 3000 borrowers affected by energy poverty benefiting from retrofit loans by 2026, bringing down their energy cost/income ratio by 15pp (baseline 2022: avarage ratio is 40%)

Practice targets

Portfolio composition and financial flows

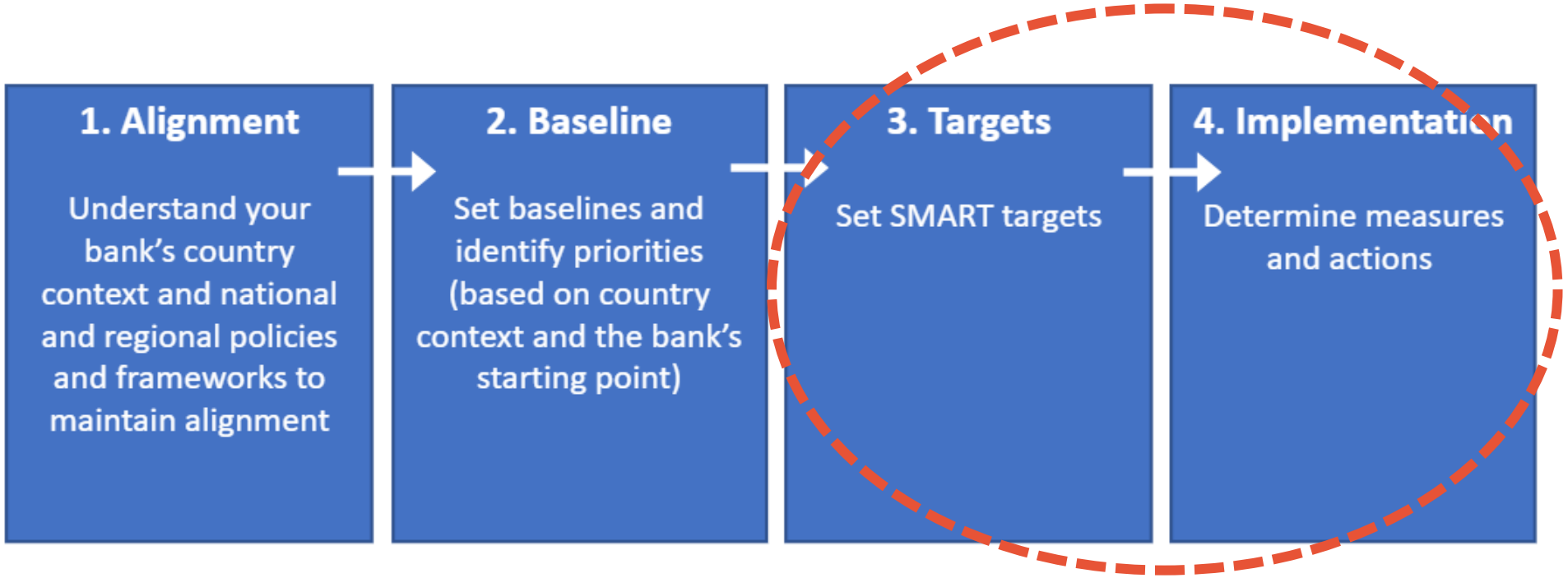
By **2026,** ensure that at least 30% of new mortgages meet the local green taxonomy criteria / certified as green using a

Client engagement

By **2024,** ensure that every year at least 5% of clients are advised about behavioral and renovation opportunities to improve energy efficiency and make their buildings more circular.

Can be similar as in the case of climate targets

The target setting process (climate or resource efficiency)



Implementation measures

- Portfolio composition & financial flows
  - ✓ Targets for new lending (x EUR mln; Y %) or for outstanding stock (reach Z% by target year)
- Client engagement
  - ✓ Engage with key clients to develop data collection templates
  - ✓ Engage with clients to collect data, starting with key clients and progressively broadening to all clients
  - ✓ Engage with clients to raise awareness and share knowledge
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  - ✓ Develop tools for clients
  - ✓ Helping clients' access to government grant programs about EE

Green Mortgages

Green mortgages – risk considerations

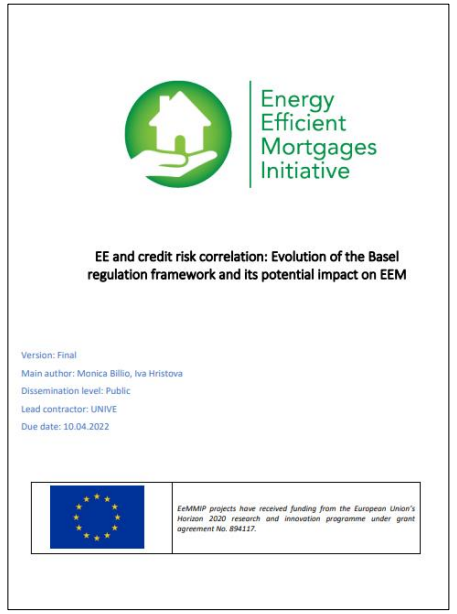
Econometric analysis demonstrates a negative and significant correlation between the buildings' energy efficiency and the probability of mortgage default

Studies evaluating the correlation between EE and probability of default (PD)

Country	Studies	Findings
USA	Kaza, Quercia, Tian (2014)	lower default risk
USA	An and Pivo (2015)	lower default risk
USA	An and Pivo (2020)	lower default risk
USA	Wallace, N., Issler, Mathew, Sun (2018)	lower default risk
USA/EU	Zancanella, Bertoldi, Boza-Kiss (2018)	lower default risk
World	Pelizzon And Riedel (2017)	lower default risk
UK	Guin and Korhonen (2018)	lower default risk
Netherlands	Billio, Costola, Pelizzon, Riedel (2020)	lower default risk
UK	Guin and Korhonen (2020)	lower default risk

Table 5 – Studies evaluating the correlation between EE and property value (PV)

Region	Country	Studies	Findings
US	US	Eichholtz, Kok, and Quigley (2010)	higher property value
		Bloom, Nobe, and Nobe (2011)	higher property value
		Fuerst and McAllister (2011)	higher property value
		Aroul and Hansz (2011)	higher property value
		Dastrup and Zivin (2012)	higher property value
		Kahn and Kok (2014)	higher property value
		Bruegge, Carrion-Flores, Pope (2016)	higher property value
		Qiu, Wang and Wang (2017)	higher property value
		Szumilo and Fuerst (2017)	higher property value
EU	Netherlands	Brounen and Kok (2011)	higher property value
	Netherlands	Chegut, Eichholtz, and Holtermans (2016)	higher property value
	Netherlands	DNB (2019)	higher property value
	Sweden (Stockholm)	Högberg (2013)	higher property value
	Sweden	Wahlström (2016)	higher property value
	Germany	Cajias and Piazolo (2013)	higher property value
	Germany	Surmann, Brunauer, Bienert (2015)	No evidence, but important restrictiveness of the data sample
	UK	Fuerst, McAllister, Nanda, Wyatt (2015)	higher property value
	UK	UK Green Building Council, LENDERS project, Core report (2017)	higher property value
	Spain	De Ayala, Galarraga, and Spadaro (2016)	higher property value
	Italy	Mangialardo, Micelli, Saccani (2018)	higher property value
	Austria, Belgium, France, Ireland and the UK	Mudgal et. alii (DG Energy) (2013)	higher property value
	Austria, France, Germany, Italy, Norway, Poland, Romania and Spain	Pascuas, Paoletti and Lollini (2017)	EPCs considered unreliable or difficult to understand by real estate agents
	EU	Pascuas et alii (ZEBRA 2020) (2017)	higher property value
	EU	Brocklehurst (2017)	higher property value
	EU	Heijmans and Loncour (2019)	higher property value
ROW and world	Singapore	Deng and Wu (2014)	higher property value
	Japan	Yoshida and Sugiura (2015)	higher property value
	Japan	Yoshida, Onishi, and Shimizu (2016)	no effect
	China	Zhang, Liu, Wu and Zhang (2020)	higher property value
	World	Ankamah-Yeboah and Rehdanz (2014)	higher property value
	World	Zancanella, Bertoldi, Boza-Kiss (2018)	higher property value


Energy Efficient Mortgages Initiative

EE and credit risk correlation: Evolution of the Basel regulation framework and its potential impact on EEM

Version: Final
Main author: Monica Billio, Iva Hristova
Dissemination level: Public
Lead contractor: UNIVE
Due date: 10.04.2022

EeMMIP projects have received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 894117.

Green mortgage example

Sustainability — Get financing for the sustainable home of your dreams

Mobility — Apply your mortgage loan with our mobile app DBS HOME360 anytime, anywhere

Availability — Get an instant 1-minute mortgage approval

Reward — Earn an extra cash rebate for going green

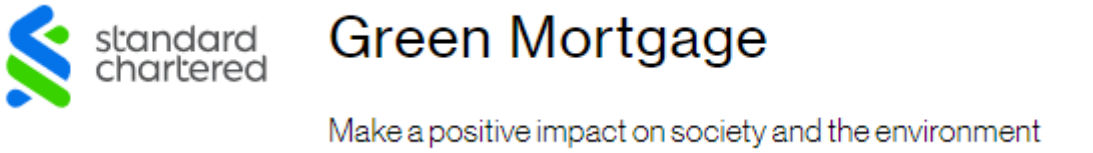
Treasures — With DBS Treasures, you can benefit from wealth management advice and solutions

Eligible are mortgage loan customers for a designated residential property that has received the BEAM Plus Platinum or Gold Rating issued by the Hong Kong Green Building Council.

Under the Promotion, an Eligible Customer will enjoy an extra cash rebate ("Extra Cash Rebate") as follows: a. DBS Treasures customer will enjoy an extra 0.1% cash rebate of the total Mortgage Loan amount. b. DBS Account customer will enjoy an extra 0.05% cash rebate of the total Mortgage Loan amount.

Source: Green Mortgage | DBS Hong Kong

Green mortgage example



How does the Green Mortgage Promotion work?

You will enjoy a pricing discount on your mortgage loan should you meet the following conditions:

- Your mortgage property must have a valid Building and Construction Authority (BCA) Green Mark rating of Green Mark Gold, Green Mark GoldPlus, Green Mark Platinum, or Green Mark Super Low Energy (SLE), which includes Green Mark GoldPlus SLE and Green Mark Platinum SLE, which is within 3 years from the certification year
- You must apply for a new mortgage loan or reprice your existing loan with the bank
- You must take up a floating rate package, which is a SORA-Pegged package.

Refer to the Standard Chartered Green Mortgage Terms and Conditions which apply[1].

Source: Green Mortgage - Standard Chartered Singapore (sc.com)

Green mortgage example

Energy efficiency loan

Improve your home's energy certification, and make sustainable savings on your energy bill.

> **Start paying off the loan when work has been completed.**
>
> **Repayment terms of up to 7 years.**

Santander

Purpose of the Energy Efficiency Loan

Self-consumption

- Installation of solar panels.
- Storage batteries.

Heating, cooling and hot water

- **Installation of heating, cooling and domestic hot water systems with** energy ratings A+, A++, A+++ (old labelling between A+++ and D) and A, B or C (new labelling between A and G).
- **Condensing boilers:** installation of heating and hot water systems using condensing boilers.
- **Heat pumps:** installation of heat pump heating and cooling system by means of splits or ducts.
- **Aerothermal:** installation of heating, cooling and domestic hot water system using aerothermal system.
- **Geothermal:** geothermal installation, systems that convert heat from the ground into thermal energy (heating, cooling and domestic hot water).

Control and automation

- Intelligent control devices for water, electricity, ventilation and air-conditioning for integrated efficient energy management.

Façade and building envelope insulation

- Replacement of exterior carpentry: Installation of aluminium or PVC windows with thermal break, low-emission double glazing, complying with the limits established in the Technical Building Code (CTE) for Energy Saving.
- External thermal insulation system (SATE).
- Ventilated façade.

Recommended resource

Sustainable Building Finance: Supporting green mortgage development in Sri Lanka

A report to inform and support Sri Lanka's banking sector on possible approaches to green finance product development, including how modest adjustments to lending practices can result in more credit flows to green buildings. The several chapters of the finance guide provide information on:

- general green building design principles and technologies;
- the state of green construction practices and beliefs in Sri Lanka;
- the barriers and benefits of green buildings;
- the need for and information gaps in Sri Lanka;
- strategies for integrating green finance practices; and
- recommendations for new green building product

[Sustainable Building Finance: Supporting green mortgage development in Sri Lanka – United Nations Environment – Finance Initiative (unepfi.org)]

Implementation measures

- Portfolio composition & financial flows
  - ✓ Targets for new lending (x EUR mln; Y %) or for outstanding stock (reach Z% by target year)
- Client engagement
  - ✓ Engage with key clients to develop data collection templates
  - ✓ Engage with clients to collect data, starting with key clients and progressively broadening to all clients
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Public examples from banks: KBC in Europe

Real estate

Mortgages, residential and non-residential commercial real estate

Context

Mixed forces are influencing renovation trends in the real estate sector. For many years, the EU has had a regulatory framework in place, imposing high energy-efficiency standards on new buildings. However, with its 'Fit for 55' package, the EU is now also laying down rules targeting the radical renovation of existing buildings and the replacement of polluting energy technologies. All EU Member States will be required to facilitate and encourage this endeavour through amongst others gradual financial incentives, when and where possible. At the same time, high energy prices are acting as additional impetus to invest in renewable energy technologies and deep renovation, whereas, by contrast, high commodity prices may act as a brake given the subsequent rapidly increasing construction costs they trigger.

KBC portfolio

Loan exposure

Real estate financing accounts for around 47% of KBC's total outstanding loan portfolio. Retail mortgage loans are a core financial product in all our core countries, accounting for financing of 77.6 billion euros at year-end 2021. Commercial real estate financing[6] for developers and investors amounted to 11.5 billion euros in the same year.

Financed emissions

According to the 2021 Sustainability Report financed emissions calculations, KBC's real estate portfolio accounts for around 12% of the total GHG emissions financed by KBC, of which 3% relates to mortgage loans and 9% to commercial real estate. In total, this amounts to around 6.9 Megatonnes CO_2e (Mt CO_2e) in 2021.

[6] Commercial real estate finance relates to the development of or investment in real estate assets (or a portfolio of such assets) by property developers or investors, which are subsequently sold or let to third parties.

Targets

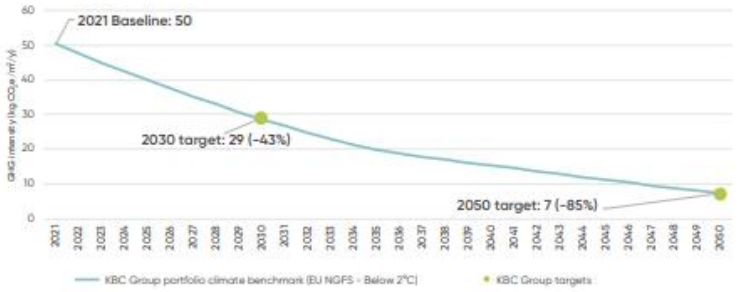
Residential property

For the residential property sector (financed both privately and commercially), a target was set for the relative emission intensity of CO_2e emitted per financed m^2 per year. The target scope focuses on emissions from building operations and therefore includes real estate ownership and investments but excludes pure commercial real estate development as this financing exclusively relates to the construction phase.

Residential real estate	Baseline 2021 (kg $CO_2e/m^2/y$)	2030 target (kg $CO_2e/m^2/y$)	2050 target (kg $CO_2e/m^2/y$)
Aggregated KBC Group target	50	29	7
Percentage reduction		-43%	-85%

Residential real estate GHG intensity targets (kg $CO_2e/m^2/y$)

The graph with baseline 2021 shows the 2030 and 2050 KBC targets (dots) for this loan portfolio and the main climate benchmark (line) that has informed our target setting.



See further details: KBC Climate Report 2022

Public examples from banks: KBC in Europe

All real estate

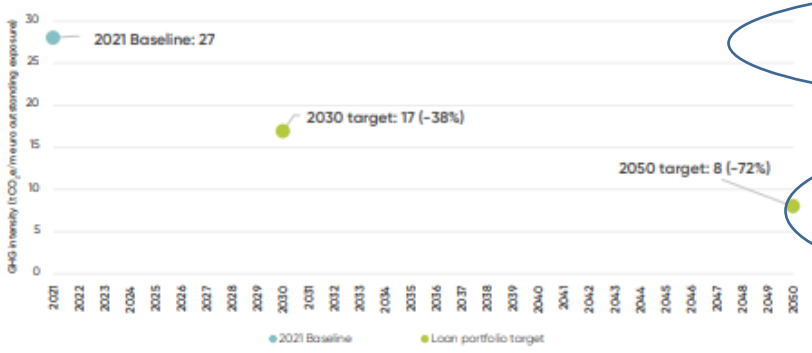
For the commercial real estate sector (including business premises, schools and shops), there is currently a lack of data to set physical GHG emission intensity targets. Therefore, a financial emission intensity target was set for the real estate sector as a whole, in addition to the targets for residential real estate. The target scope focuses on emissions from building operations and is therefore limited to real estate ownership and investments. Pure commercial real estate development is excluded as such financing exclusively relates to the construction phase. This target is expressed in financed tonnes of CO_2e per one million euros.

Real estate whole sector	Baseline 2021 (t CO_2e/m euro)	2030 target (t CO_2e/m euro)	2050 target (t CO_2e/m euro)
Aggregated KBC Group target	27	17	8
Percentage reduction		-38%	-72%

The financial targets have not been adjusted for inflation.

Real estate GHG intensity targets (t CO_2e/m euro outstanding exposure)

Scenario benchmarks are not shown in these charts, as this sector consists of a combination of several sub-sectors for some of which the necessary data are lacking and/or for which no uniform scenario benchmarks exist.



Actions

To achieve these targets, KBC wi[ll] seek to encourage its clients to improve the energy performa[nce] of their properties, and also focus on real estate with a (more) favourable EPC (Energy Performance Certificate) rating. We will do so by sharing information on sustainable construction and renovation, advising on subsidies, working with partners on energy efficiency exercises and the supervision of constructions or renovations. We also aim to gradually offer the best available interest rates on loans for buildings with a favourable EPC rating and/or incentivise this aspect through energetic renovation upon purchase, in many cases backed by government support.

Note: These targets are set and expres[sed] against a background in which not all of KBC's [home] countries already have government schemes and inc[entive] packages in place to substantially boost the much nee[ded] building energy efficiency improvements.

Client engagement

Products with pricing linked also to energy efficiency

Implementation measures

- Portfolio composition & financial flows
  - ✓ Targets for new lending (x EUR mln; Y %) or for outstanding stock (reach Z% by target year)
- Client engagement
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Example:
KBC mobile app + renovation program for employees

KBC introduces new features in KBC Mobile to help customers save on energy, time and money, and launches pilot project to guide its employees on the energy transition journey.

Tuesday, November 29, 2022 – Driven by alarmingly high energy prices, many households are turning to smart, energy-efficient solutions to help them slash costs and keep a tighter rein on their energy bills.

KBC has launched a pilot project for 250 of its employees who will be offered the opportunity – in conjunction with external professional partners – to have solar panels and/or a home battery installed in their home with minimum effort required on their part. The installation includes an energy management system to help them make maximum use of their self-generated solar power and optimise their energy consumption. Based on the insights gained from this pilot project, KBC intends to develop solutions for all its customers in the near future.

KBC already offers its customers a number of new tools free of charge in the KBC Mobile app (such as an 'Energy Barometer' and 'Energy insights') to help them become more energy-efficient and save money.

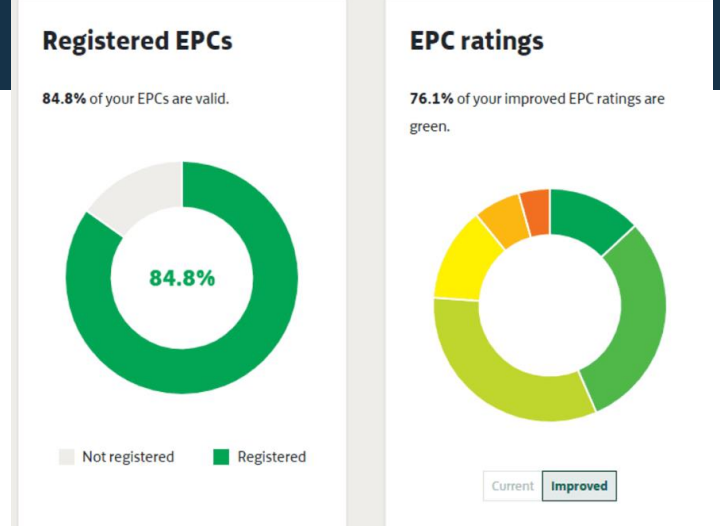
Customers can also simply ask our personal digital assistant Kate a question about energy and get directed to the right tool. One of Kate's future updates will include the ability to proactively provide energy-saving tips to interested customers.

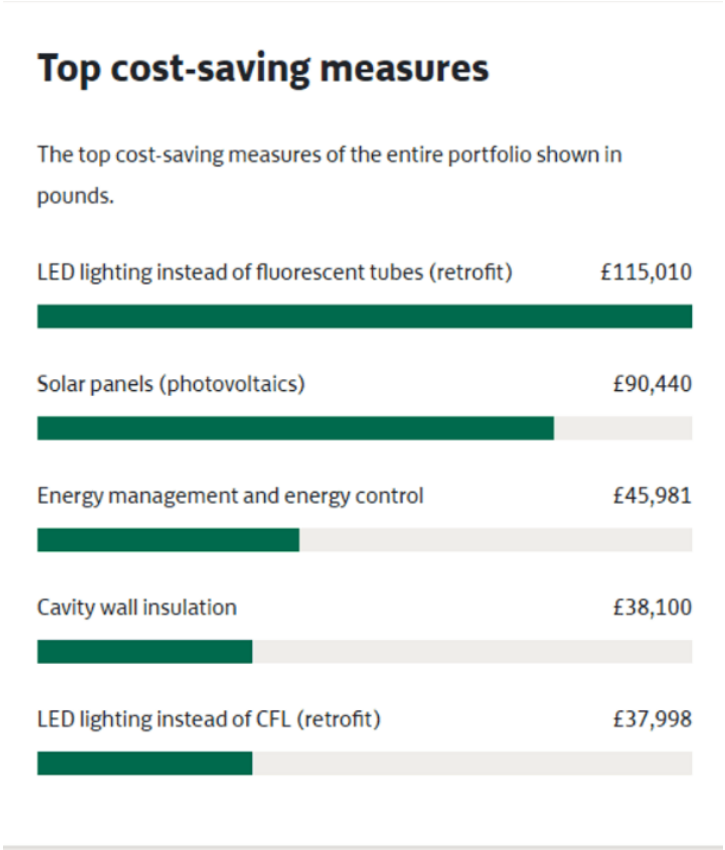
The 'energy tools' in KBC Mobile are available under 'Home and energy' in the app's additional services.

[See details: KBC introduces new features in KBC Mobile App]

Example: Lloyd's Green Buildings Tool

- The Green Buildings Tool helps clients (who own or lease properties) understand their emission reduction opportunities and build a sustainability strategy.
- The tool has a simple interface allowing customers to assess the business cases for up to 58 cost-saving measures to improve the green credentials of a property or portfolio of properties.
- The impact of all measures can be viewed in terms of their potential impact on EPC ratings, estimated payback period and annual savings, investment required and the reduction in carbon emissions.
- The tool is free to use and designed for clients of all sizes, from SMEs with single premises to the largest companies in the UK.
- The tool is also designed to be updated after measures have been implemented so that clients can review their progress.
- Once clients have determined the optimal investments to reduce the emissions of their properties, they can apply for discounted financing





See details at www.lloydsbank.com/business/sustainability/green-buildings-tool.html

Implementation measures

- Internal measures
  - ✓ Awareness raising & trainings
  - ✓ Incentivise (e.g. bonuses tied to energy efficiency mortgage volume target etc.)
  - ✓ Internal policies and processes
  - ✓ Bank or staff building energy efficiency improvements to enhance credibility and build internal awareness
- Partnering and engaging in industry initiatives
- Partnering with Development Financial Institutions
- Policy advocacy to support the transition to a low-carbon and circular economy
  - ✓ Cooperationg with governments to design grant+loan subsidy schemes
  - ✓ Access to EPC data
- Public awareness raising and research

The Energy Efficient Mortgages Initiative at a glance

1
Creating a 'virtuous circle'
EEM definition, property valuation guidelines & building energy performance parameters

2
Making the business case
Dedicated to empirical evidence gathering

3
Building confidence through transparency
Launch of the EEM Label

4
Roll out across EU markets
National hubs & consumer research

5
Keeping pace with EU legislation
EEMI as a bridge

See www.energyefficientmortgages.eu

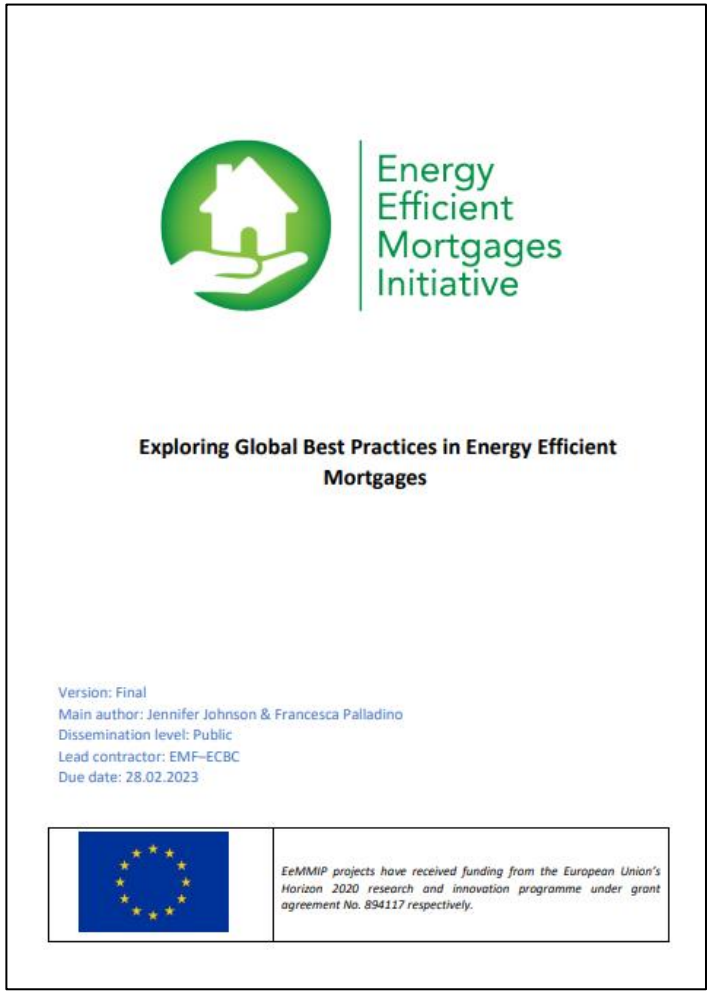
Recommended resource

Case study analysis in the following global jurisdictions: EU, Kenya, **Malaysia and Japan**.

(1) the key pillars for accelerated market development in relation to energy efficient mortgages as identified under the Energy Efficient Mortgages Initiative (EEMI),

(2) the regulatory framework for Sustainable Finance and building energy performance in each of the jurisdictions and

(3) the different public support actions in place in each of the jurisdictions



[Exploring-Global-Best-Practices-in-Energy-Efficient-Mortgages.pdf (energyefficientmortgages.eu)]

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  - ✓ Access to EPC data
- Public awareness raising and research

Example: NatWest's Energy efficient housing tracker

Less planning sustainability improvements

The proportion of homeowners planning to make improvements to the environmental sustainability of their properties in the next 12 months and over the next ten years has decreased for the first time since Q2 2021.

Cost of living impacting plans for home improvements

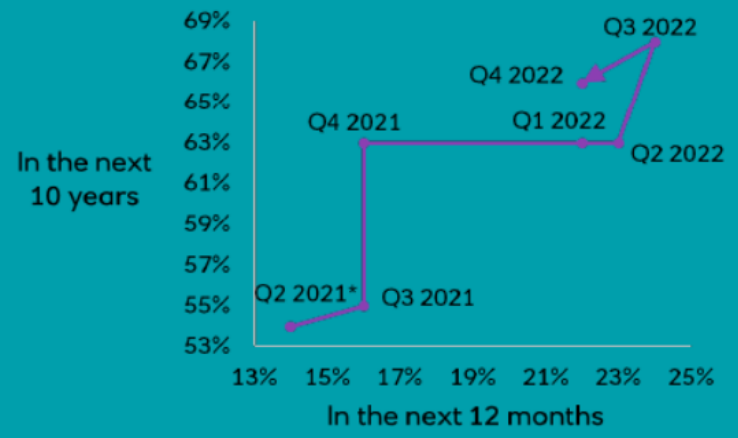
Over a quarter (26%) of homeowners said the rise in the cost of living had made them less likely to implement energy efficiency measures in the next 12 months, up from 23% in Q3.

Smart meters are still the most popular improvement.

A smart energy meter was the item most likely to be installed over the next year, although just over half (54%) of homeowners reported having a smart energy meter already installed. Rental properties lag behind with 48% of households saying they already had one installed.

Future plans for solar panels and electric car chargers.

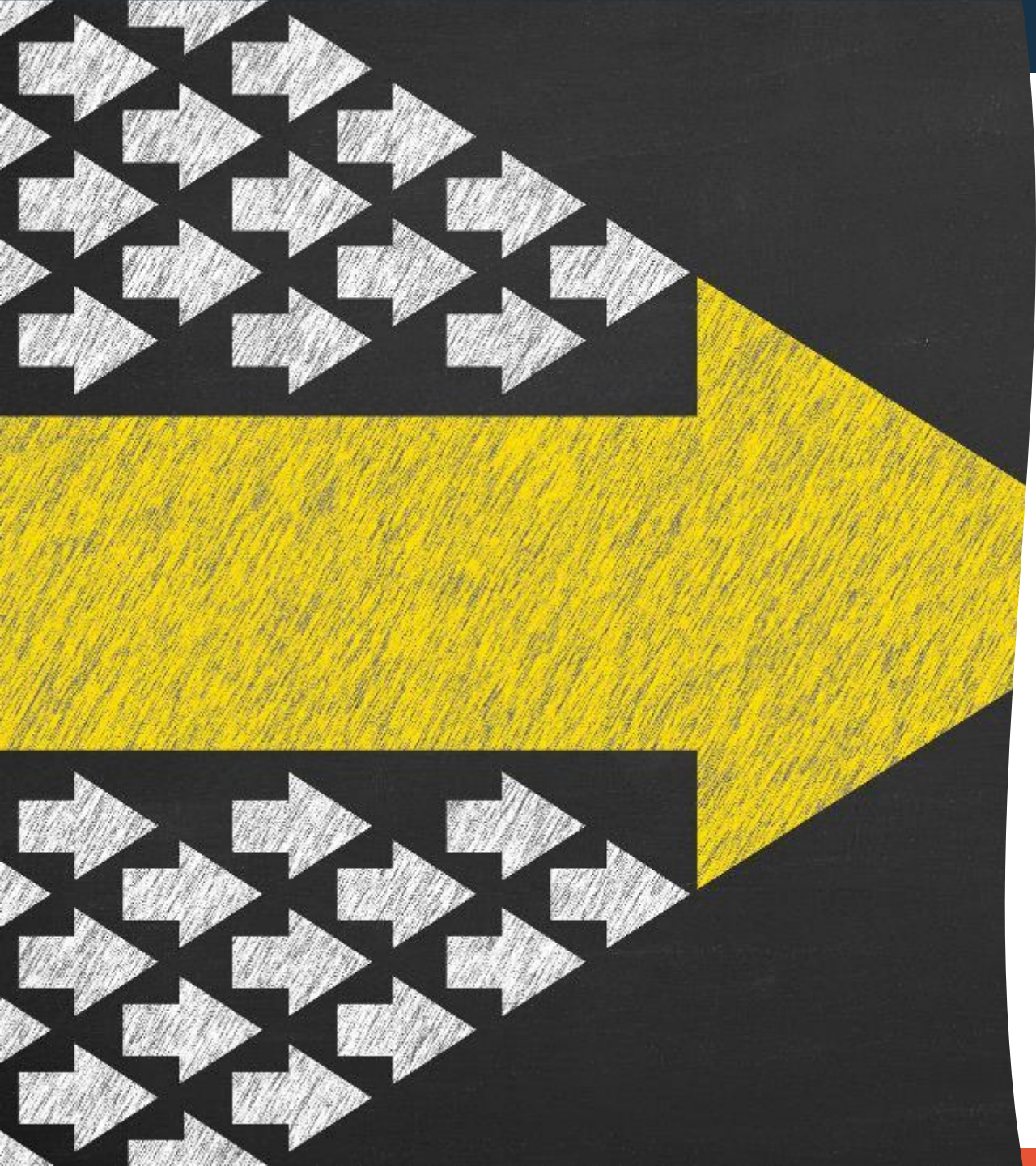
Medium to longer term, consumers desire electric car charging points and solar panels to improve energy efficiency (stated by 39% and 38% of homeowners respectively).



Green home improvements index

Data collected in the three months to December showed that, for the first time since the Green Home Improvements Index's inception in Q2 2021, there was a **decrease in the proportion of homeowners planning to make improvements** to the environmental sustainability of their properties, both in terms of the next 12 months (from 24% in Q3 to 22%) and over the next ten years (from 68% in Q3 to 66%). Nevertheless, **these proportions were still higher than those recorded a year earlier** (16% and 63% respectively).

[See details: Greener Homes Attitude Tracker]



Opportunity to receive individual technical assistance from UNEP FI

- We hope the workshops were useful and provided you good ideas.
- We encourage you to start taking concrete steps to implement what was covered during the workshop.
- If you have questions / want to set energy efficiency targets and/or develop your energy efficiency financing, feel free to contact us to see how we can further help you bilaterally.
- Contact: gabor.gyura@un.org

Evaluation - UNEP FI Energy Efficency capacity building workshops Asia Pacific

Please evaluate the workshops and give us ideas how to develop further the training

- Please complete our quick survey (takes only 2-3 minutes) which you can access on the link below or with the QR code
- https://forms.office.com/e/251Y5SEuL8

Thank you for your attention!

Slides + evaluation form will be shortly shared in email.

Contact: gabor.gyura@un.org