International Energy Agency

IEA's Regional Training on Energy Efficiency Policy Packages for Sub Saharan Africa

Day 3: Buildings

Regional Training on Energy Efficiency Policy Packages for Sub Saharan Africa

21-25 November 2022

Day 3 – Buildings

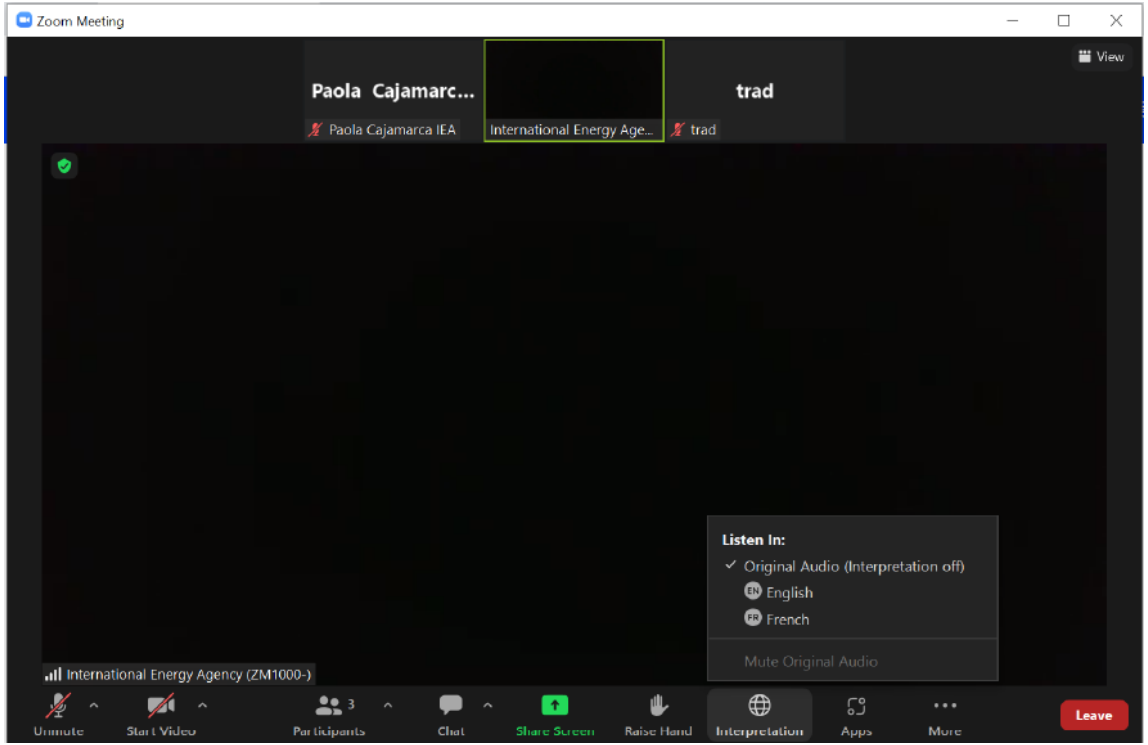
AFRICAN DEVELOPMENT BANK GROUP
GROUPE DE LA BANQUE AFRICAINE DE DÉVELOPPEMENT

Ksenia Petrichenko

Energy Policy Analyst,
International Energy Agency (IEA)

Housekeeping rules

- Please keep in mind that this event is both in French and English and that translation is available.
- Please keep your mics **on mute**, and leave your camera on if you are able to.
- Do not hesitate to ask questions through the chat and we will try to address them if time allows.In case of technical issues please contact us through the chat or send us an email at: energy.efficiency@iea.org
- We will be engaging through menti polls and encourage everyone to participate.



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Melanie Slade

Senior Programme Manager,
Energy Efficiency Division IEA

Day 3: Buildings. Speakers

Ksenia Petrichenko
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Energy Efficiency in Emerging Economies (E4)
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Elizabeth Wangeci Chege
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SEforALL & Chair of Africa Regional Network of WorldGBC

Teslim Yusuf & Nqobile Ngcobo
Acting General Manger& Data Analyst
South African National Energy Development Institute (SANEDI)

Programme for today

Training Day 3:

- Opening presentation 
- International best-practice: Australia 
- Regional overview: Sub-Saharan Africa 
- Country focus: South Africa 

PANEL DISCUSSION

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MENTI #1 & 2

1. In one or two words describe what is the first thing that comes to your mind when you think about energy efficiency in buildings?

2. In one or two words describe one topic you are hoping to learn about today

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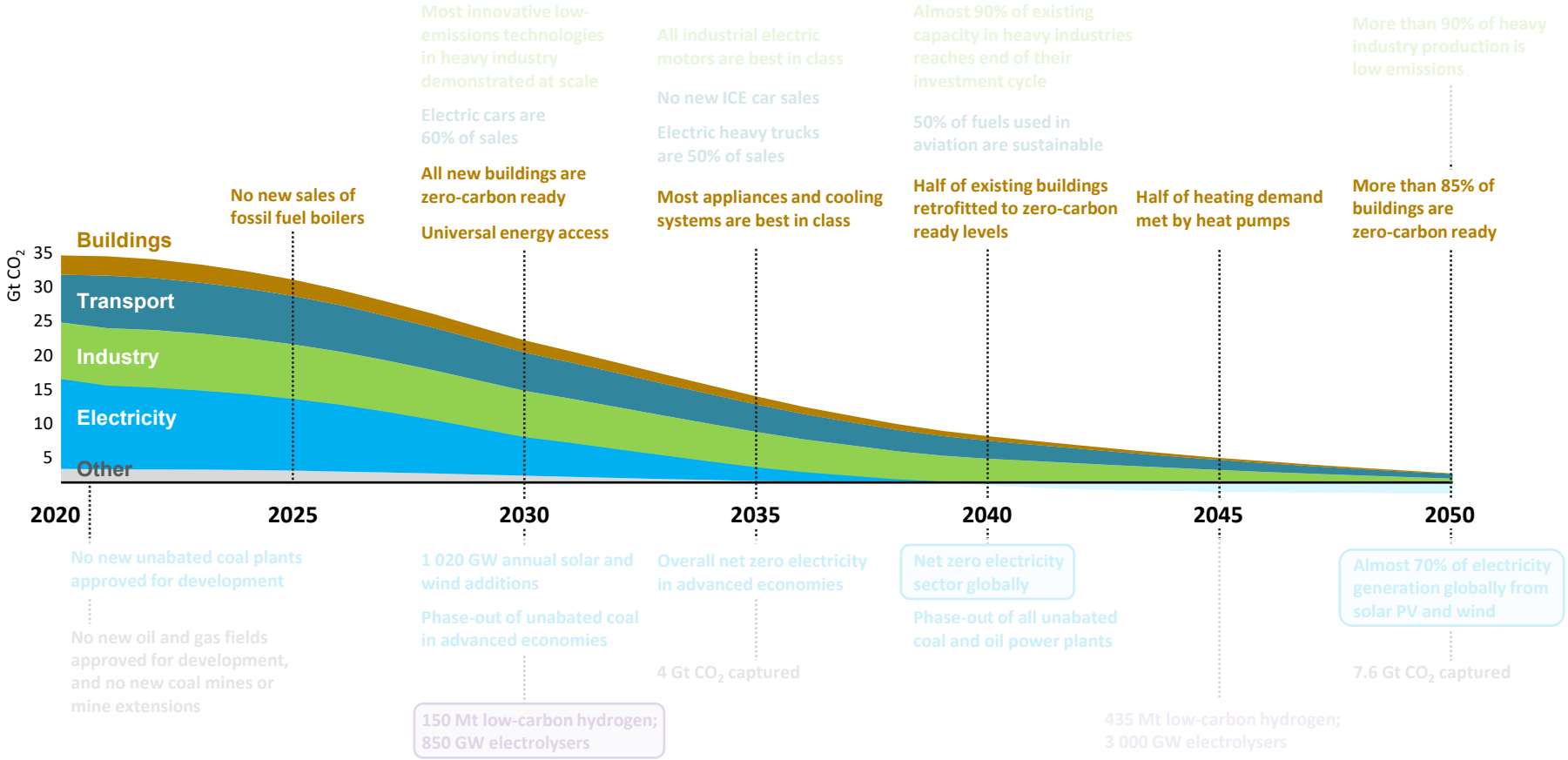
Introduction to Buildings Energy Efficiency Policy Package in Sub Saharan Africa

Dr Ksenia Petrichenko

23 November 2022

International Energy Agency

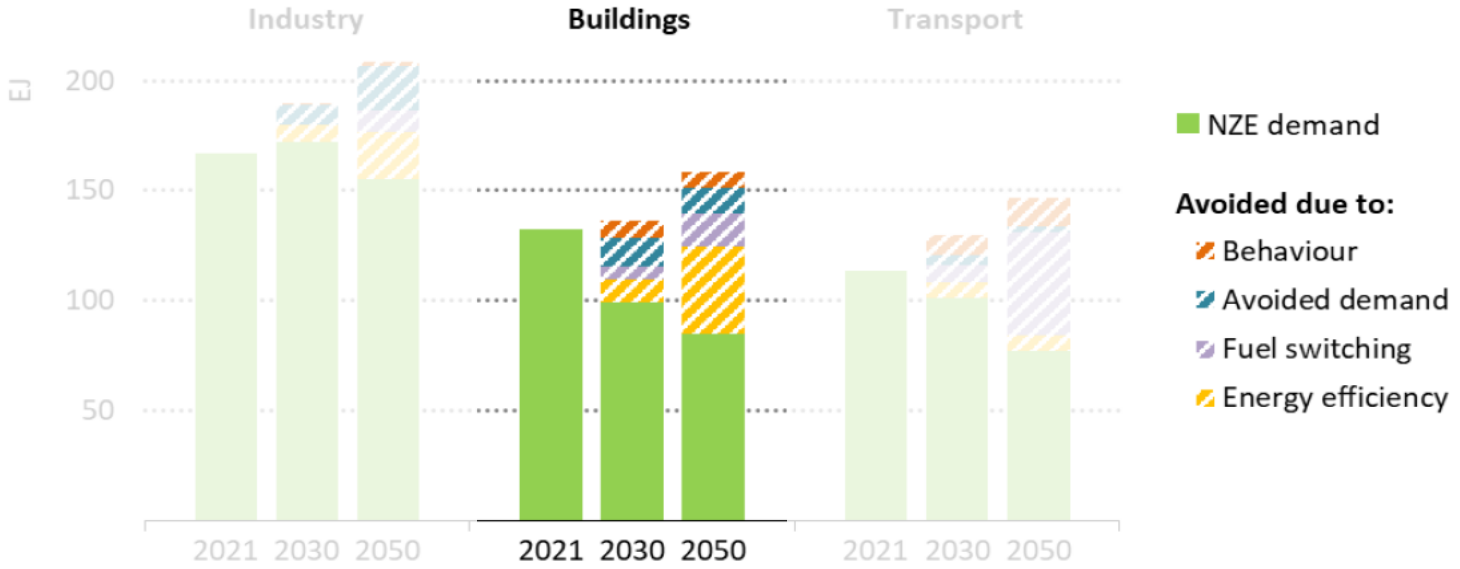
Emissions in buildings can be reduced by more than 95% by 2050



*accounting for emissions from direct fossil fuel combustion as well as from upstream electricity and heat generation.
IEA (2020). 'Is cooling the future of heating'

Net Zero by 2050
https://www.iea.org/reports/net-zero-by-2050

Total final consumption in the STEPS and demand avoided by measure in the NZE Scenario



Energy efficiency in buildings can help avoid around one-quarter of the excess sector's energy demand in the STEPS in 2030 and more than a half of this in 2050

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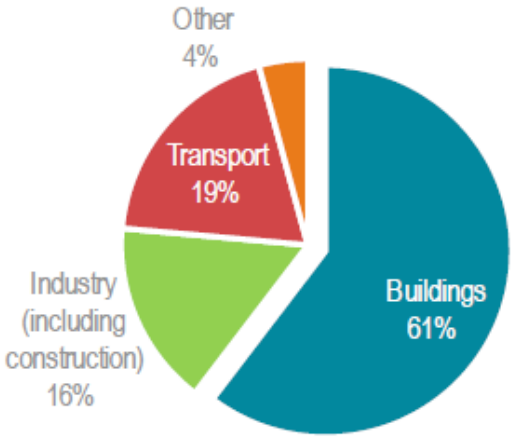
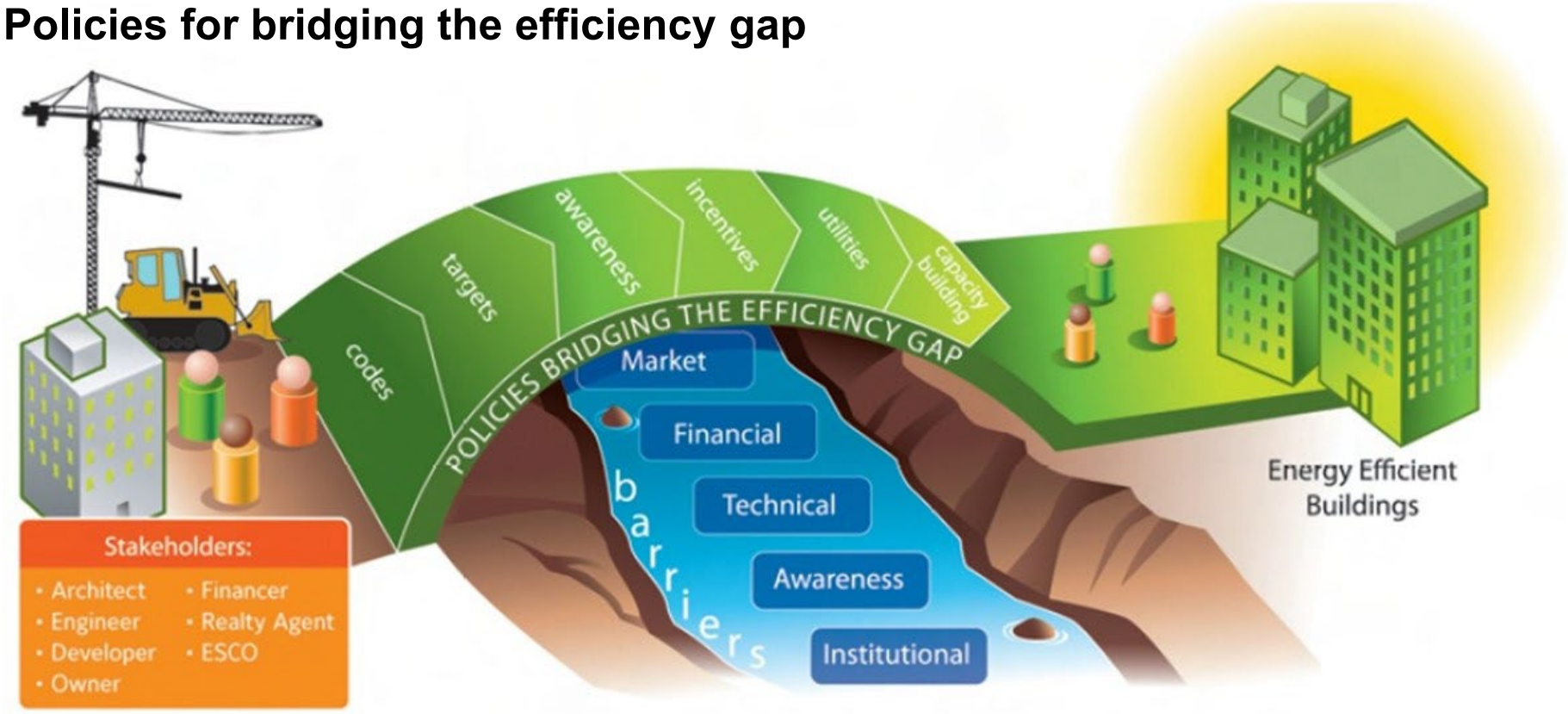
Buildings' share of total **final energy consumption** Africa, 2018



"What if we don't change at all ...
and something magical just happens?"

Policies for bridging the efficiency gap



Source: Institute for Building Efficiency, WRI

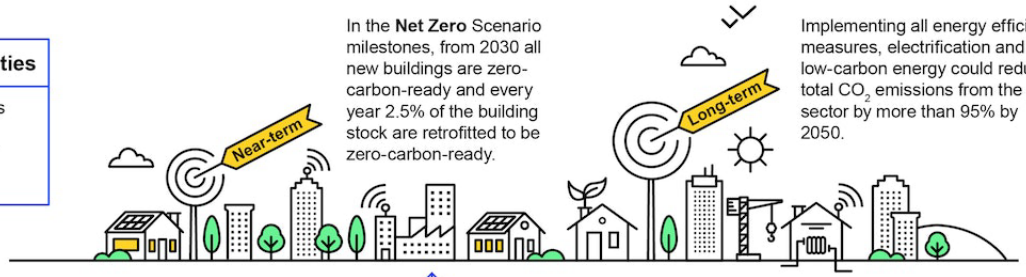
Buildings Energy Efficiency Policy Package

Immediate opportunities

Replacing fossil fuel boilers with high efficiency heat pumps can reduce energy use by up to 75%.

In the **Net Zero** Scenario milestones, from 2030 all new buildings are zero-carbon-ready and every year 2.5% of the building stock are retrofitted to be zero-carbon-ready.

Implementing all energy efficient measures, electrification and low-carbon energy could reduce total CO_2 emissions from the sector by more than 95% by 2050.



REGULATION

- **Targets for energy efficiency** in buildings, including for renovation rates, fosters market growth and facilitates long-term investment decisions.
- **Building energy codes** for new buildings and retrofits are essential to accelerate the transition to zero-carbon-ready buildings.
- **Minimum energy efficiency requirements** for renovation help guarantee performance and accelerate the process of renovation through instruments such as the standardisation of services.
- **Regulations** ensure that buildings can become "demand response ready" to enable future flexibility.

INFORMATION

- **Information on building performance** allows consumers to identify the most efficient options when buying or renovating buildings. Examples include energy performance certificates, disclosure programmes, one-stop shops for upgrades and renovation passports.
- **Smart interactive technologies** can show real-time energy performance and help adjust occupants' behaviour.
- **Training and education programmes** for building sector workers are important to ensure a suitably skilled work force.
- **Public awareness campaigns** designed to include behavioural insights encourage low-cost actions, such as thermostat adjustment.

INCENTIVES

- **Financial incentives** such as green mortgages, energy performance-based preferential loans and tax rebates and grants can motivate consumers and developers to increase investment in energy efficient solutions.
- **Expedited administrative procedures**, including accelerated permitting, targeted at high performing new build or retrofit projects, encourage the implementation of energy efficient measures.
- **Award and recognition programmes** encourage the development of highly energy efficient buildings.

Policy package for market transformation

Enabling Policies

Regulation:
- **Codes/standards**
- **Disclosure**

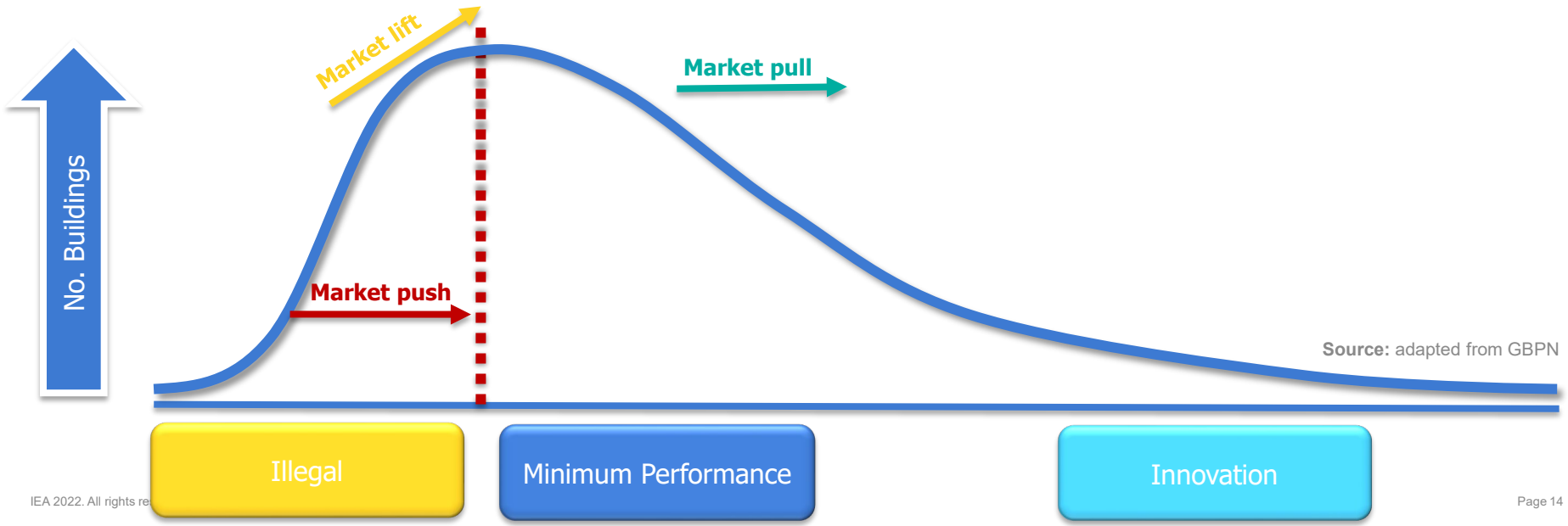
Sticks

Information:
- **Capacity building**
- **Awareness/labels**

Tambourines

Incentives:
- **Rebates/loans**
- **Non-financial incentives**

Carrots



Source: adapted from GBPN

Target setting: definition and characteristics

Targets: the desired level of performance you want to see, as measured by indicators, that represents success at achieving your outcome

- **Specific:** what you plan to achieve is clear
- **Measurable:** there is a way to determine whether or not you have achieved it
- **Attainable**
- **Relevant**
- **Timeframe** is specified

For more information on target setting see
IEA Buildings MOOC

Mandatory regulation

- **Codes:** regulation for energy efficiency and sustainability for a whole building.
- **Standards:** regulation for individual products or services, often referenced within a building code for individual building components.
- **Mandatory disclosure:** regulation that requires organisations or individuals to report or disclose how their building is performing, such as disclosing the energy performance certificate or energy usage.

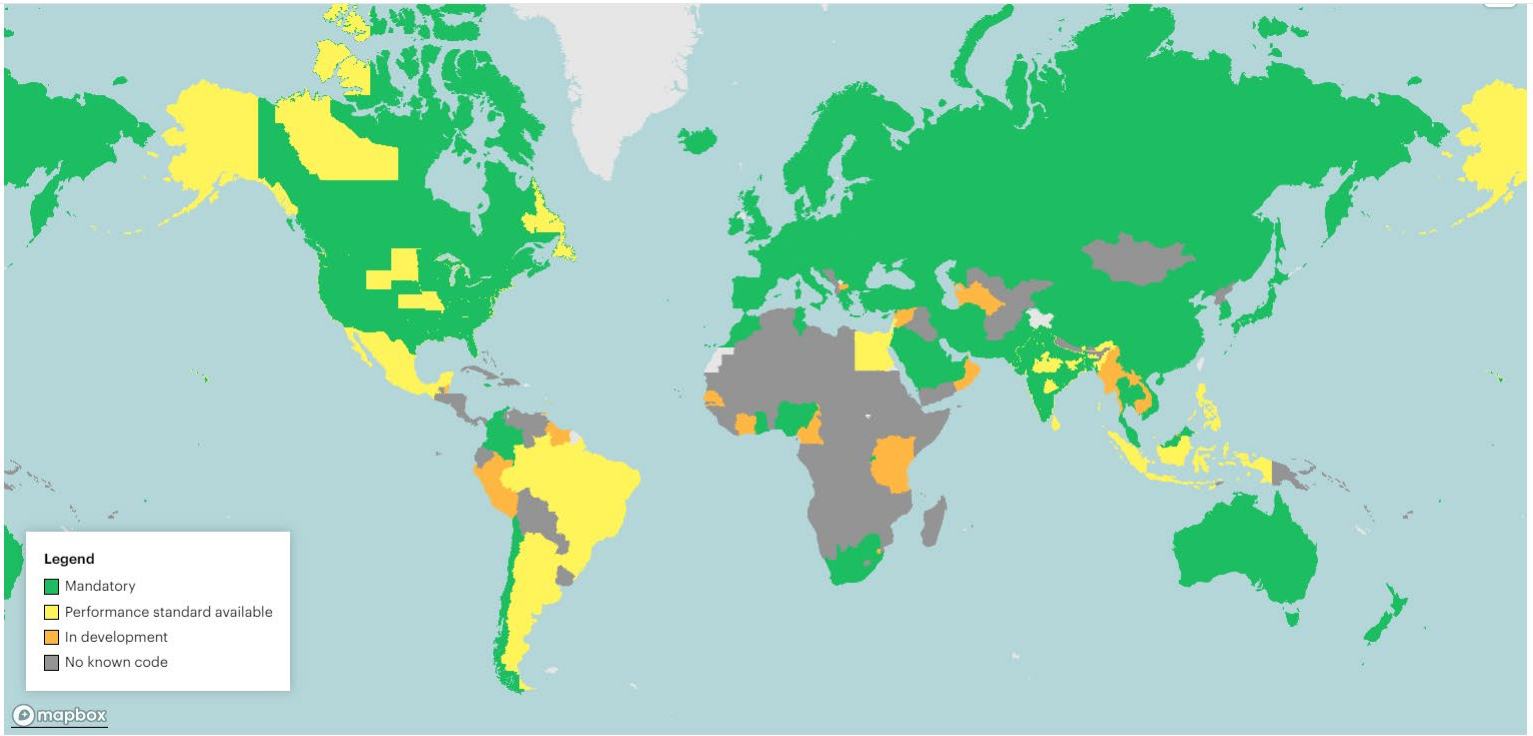
Obligations

- **Utility obligations:** rules for regulated utilities that enable increasing investment in energy efficiency and passing the costs system-wide in the energy prices
- **Public procurement:** rules for government organisations to purchase products and services that meet certain criteria, such as energy performance or certification.

For examples on regulations in different countries see IEA Buildings MOOC

Energy codes for new buildings around the world, 2021-2022

- Nearly two-thirds of countries do not have mandatory building energy codes in place today



Sources: Global Status Report on Buildings and Construction 2021 and IEA Energy Efficiency 2021.

Source: IEA Tracking Report 2022. Building Envelopes

Data and information

- **Energy performance certificates:** documentation of basic building information plus energy performance
- **Building passport:** documentation of most buildings data and information, including basic information, construction materials, systems, renovations and energy use.

Awareness

- **Labels and branding:** easily identifiable visual that enables consumers to recognise product or service as efficient.

Capacity building

- **Education and training:** learning efforts to increase the knowledge of building sector professionals or general population.
- **Labour certification:** searchable documentation of professional expertise in delivering energy efficiency.

For examples on information instruments in different countries see IEA Buildings MOOC

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

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	≤ 1.00 Ref EP*	
E	≤ 1,41 Ref	
F	≤ 2,00 Ref	
G	2,00 Ref <	

REFERENCE*

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 %	

RE* Evaluated building — 0.5 0.75 1 1.25 1.5 1.75 2 2.25 2.5 2.75 3 — 33 42

Final energy 1.25 Ref EP

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:	JBC

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

Non-financial incentives

- **Time:** expedited approval for permits
- **Scope:** increased floor area, building height or number of floors

Financial incentives

- **Finance:** enabling private investment, including through loan guarantees, preferential loan terms or increased access to funds
- **Direct credit:** improving the cost of energy efficiency to consumers through grants, rebates, tax credits and discounts

For examples on incentives in different countries see IEA Buildings MOOC

Example of financial incentives

Incentives in France:

- VAT reductions scheme (5.5%) for energy-saving works and renewable heating systems in new/existing dwellings
- Interest-free loans for energy renovation works
- Grant to finance thermal insulation, heating, ventilation or energy auditing work in existing dwellings. It includes performance incentives based on an energy audit report

Grants in Scotland:

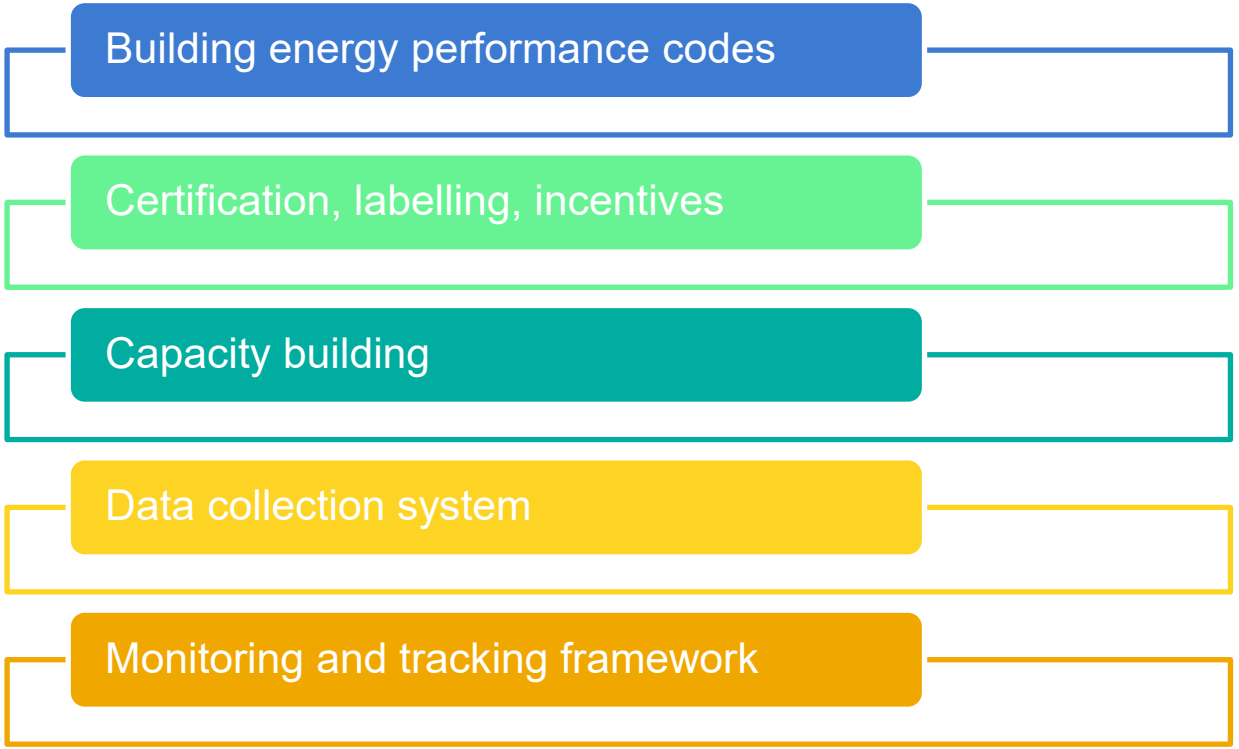
- "Warmer homes Scotland" – grant to cover up to 100% of the costs of upgrades to reduce home heating costs for homeowners and private tenants. The upgrades are determined through a property assessment by accredited evaluators during a home visit. They often include a variety of insulating, draught-proofing, and heating.

Energy Efficient Mortgages

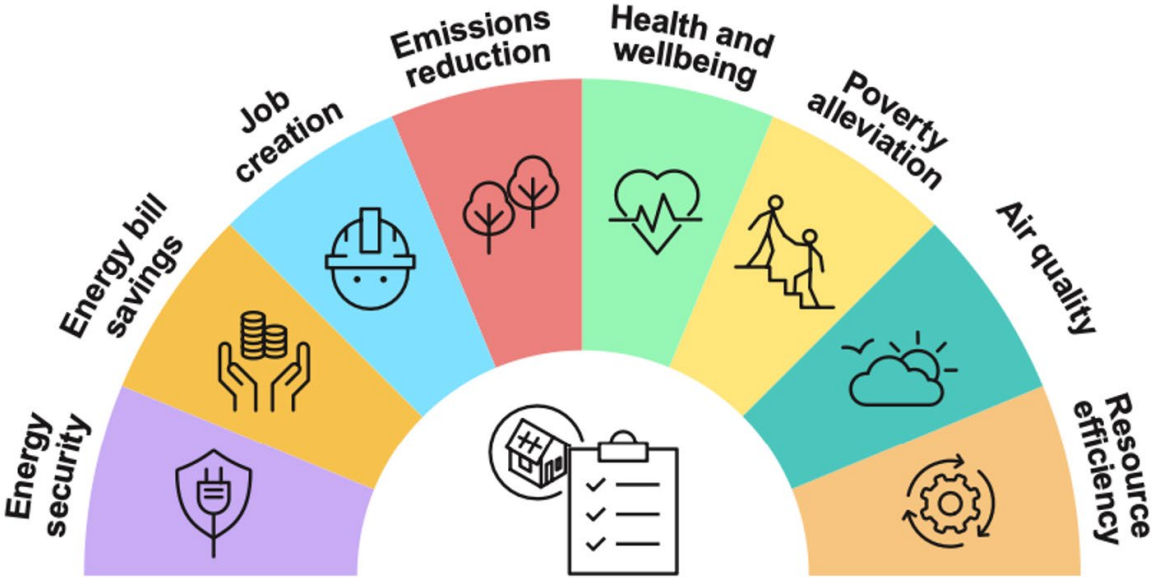
- Energy Efficient Mortgage (EEM) to incentivise borrowers to improve the energy efficiency of their buildings and/or acquire highly energy efficient properties. Such programs already exist in the EU, India, China

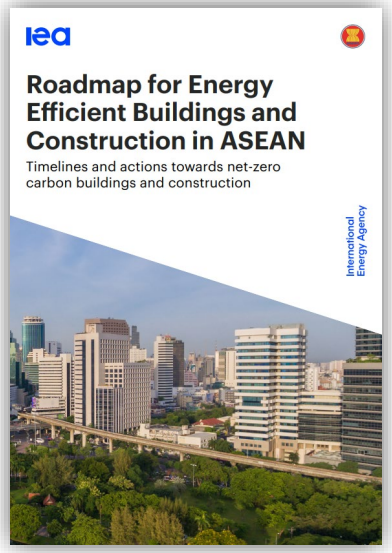
Energy Efficient Mortgage Label

Recommendations for policy package development



Multiple Benefits of Energy Efficiency in Buildings



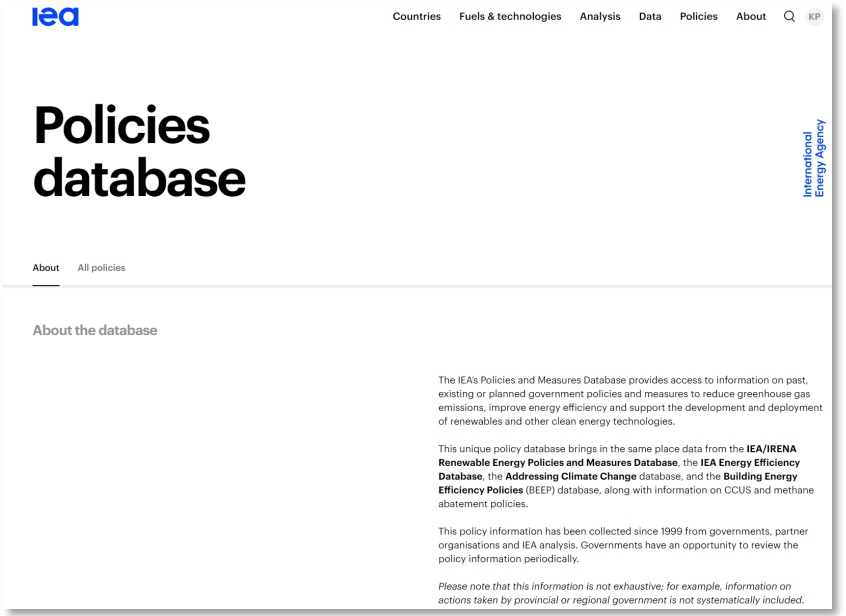


See for more information:
[Roadmap for energy efficient buildings and construction sector]

IEA Energy Efficiency in Buildings MOOC

- Find more on the above topics in the MOOC here: https://elearning.iea.org/courses/course-v1:IEA+BUILDINGS1+Open/about

  - Module 2 – Implementing energy efficiency:
    - Lesson 1 - Energy efficiency policies
    - Lesson 2 - Target setting
    - Lesson 3 – Building codes and standards



https://www.iea.org/policies/about

Regional Training on Energy Efficiency Policy Packages for Sub Saharan Africa

21-25 November 2022

Day 3 – Buildings

Stanford Harrison

Australian Government, Commercial Buildings Policy, Department of Climate Change, Energy, the Environment and Water

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MENTI #3

3. Please evaluate these barriers to improving energy efficiency in buildings in terms of their importance in your country

Regional Training on Energy Efficiency Policy Packages for Sub Saharan Africa

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Elizabeth Wangeci Chege

Sustainable Energy for All
Africa Regional Network of World Green Building Council

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MENTI #4

4. What is the most important policy instrument to accelerate energy efficiency improvements in buildings in your country right now?

Regional Training on Energy Efficiency Policy Packages for Sub Saharan Africa

21-25 November 2022

Day 3 – Buildings

Teslim Yusuf
Nqobile Ngcobo

South African National Energy Development Institute (SANEDI)

Regional Training on Energy Efficiency Policy Packages for Sub Saharan Africa

21-25 November 2022

Day 1 – Introduction to Energy Efficiency Packages

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GROUPE DE LA BANQUE AFRICAINE DE DÉVELOPPEMENT

Panel Discussion

Stanford Harrison

Department of Climate Change, Energy, the Environment and Water, Australia

Elizabeth Wangeci Chege

Sustainable Energy for All Africa Regional Network of World Green Building Council

Teslim Yusuf

Bureau of Energy Efficiency, India

Jane Akumu

United Nations Environment Programme

Regional Training on Energy Efficiency Policy Packages for Sub Saharan Africa

21-25 November 2022

Day 3 – Buildings

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Panel Discussion

- What are the key elements of the impactful policy package for buildings?
- How do they differ in short-term vs long-term?
- What are the important steps for the implementation of the policy package?
- How do you see the role of digitalisation in improving energy efficiency in buildings?

Overview of the key policies and actions to improve energy efficiency in buildings in Sub-Saharan region

23 November 2022

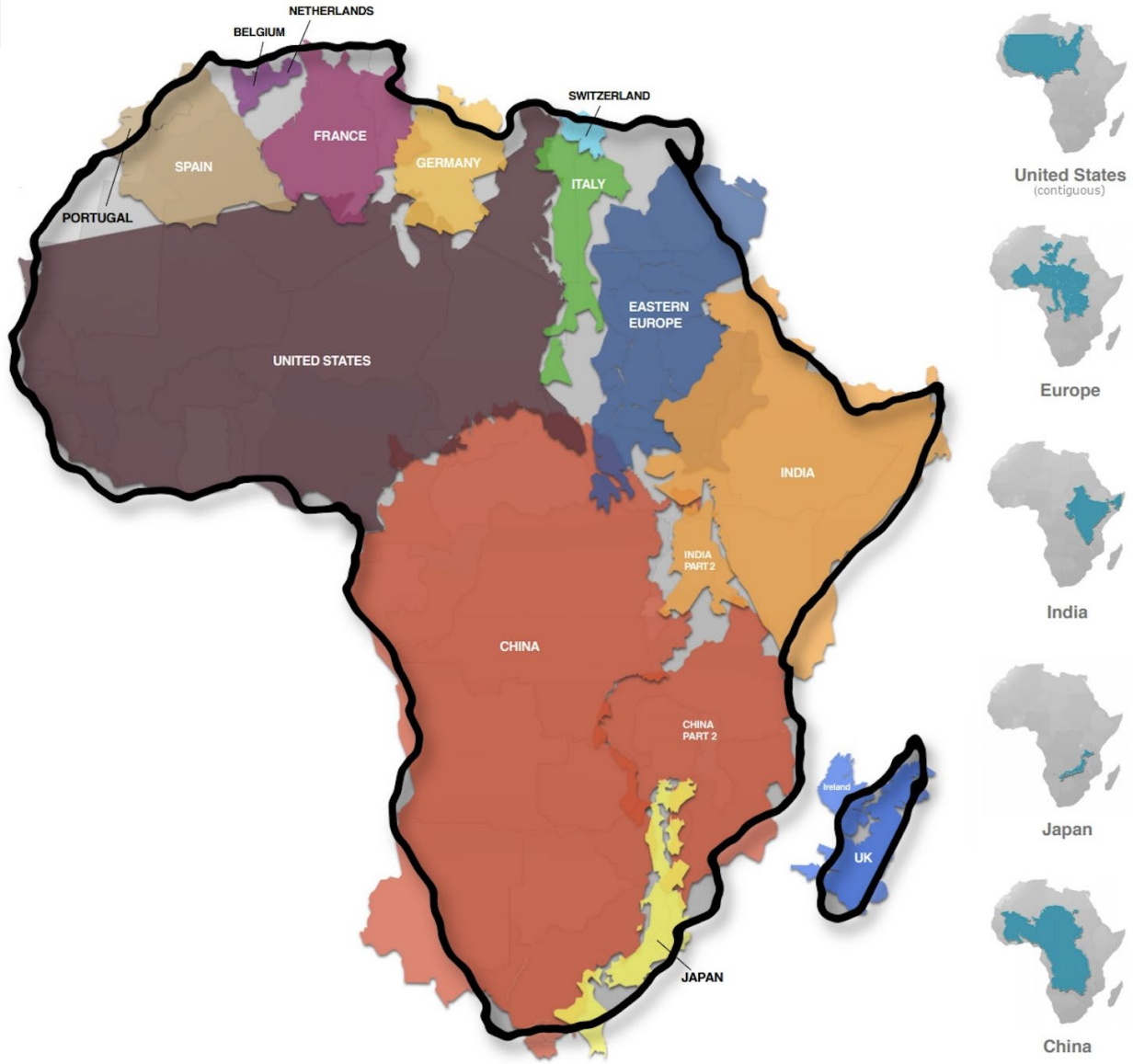
The True Size of Africa

In 2021, construction activities rebounded back to pre-pandemic levels in most major economies, alongside more energy-intensive use of buildings as workplaces reopened but hybrid working remained.

In addition, more emerging economies increased their use of fossil fuel gases in buildings.

As a result, buildings energy demand increased by around 4 per cent from 2020 to 135 EJ – the largest increase in the last 10 years.

CO_2 emissions from buildings operations have reached an all-time high of around 10 $GtCO_2$, around a 5 per cent increase from 2020 and 2 per cent higher than the previous peak in 2019.



The energy efficiency opportunity

SDG 7.3 calls for doubling the rate of improvement in energy efficiency by 2030

- Energy efficiency is also the quickest and most cost-effective opportunity to underpin the clean energy transition and universal access to energy
- It could deliver over 40% of the emissions reductions required by the Paris Agreement
- It also brings multiple social, economic and health benefits
- Many energy efficiency policy and technology solutions are well-known, and most of the improvement needed to achieve net-zero could be implemented cost-effectively by 2030

The energy efficiency opportunity –Accelerator Programs

Highlights (1/2)

Building Efficiency Accelerator

- Raising awareness, ambition and action in **52 cities in 25 countries**
- Supporting implementation of the Zero Carbon Building for All Initiative, a multi-stakeholder coalition committed to decarbonizing all new buildings by 2030 and all existing buildings by 2050
- 83M tons CO2e emissions reduced, and 43.9M GJ energy saved until 2020

District Energy in Cities Initiative

- Strengthening know-how, policies, and project pipeline with **38 partners and 45 cities**
- 15 cities committed to at least one policy, one pilot project, and tracking progress
- $ 28M mobilized by partners towards pilot projects in **36 cities in 14 countries**
- 823,050 tons CO2e emission reduced, and 18M GJ energy saved until 2020

Industrial Energy Accelerator

- Enhancing policy, capacity, financing mechanisms, and energy efficiency pipeline or market in **10 countries**
- Mexico and Brazil improved training and certification in energy management, and appraisal EE investment projects respectively
- Potential 3.9B tons CO2e emission reductions and 12B GJ energy savings annually

Partners: UNIDO, Carbon Trust, GEF

Highlights (2/2)

Global Fuel Economy Initiative

- Supported development of cleaner and efficient fuels and vehicle policies in **68 countries**
- 66 countries completed a fuel economy baseline assessment, 51 developed policy proposals and 17 implemented new policies
- Two regions (ASEAN and ECOWAS) agreed to a fuel economy roadmap
- 210M tons CO2e emissions reduced and 1.5B GJ energy saved by fuel economy policies in 2005-2015

Partners: European Commission, GEF, FIA Foundation, UNEP, IEA, ICCT, International Transport Forum, UC Davis

Appliances and Equipment Accelerator (U4E)

Lighting Accelerator (U4E)

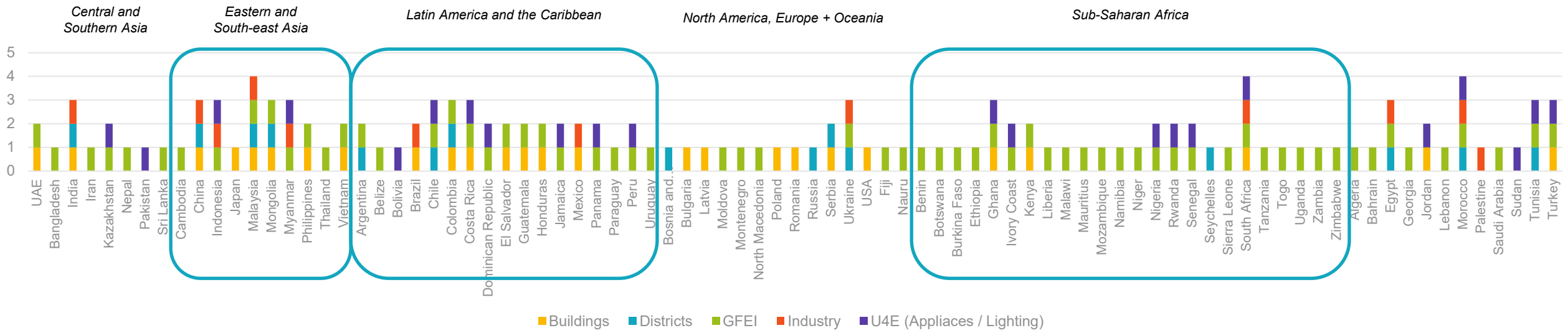
- Promoted an integrated policy approach for market transformation in over **25 countries and 5 regions** (Southern Africa, East Africa, Caribbean, Southeast Asia)
- 150+ Country Savings Assessments, 5 Policy Guides, 5 Model Regulations Guidelines, 4 Product Registration Guidance, 1 Manual of Financing Mechanisms and Business Models for Energy Efficiency
- 2.3M tons CO2e emissions reduced and 49.6M GJ energy saved annually until 2040

Partners: UNEP, International Copper Association

COPENHAGEN CENTRE ON ENERGY EFFICIENCY
SEforALL EE HUB

- Supporting Accelerators with coordination, technical backstopping and synergies
- Co-hosted the Energy Efficiency Global Forum in Copenhagen in 2018
- Resource library on Buildings, Cities and District Energy with over 1,100 resources

Overview of support across regions



GFEI –Global Fuel Economy Initiative

While 3 countries in Africa are expected to achieve universal access by 2030, 18 would still have significant unelectrified populations (10 million or more)

Countries expected to achieve universal access by 2030

- Algeria
- Cabo Verde
- Mauritius

Countries expected to have unelectrified populations of ~10 million or more by 2030

- Angola
- Burkina Faso
- Burundi
- Chad
- Congo (DR)
- Ethiopia
- Madagascar
- Malawi
- Mozambique
- Niger
- Nigeria
- Somalia
- South Africa
- South Sudan
- Sudan
- Tanzania
- Uganda
- Zambia

DATA SOURCE: World Bank /ESMAP Tracking SDG7 Database, 2022.

AU Agenda 2063

Agenda 2063 encapsulates not only Africa's Aspirations for the Future but also identifies key Flagship Programmes which can boost Africa's economic growth and development and lead to the rapid transformation of the continent.

Agenda 2063 also identifies key activities to be undertaken in its 10 year Implementation Plans which will ensure that Agenda 2063 delivers both quantitative and qualitative Transformational Outcomes for Africa's people.

Aspirations for the Africa We Want

1. A prosperous Africa based on inclusive growth and sustainable development
2. An integrated continent, politically united and based on the ideals of Pan-Africanism and the vision of Africa's Renaissance
3. An Africa of good governance, democracy, respect for human rights, justice and the rule of law
4. A peaceful and secure Africa
5. An Africa with a strong cultural identity, common heritage, shared values and ethics
6. An Africa, whose development is people-driven, relying on the potential of African people, especially its women and youth, and caring for children.
7. Africa as a strong, united, resilient and influential global player and partner.

AU Agenda 2063

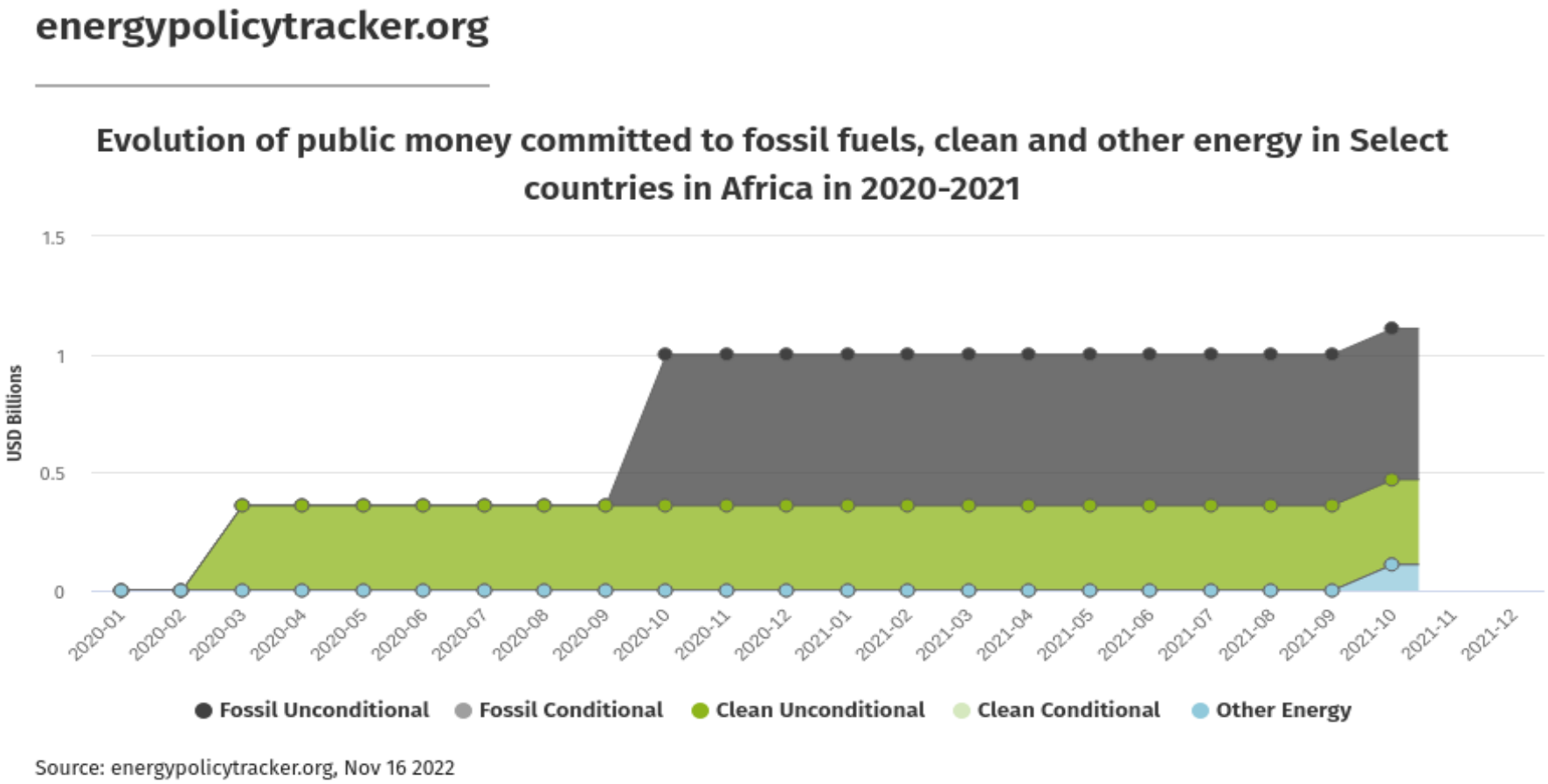
Agenda 2063 identifies several key benefits to Africans if the programmes identified in the strategic development framework are initiated and implemented in the FTYIP.

Africa is expected to show improved

- Standards of living
- Transformed, inclusive and sustained economies
- Increased levels of regional and continental integration
- A population of empowered women and youth and a society in which children are cared for and protected
- Societies that are peaceful, demonstrate good democratic values and practice good governance principles and which preserve and enhance Africa’s cultural identity.

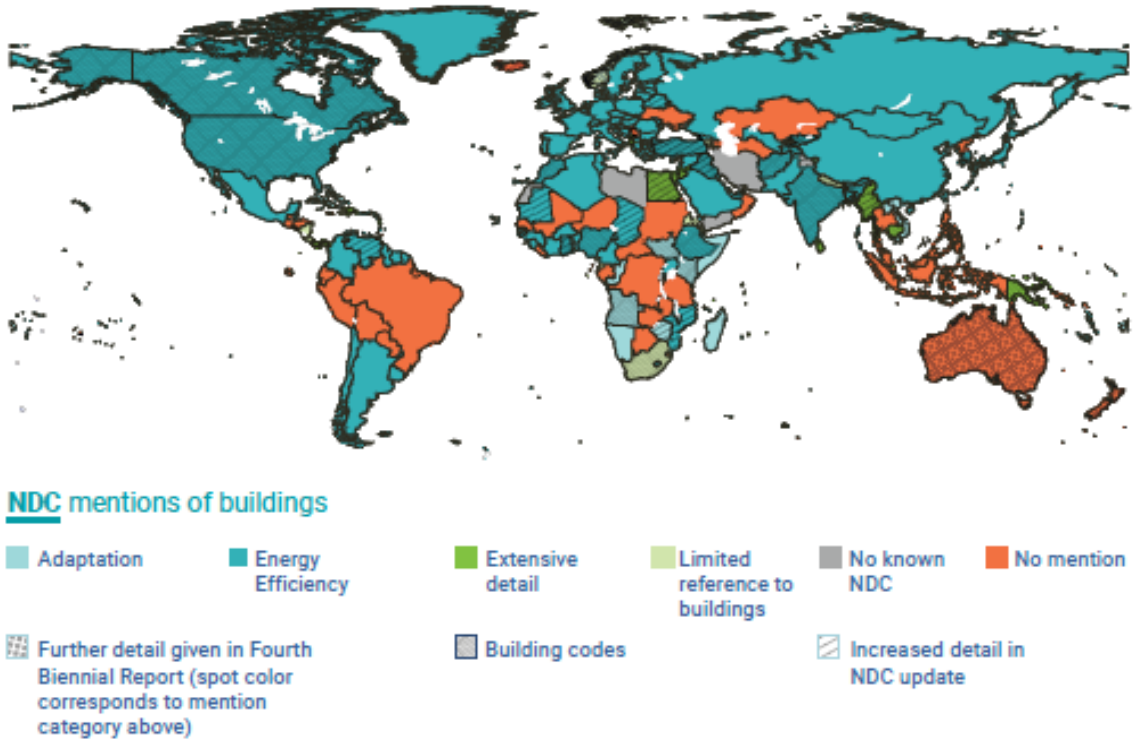
Public Financing

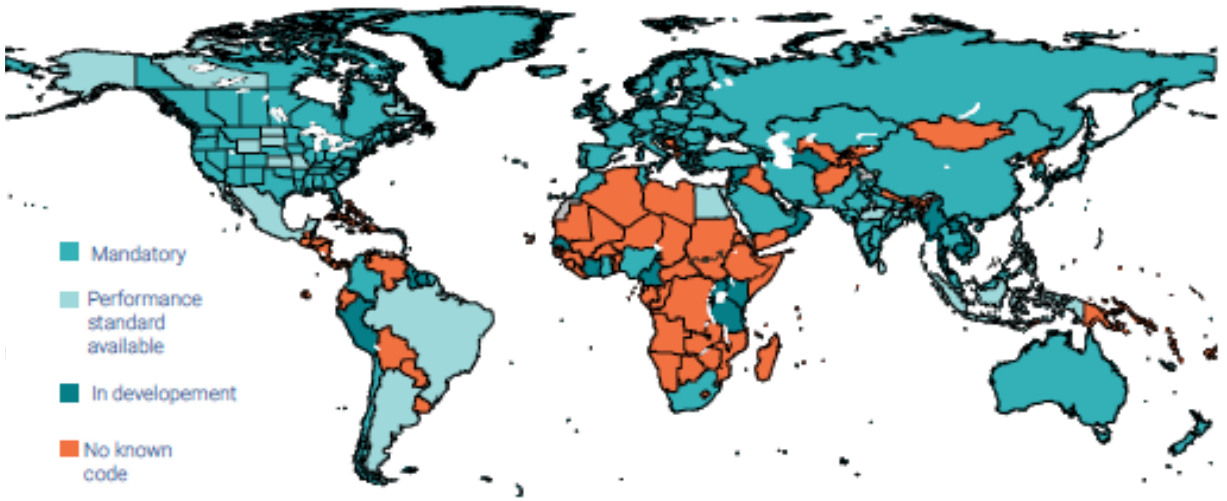
Select countries in Africa
In 2020-2021, in response to the COVID 19 pandemic, governments in **Select countries in Africa** have committed at least **USD 1.12 billion** to supporting **different energy types** through new or amended policies, according to official government sources and other publicly available information.



Source: energypolicytracker.org, Nov 16 2022

Global status of NDC mentions vs building energy codes in 2021

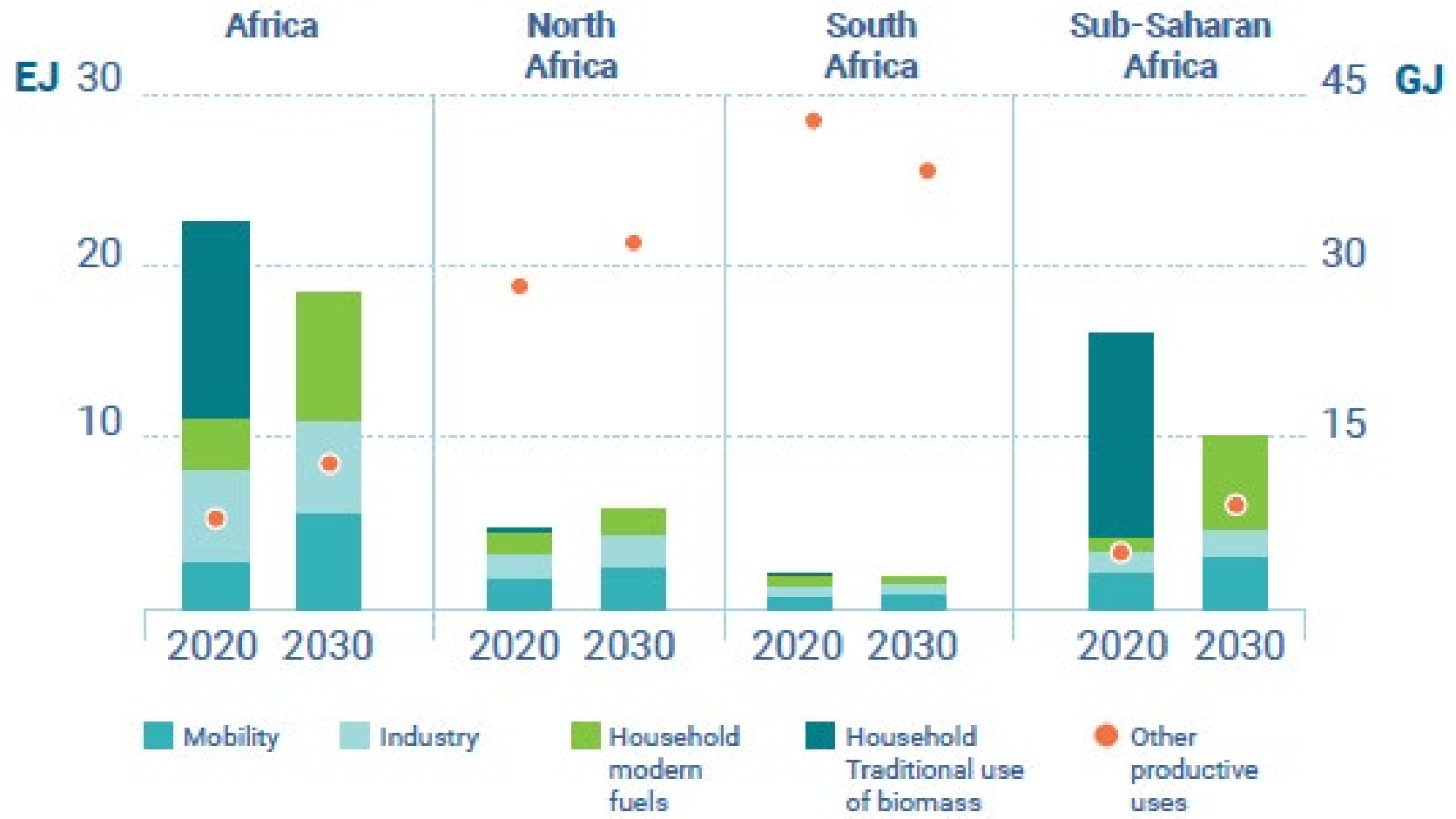




*In total, 51 out of 196 countries tracked by the Buildings Global Status Report have mandatory building energy codes which cover both residential and non residential buildings. This number is higher than last year's total, but the methodological changes this year means these numbers should not be directly compared.

Source: 2022 Global Status Report for Buildings and Construction

Africa’s final energy consumption by sector 2020-2030

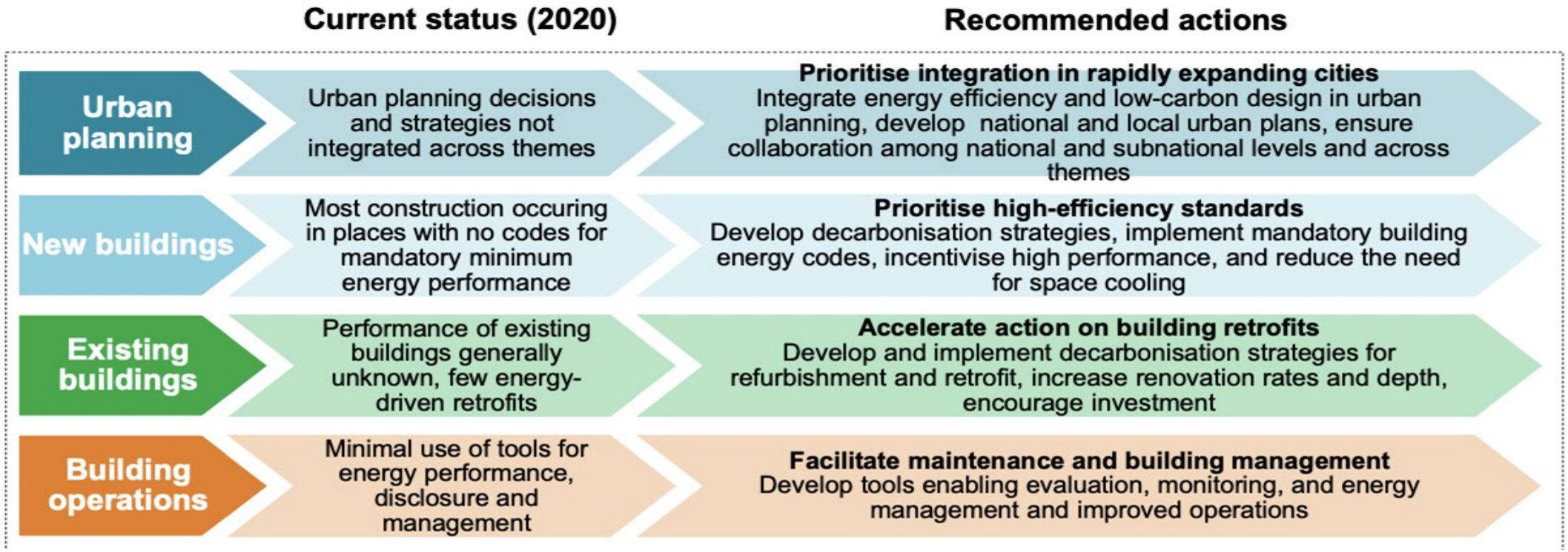


Source: IEA Africa Energy Outlook 2022 (IEA 2022b).

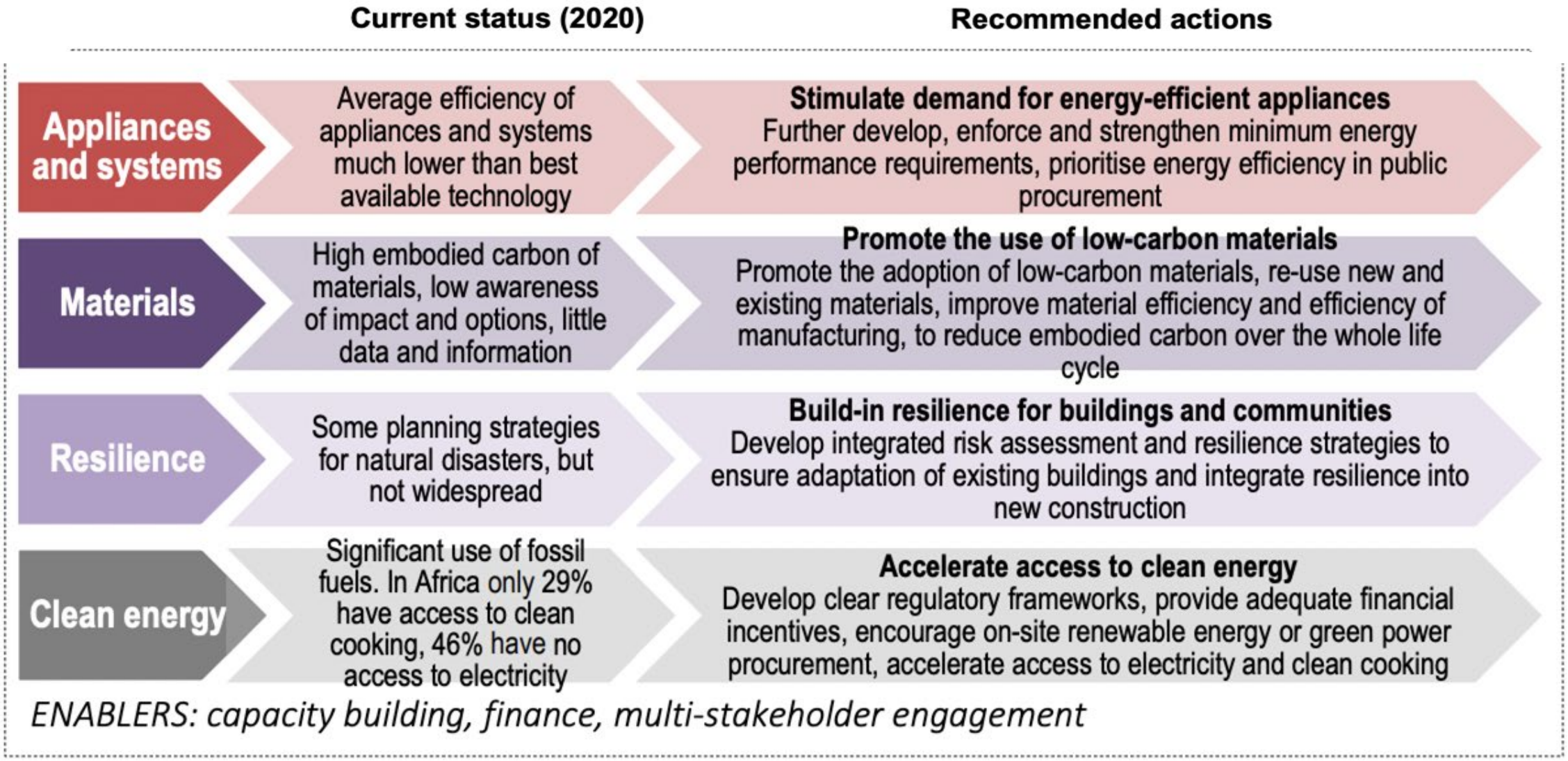
GlobalABC Regional Roadmap for Buildings and Construction in Africa, 2020-2050

- (GlobalABC/IEA/UNEP, 2019; IEA, 2019b). Very few countries have mandatory or voluntary codes or certification programmes, though several are under development.

- The purpose of this roadmap is to support a common language and vision for the complete decarbonisation of buildings across their life cycle, and to support the development of national or subnational strategies and policies, including for example, Nationally Determined Contributions (NDCs).



GlobalABC Regional Roadmap for Buildings and Construction in Africa, 2020-2050



Africa Manifesto for Sustainable Cities & the Built Environment

Developed by a coalition of Green Building Councils (GBCs) representing a cumulative population of 700 million people across all regions across Africa, the draft articulates the policies African business leaders and government officials must support to deliver sustainable cities and the built environment. The recommendations are divided across the five key priority areas below and the final Africa Manifesto for Sustainable Cities & the Built Environment has launched at the **Green Building Convention** in Cape Town on 04 November 2022.

ENERGY

WATER

MATERIALS

FINANCE

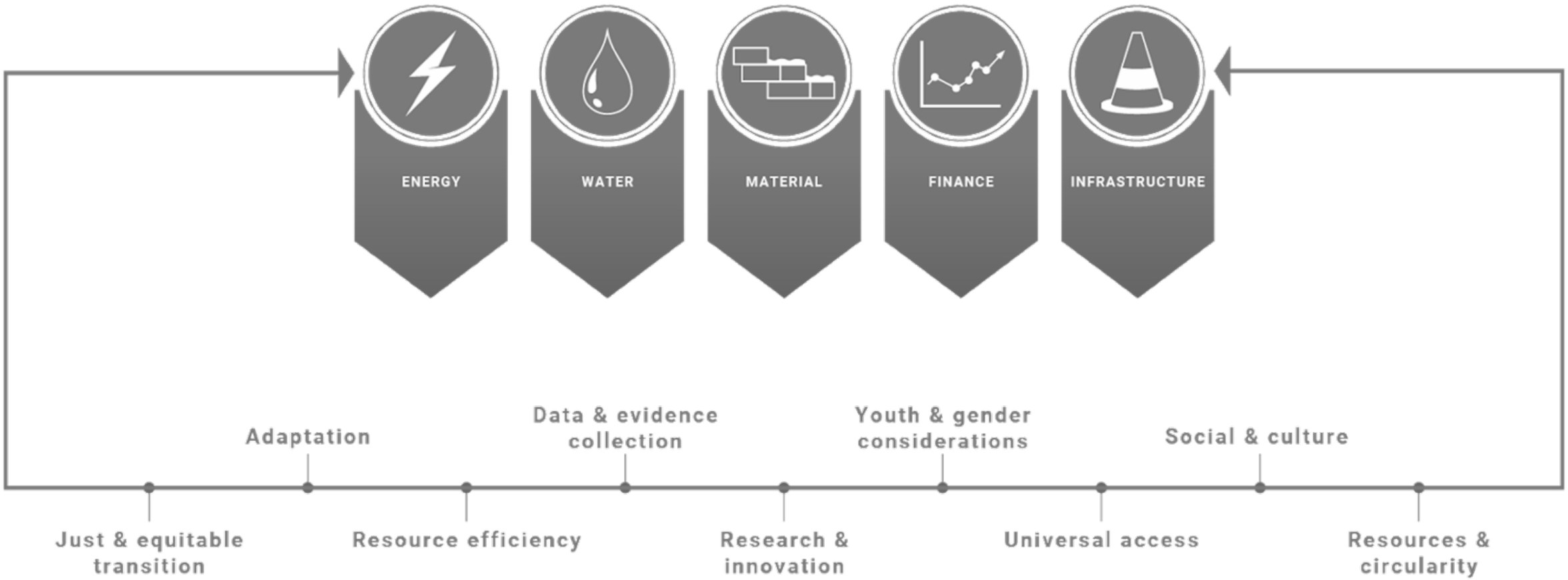
INFRASTRUCTURE

Africa Alliance

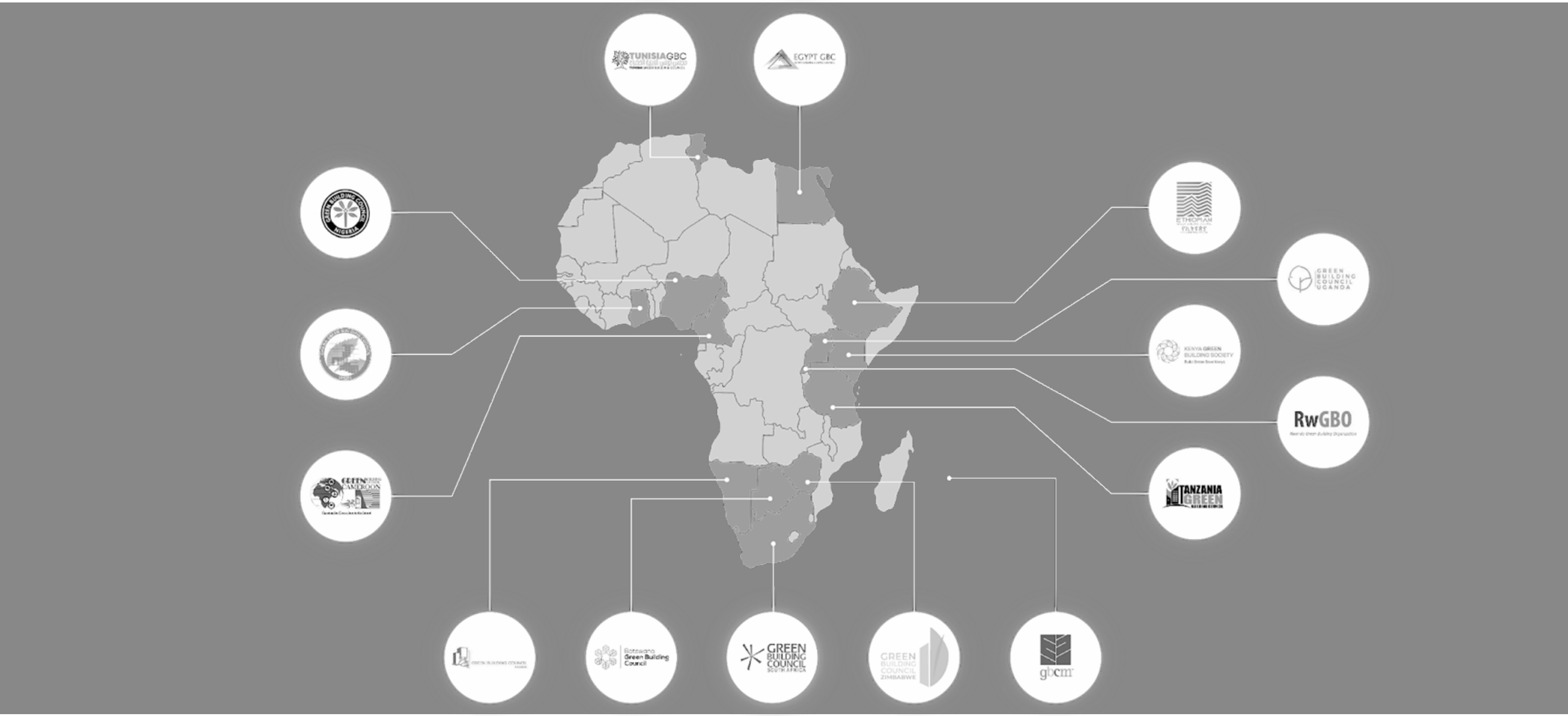
- The objective of the African Alliance initiative is to provide a resource for SMEs to deliver the sustainable cities and built environment solutions that Africa deserves and needs.

- The African Alliance, supported by the Africa Net Zero Collaborators, has launched at COP27 in Sharm-El-Sheikh on 11 November 2022.

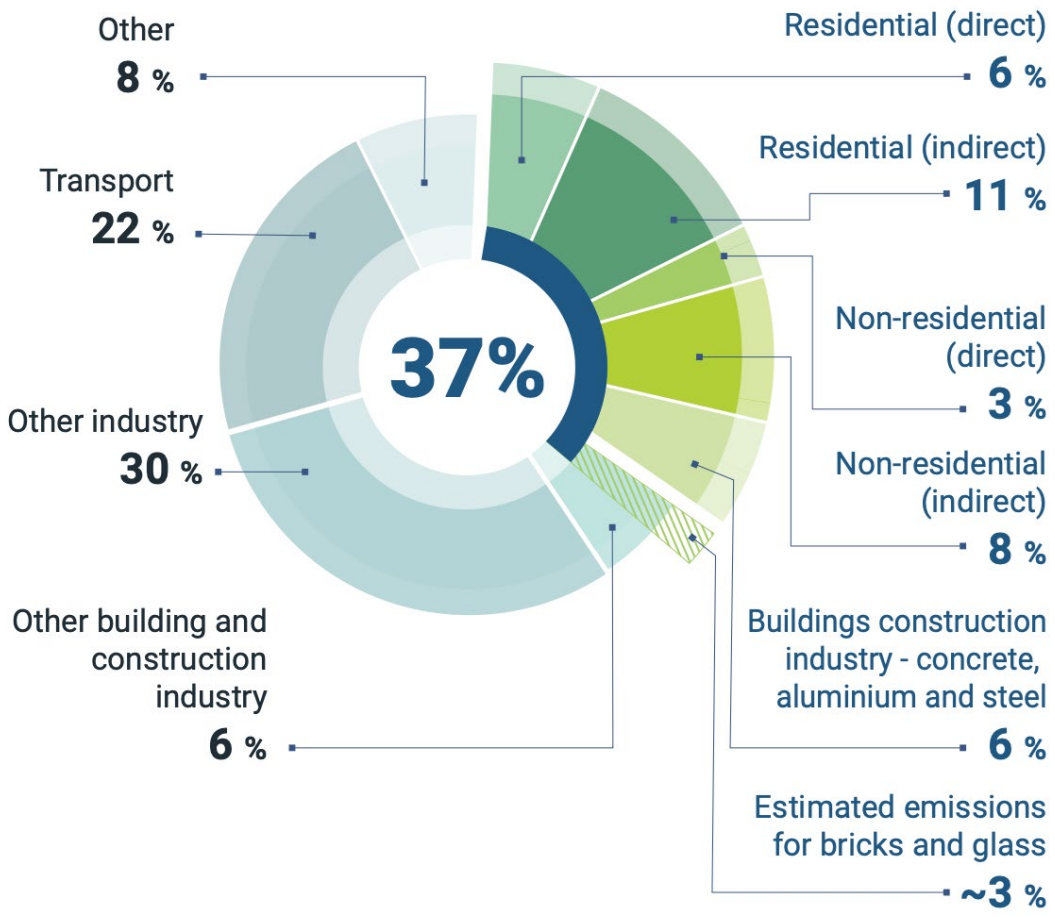
Cross Cutting Themes



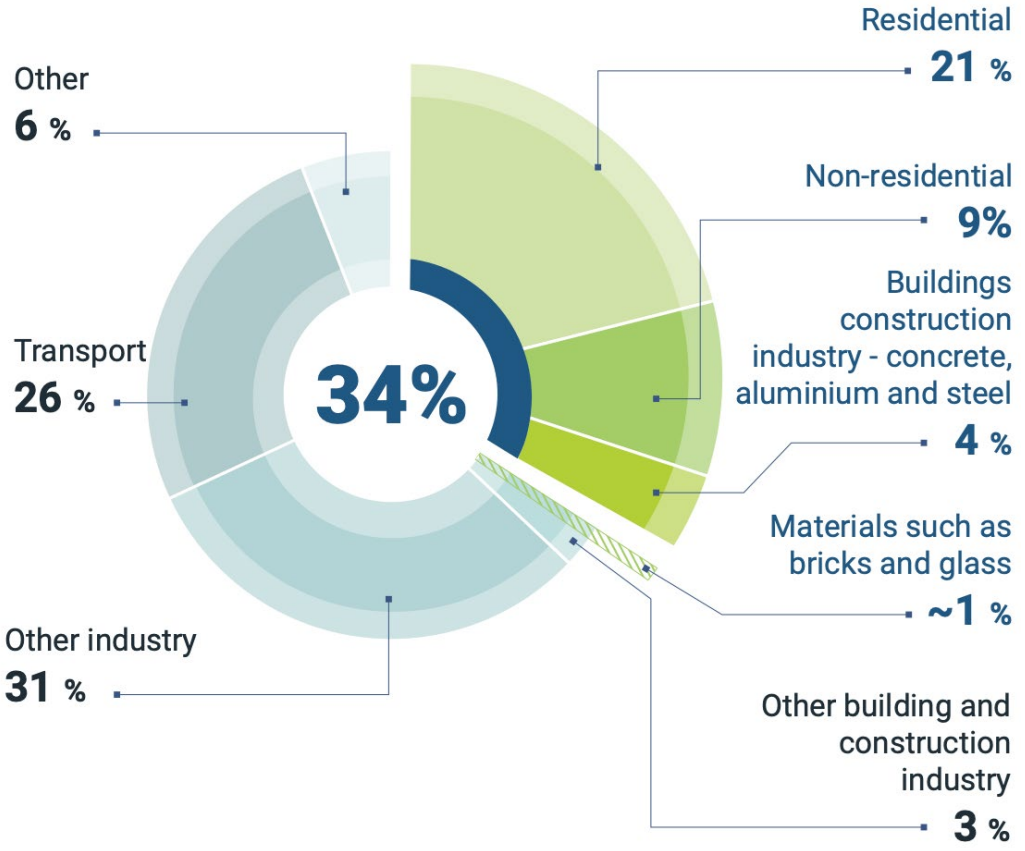
World Green Building Council - Africa Regional Network



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



Global share of buildings and construction final energy demand, 2021



World Green Building Council

The climate emergency demands that government policy and regulations are ambitious enough to keep the world within a 1.5 degree trajectory of warming. World Green Building Council's (WorldGBC) global advocacy brings together our network of Green Building Councils (GBCs) to recognise the potential and opportunity of our built environment, and align around a common purpose to ensure that global, national and local building policies are aligned with the Paris Agreement goals.

WorldGBC's vision is for every citizen on earth to enjoy the benefits of living in a totally decarbonised, circular, resilient and equitable built environment that provides a high quality of life.

WorldGBC's North Star Goals outline a pathway to deliver on this vision across three impact pathways:

- **Climate Action:** Total decarbonisation of the built environment;
- **Health and Wellbeing:** A built environment that delivers healthy, equitable and resilient buildings, communities and cities;
- **Resources and Circularity:** A built environment that supports the regeneration of resources and natural systems, providing socio-economic benefit through a thriving circular economy.

Global Policy Principles for a Sustainable Built Environment

Principles	When developing policies and programmes, national Governments must
Carbon	Prioritise preservation of existing buildings and eliminate carbon emissions across the lifecycle of a building.
Circularity	Optimise resource and material use to drive waste out of the construction value chain and promote the restoration of natural capital.
Water	Safeguard water resources and provide equitable access to safe & sustainable potable water & sanitation.
Biodiversity	Deploy nature-based solutions that protect the natural environment and restore biodiversity loss.
Resilience	Promote adaptation and integrate climate resilience by future proofing homes and communities, enhancing their ability to respond to environmental, social & economic change.
Human Health	Protect human health and promote wellbeing benefits in design and construction of buildings.
Equity and Access	Ensure all citizens have equal access to safe, healthy, sustainable homes and communities.

Global Policy Principles for a Sustainable Built Environment

- Fiscal Expenditure; Carbon Markets; Finance Mechanisms
- Urban Spatial Planning – national planning
- Capacity Building/ Awareness Curriculum
- Building Component Policy Packages
- ICT –Data Mining-Open Source
- Incentives – Fiscal & Non-Fiscal

SUSTAINABLE ENERGY FOR ALL

Thank you!

Elizabeth Wangeci Chege

Chair of World Green Building Council Africa Regional Network &
Energy Efficiency and Cooling Specialist, SEforALL

www.seforall.org

AFRICA REGIONAL NETWORK

WORLD GREEN BUILDING COUNCIL

International Best Practice - Overview of the policy package on energy efficiency in buildings in Australia with the focus on Commercial Buildings Disclosure and National Australian Built Environment Rating System (NABERS)

IEA Sub-Sahara Africa Training on Energy Efficiency Policy Packages

Stanford Harrison

Department of Climate Change, Energy, the Environment and Water

Monique Alfris

National Australian Built Environment Rating System (NABERS)

What is the Commercial Building Disclosure (CBD) Program?

- Introduced in 2010 – Building Energy Efficiency Disclosure Act
- Mandates disclosure of energy efficiency information
- Required when more than 1,000m² office space is offered for sale or lease
- Market can make informed decisions when buying & leasing
- NABERS Star Rating 0-6 Stars required on all advertising
- 5000 office buildings 1000-100,000 m^2 have been rated

CBD requirements

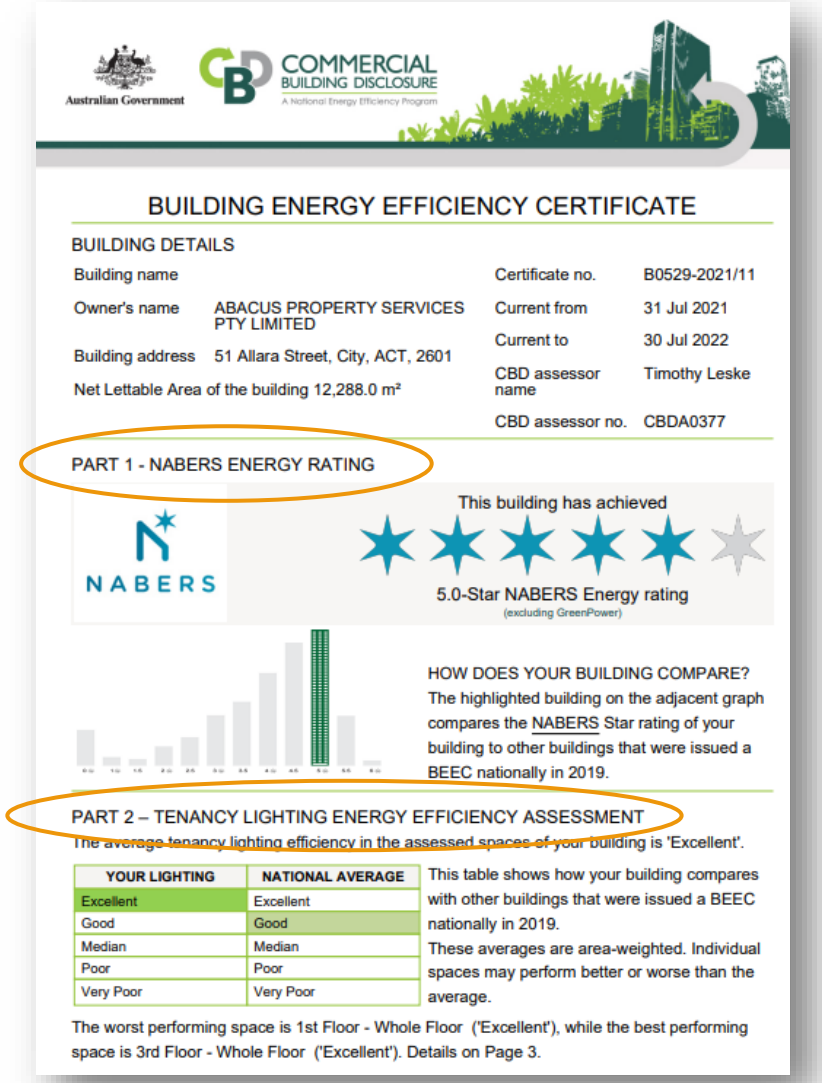
Smith-Jones Real Estate

Now Leasing

2.5-star NABERS Energy rating

Phone John Smith 0012 345 678

Required on all advertising



Australian Government

COMMERCIAL BUILDING DISCLOSURE
A National Energy Efficiency Program

BUILDING ENERGY EFFICIENCY CERTIFICATE

BUILDING DETAILS

Building name		Certificate no.	B0529-2021/11
Owner's name	ABACUS PROPERTY SERVICES PTY LIMITED	Current from	31 Jul 2021
		Current to	30 Jul 2022
Building address	51 Allara Street, City, ACT, 2601	CBD assessor name	Timothy Leske
Net Lettable Area of the building 12,288.0 m²		CBD assessor no.	CBDA0377

PART 1 - NABERS ENERGY RATING

NABERS

This building has achieved

5.0-Star NABERS Energy rating
(excluding GreenPower)

HOW DOES YOUR BUILDING COMPARE?
The highlighted building on the adjacent graph compares the NABERS Star rating of your building to other buildings that were issued a BEEC nationally in 2019.

PART 2 – TENANCY LIGHTING ENERGY EFFICIENCY ASSESSMENT

The average tenancy lighting efficiency in the assessed spaces of your building is 'Excellent'.

YOUR LIGHTING	NATIONAL AVERAGE
Excellent	Excellent
Good	Good
Median	Median
Poor	Poor
Very Poor	Very Poor

This table shows how your building compares with other buildings that were issued a BEEC nationally in 2019.
These averages are area-weighted. Individual spaces may perform better or worse than the average.

The worst performing space is 1st Floor - Whole Floor ('Excellent'), while the best performing space is 3rd Floor - Whole Floor ('Excellent'). Details on Page 3.

Public BEEC Certificate example

Climate zones

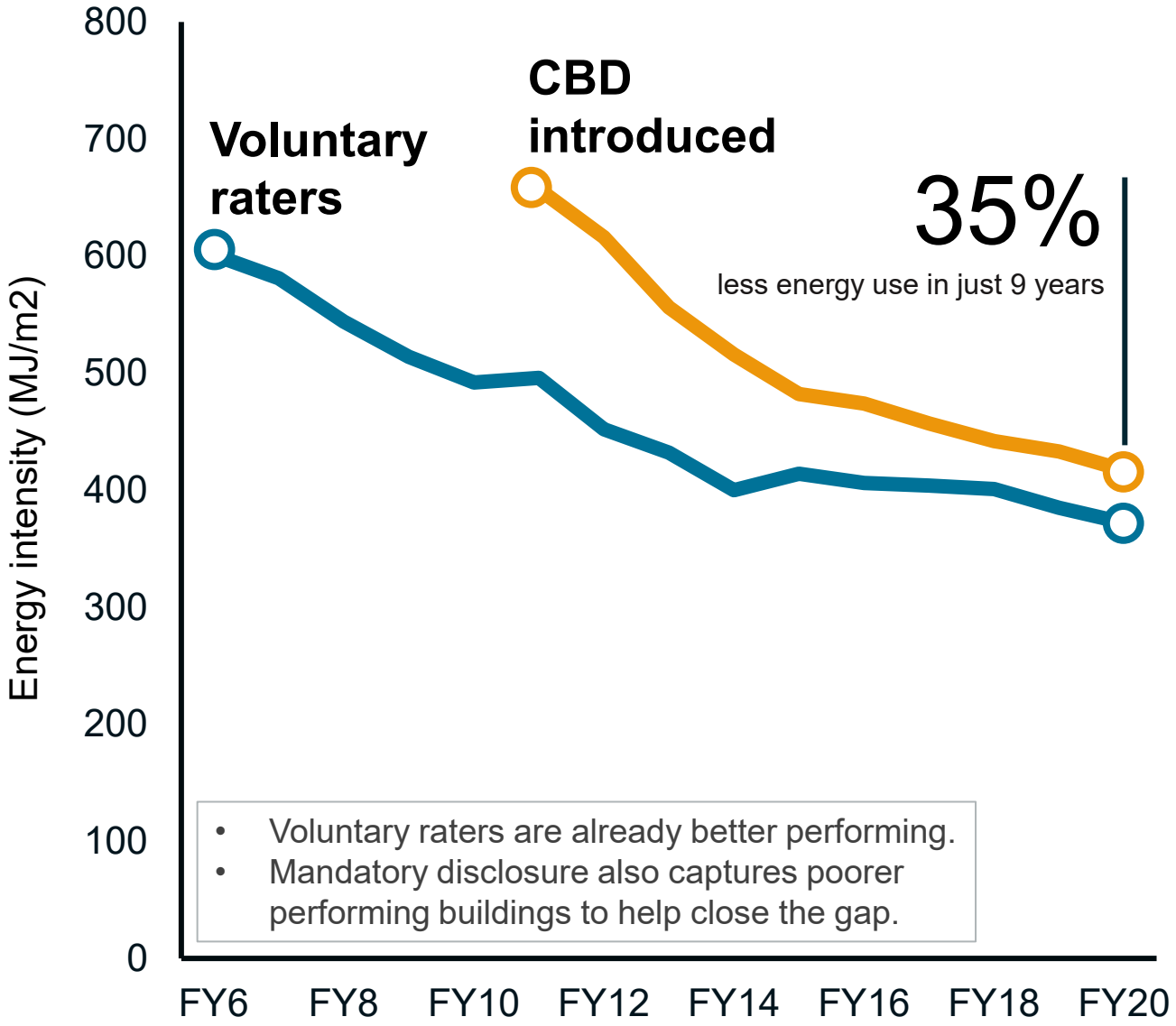
- Australia has a population of 25.74m
  - 72% in Major cities
  - 18% in Inner regions
  - 8% in Outer regions
  - 1.1% in Remote areas

- NABERS benchmarking includes climate zone information to ensure like-for-like comparison.
- Commercial Buildings used 267 PJ, Electricity consumption was just under 24% (23.8%) of Australia's total electricity consumption for FY2020.

Australia's National Construction Code defines eight climate zones.

The Commercial Building Disclosure program is driving improvements in offices over time. This has been lead by:

- Better energy management
- Minor works



Compliance and monitoring

- Online advertisements
- Field surveillance of buildings across Australia
- Confidential tip-offs
- Other: videos, newspapers and social media
- Fines are $170,000 per day
- 5% of ratings are audited

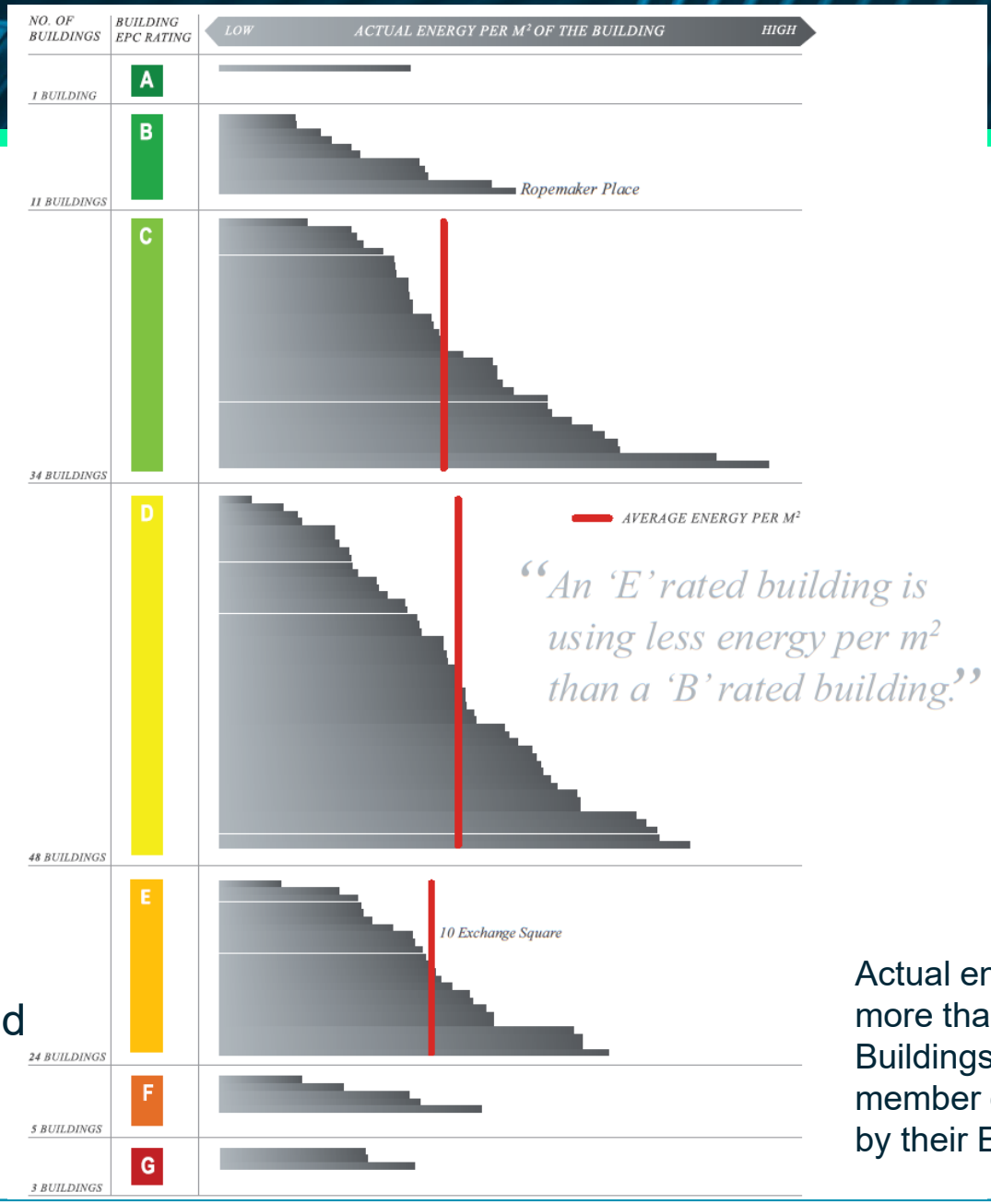
Comparison with EPC

Energy Performance Certificate (EPC) is the UK's mandatory building rating system.

- required when a property is built, sold or rented
- valid for 10 years
- do not use actual (metered) energy consumption

NABERS and CBD

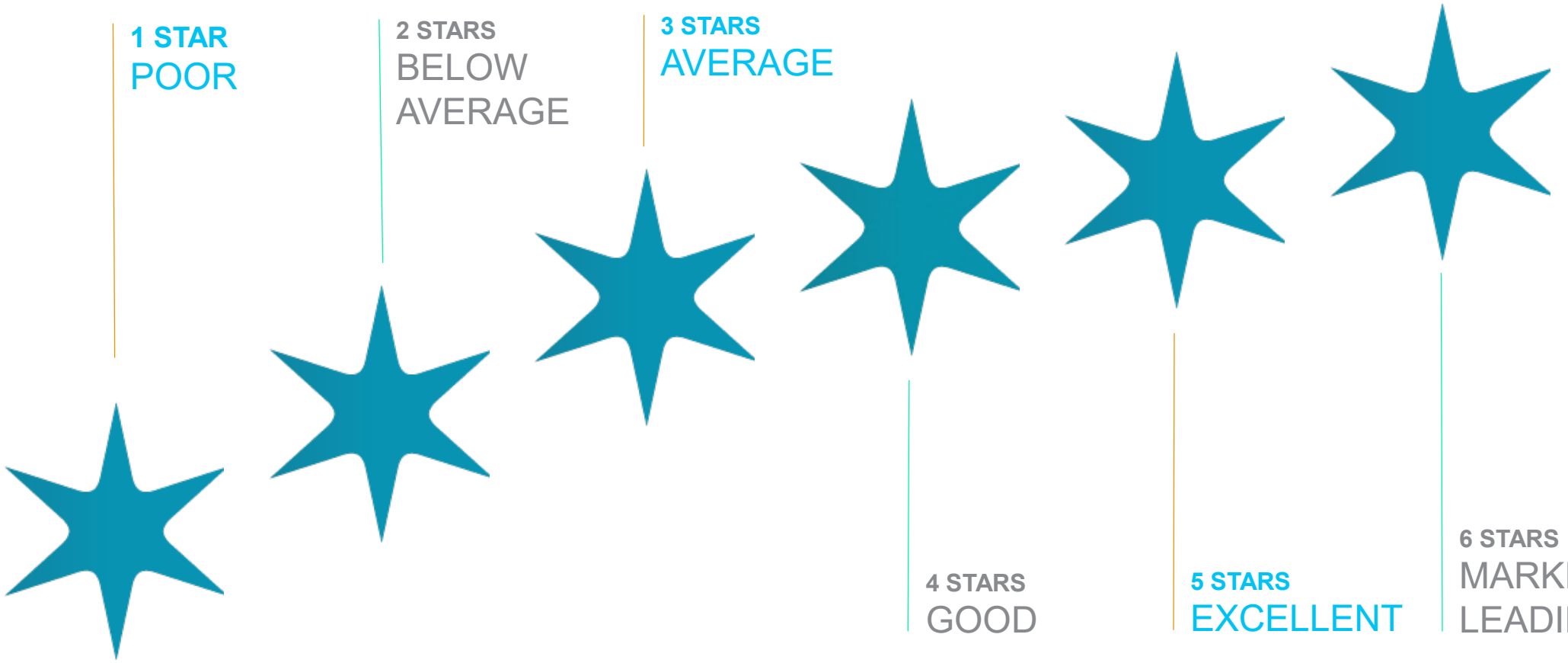
- NABERS rating valid for 1 year
- uses real energy data
- Tenancy Lighting Assessment (TLA) is valid for 5 years



Actual energy use of more than 100 Better Buildings Partnership member offices grouped by their EPC rating

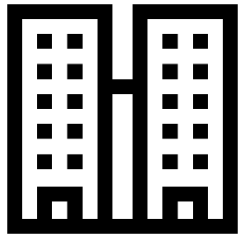
A tale of two buildings: Are EPCs a true indicator of Energy Efficiency? Jones Land LaSalle

NABERS is Australia's language for building sustainability

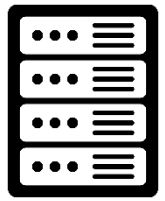


Sectors currently covered by NABERS Energy

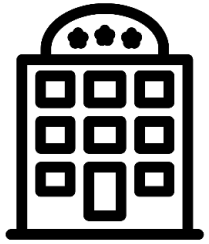
NEW



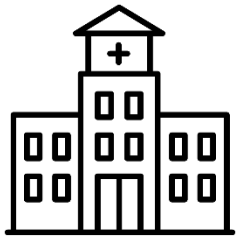
Apartment Buildings



Data centres

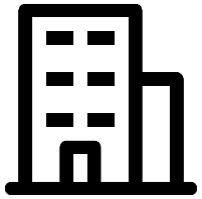


Hotels

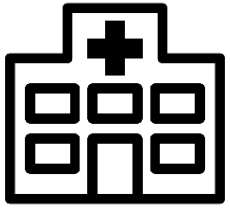


Residential aged care

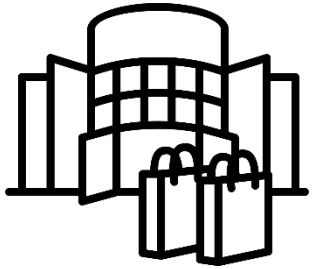
Warehouses



Offices

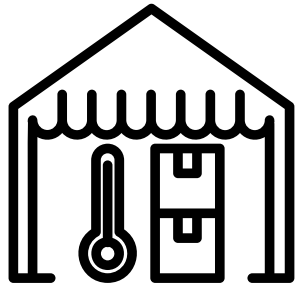


Public Hospitals



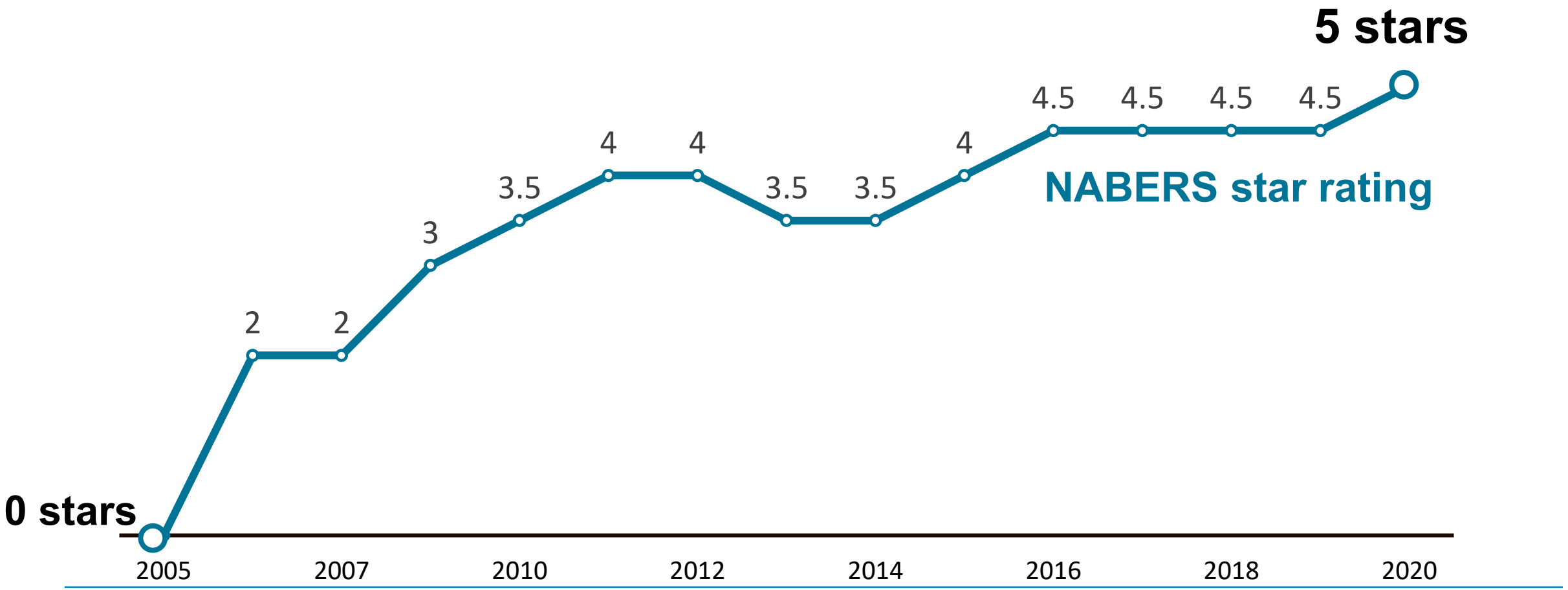
Shopping centres

Retirement living



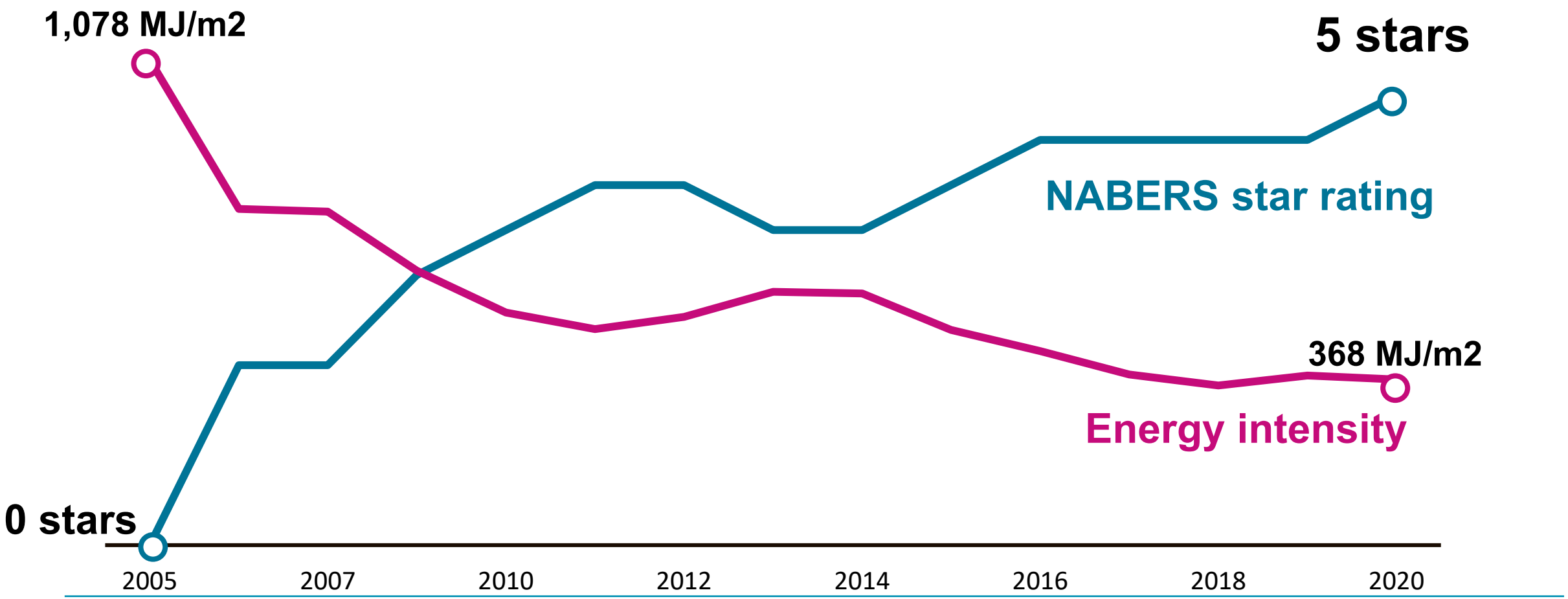
Cold stores

Standing tall: *Australia Square's* sustainability journey



*Australia Square | 264-268 George St, Sydney. Co-owned by DEXUS and GPT.

Standing tall: *Australia Square's* sustainability journey

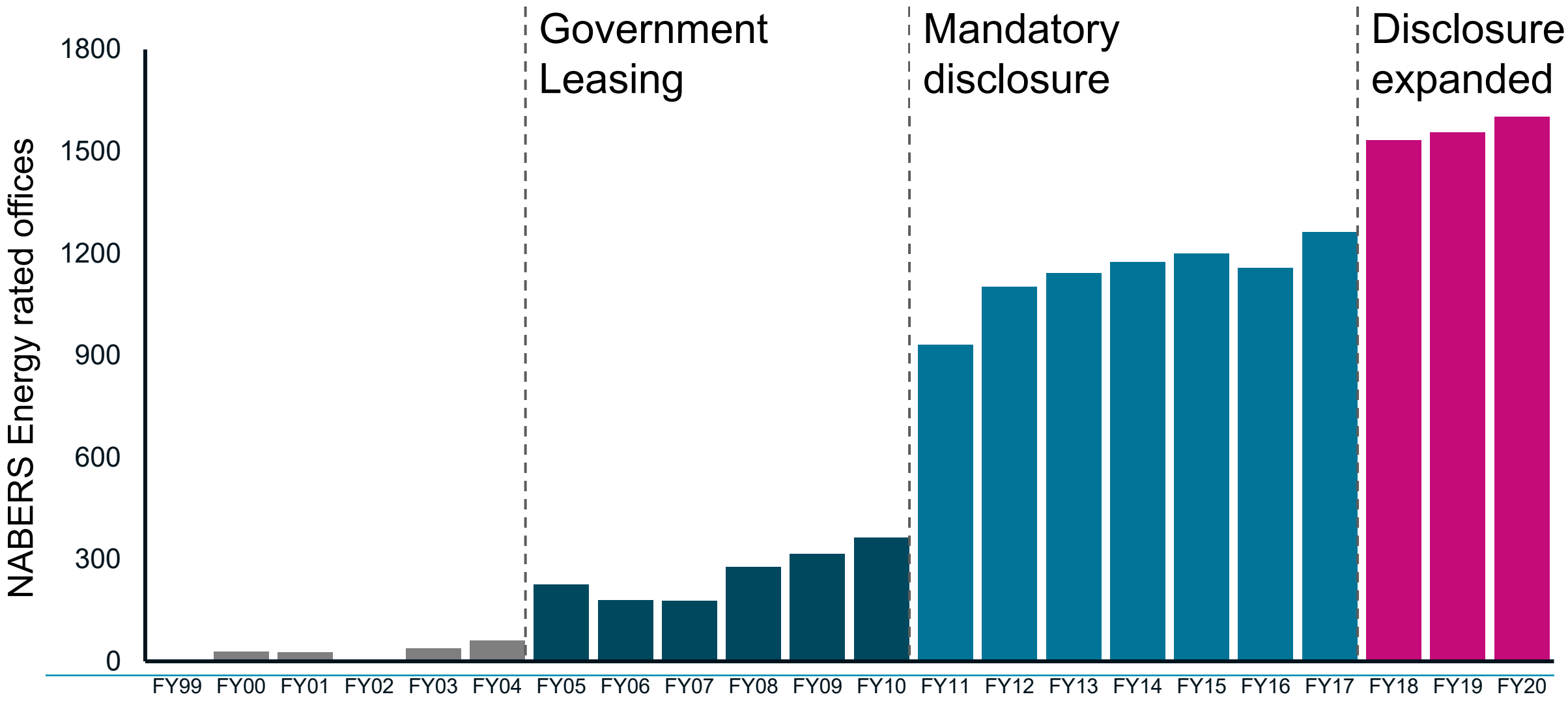


*Australia Square | 264-268 George St, Sydney. Owned by DEXUS and GPT.

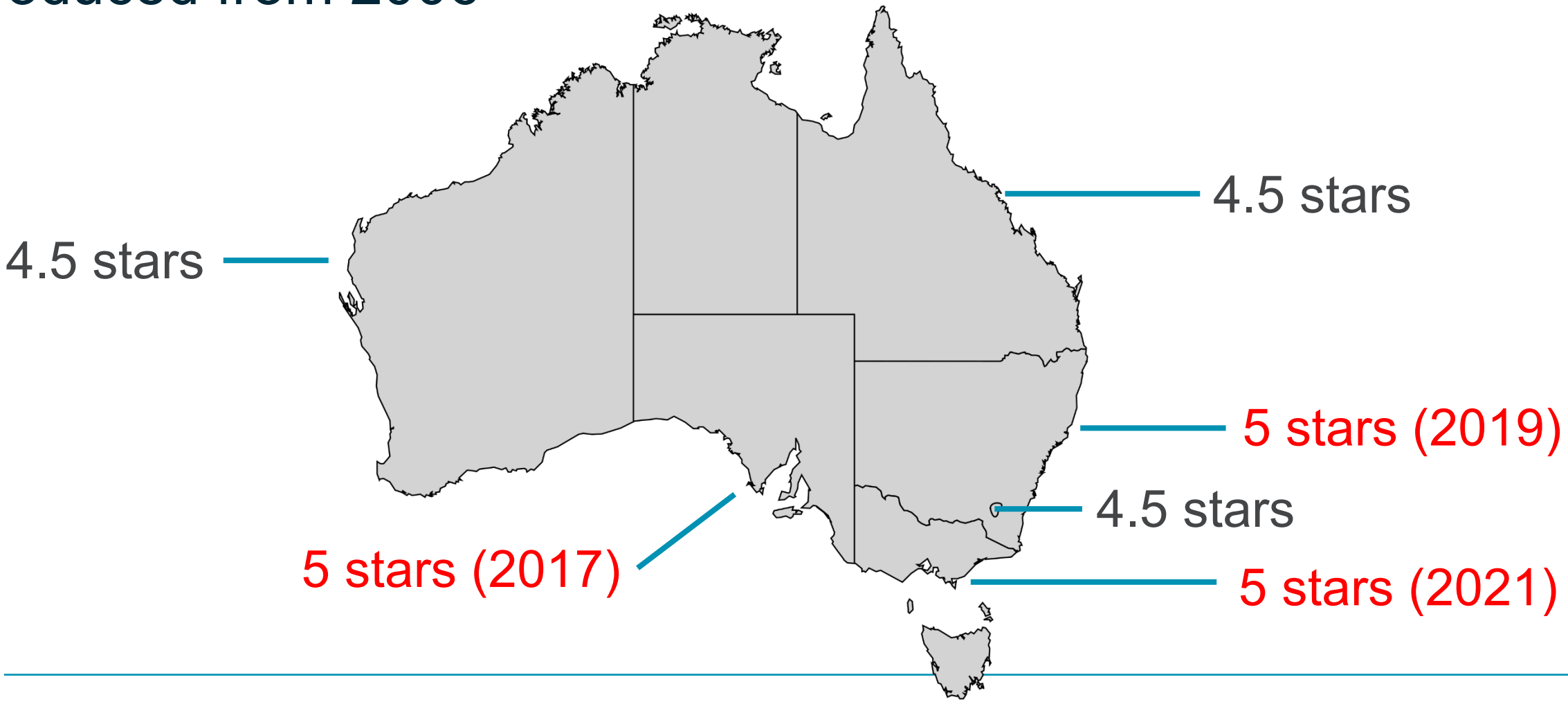
NABERS is the backbone of most of Australia's energy and climate policies in the building sector

NABERS

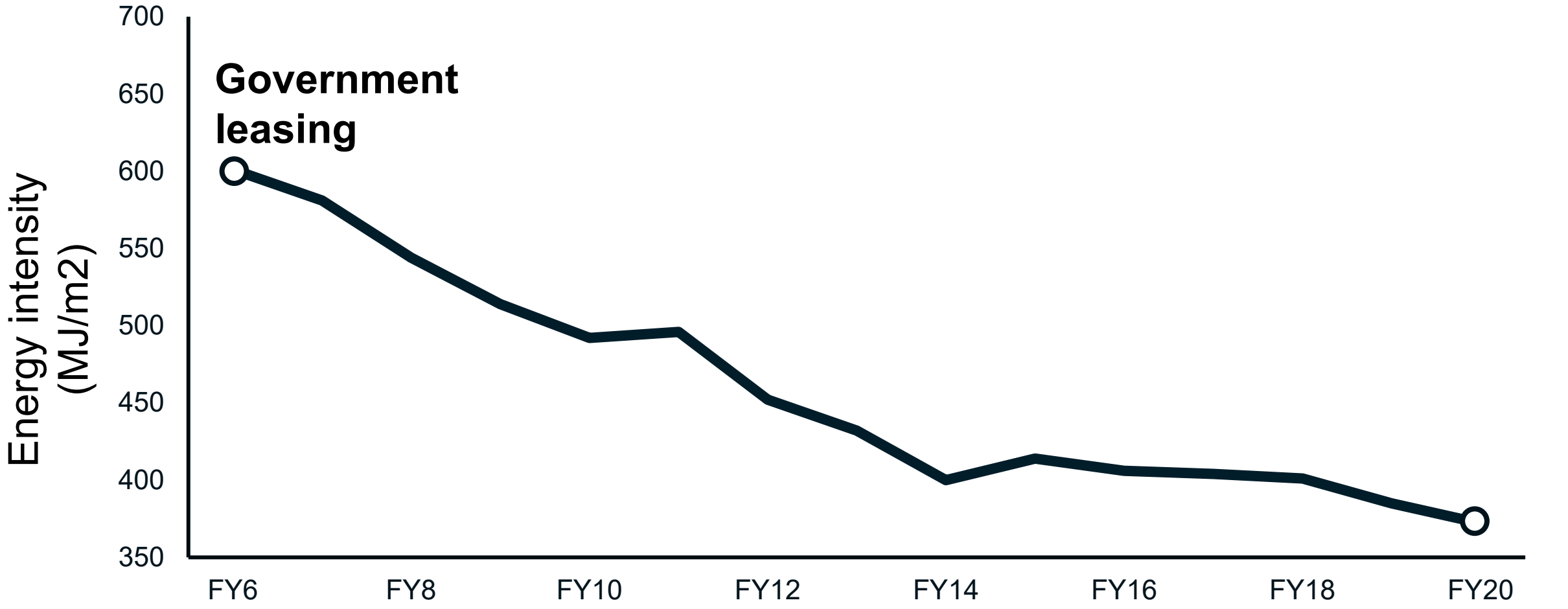
Government policies made building energy efficiency visible



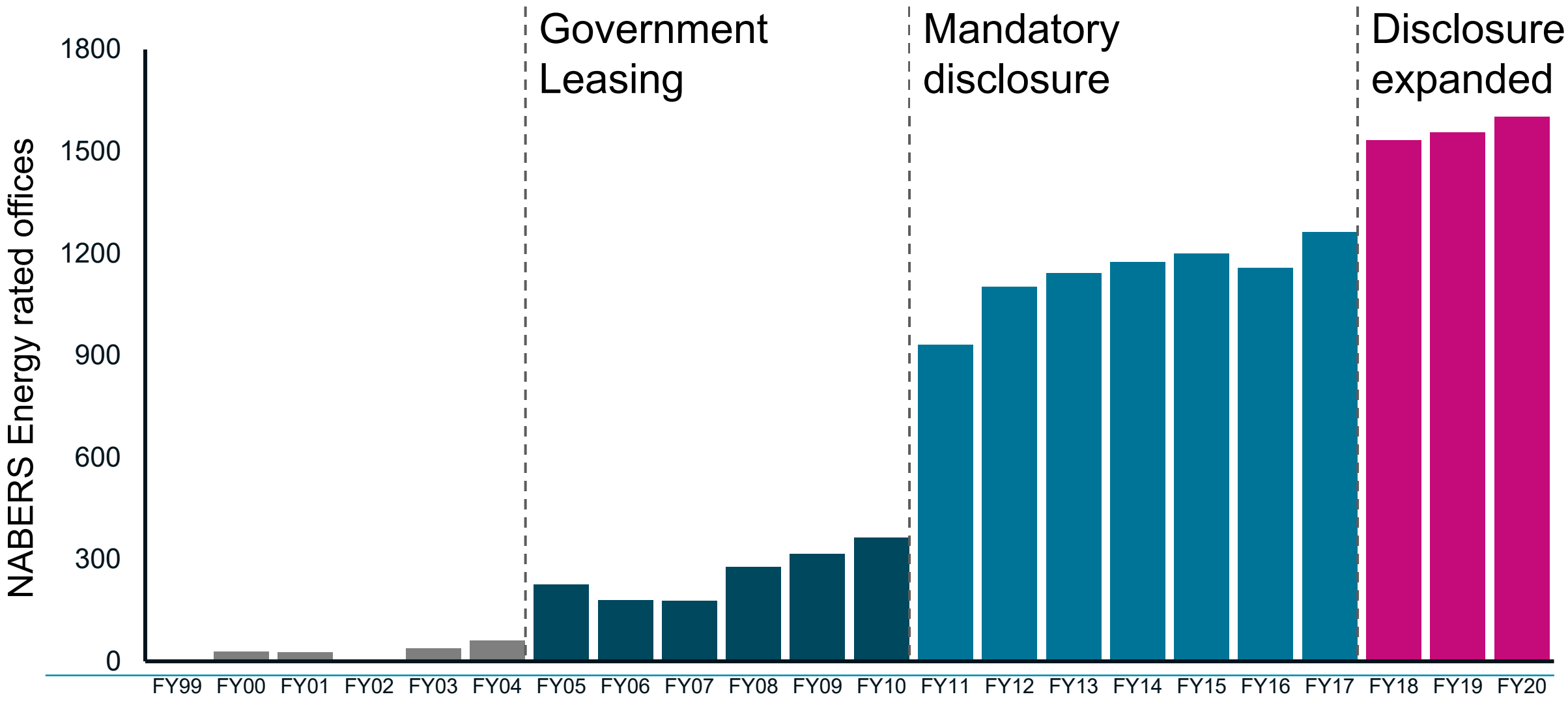
NABERS Energy requirements for Government leasing introduced from 2006



Energy savings following government leasing policies

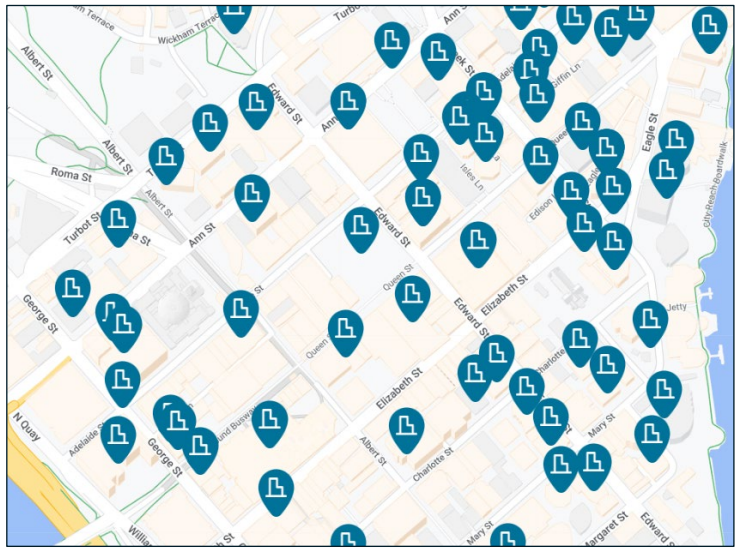


Government policies made building energy efficiency visible

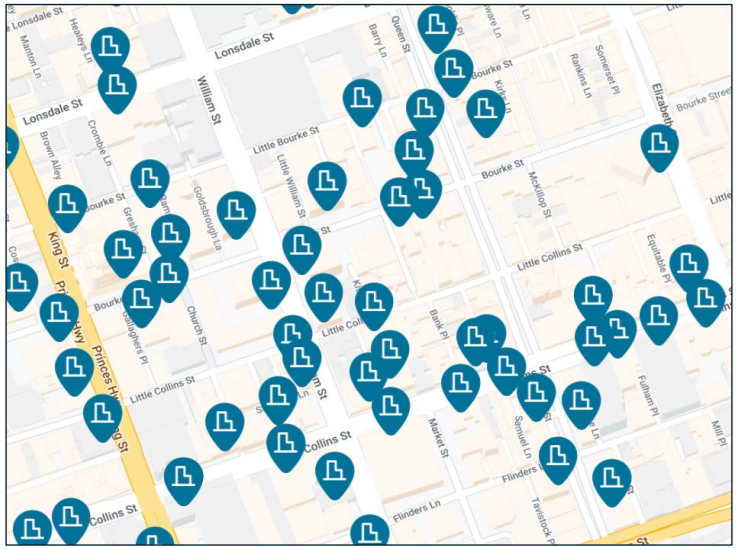


NABERS rated buildings in major cities

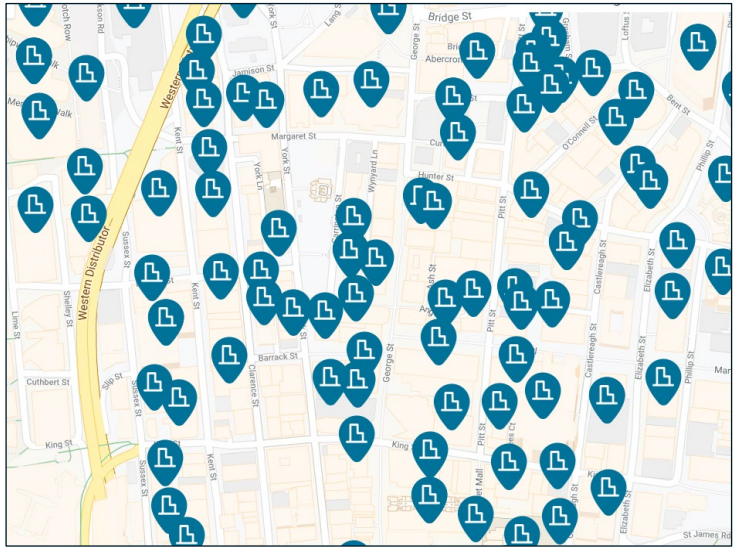
Brisbane



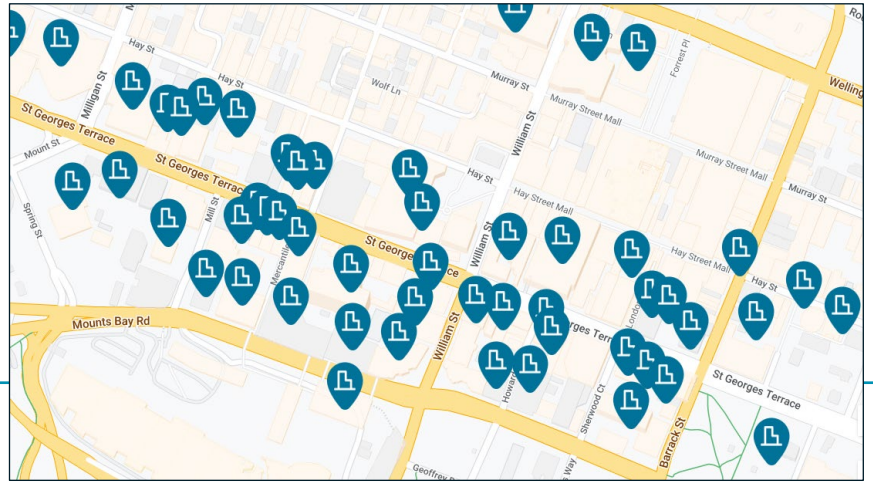
Melbourne



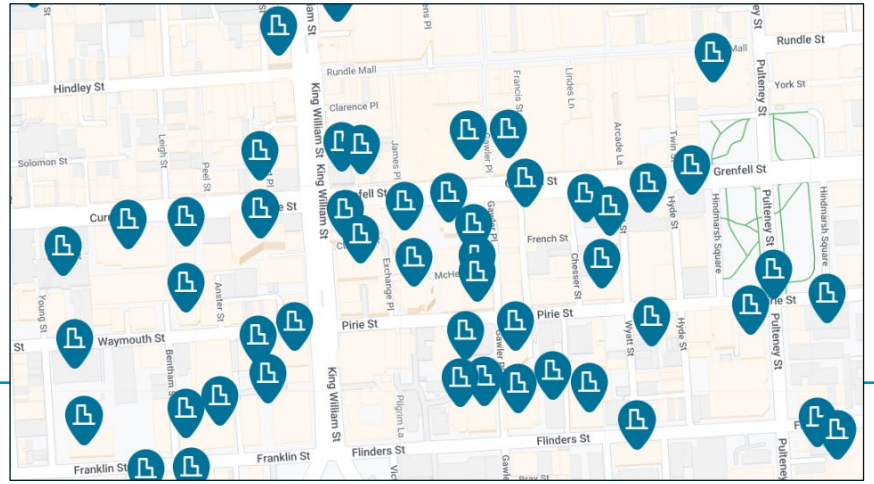
Sydney



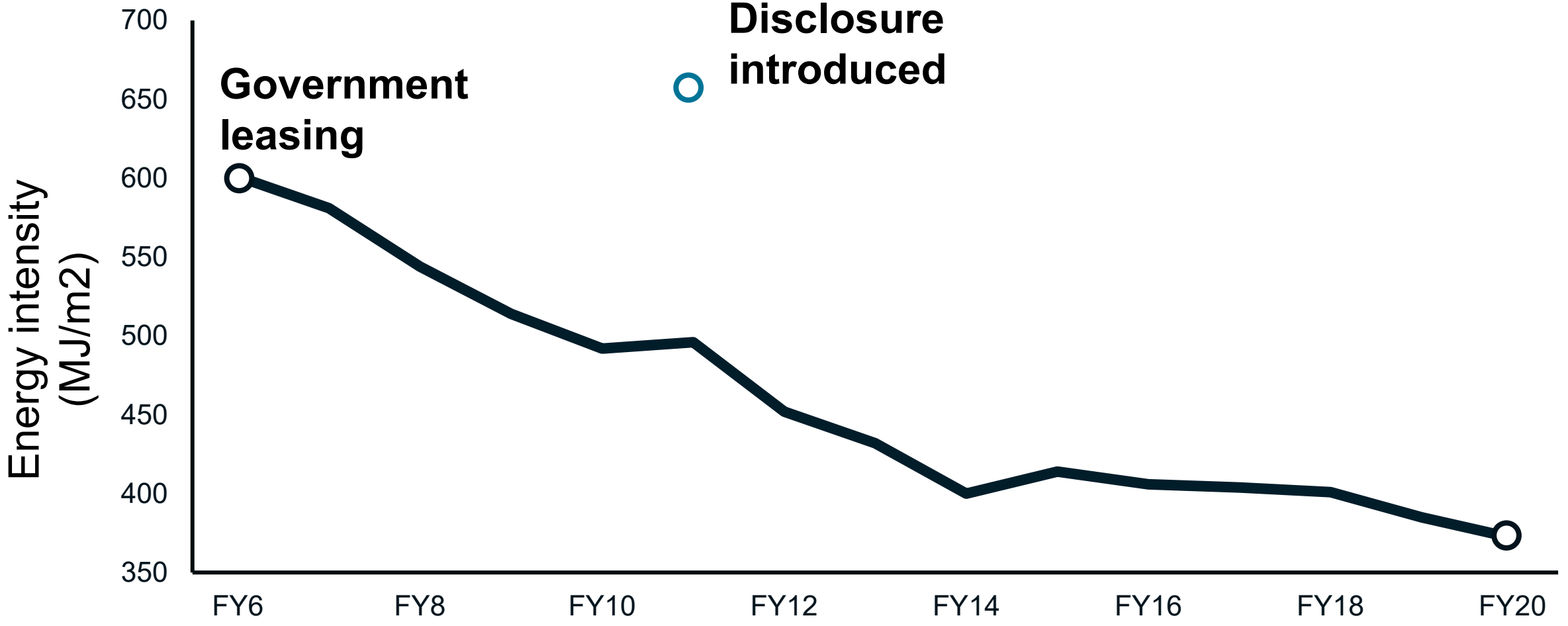
Perth



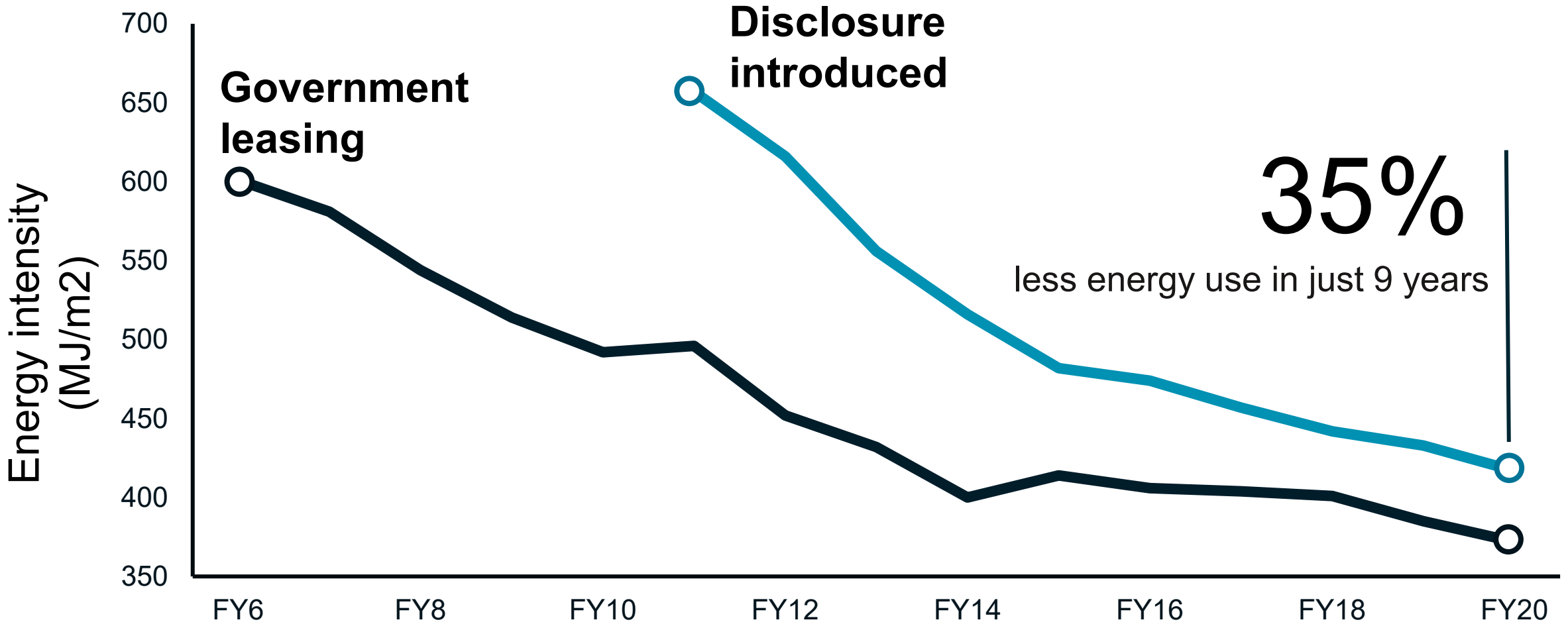
Adelaide



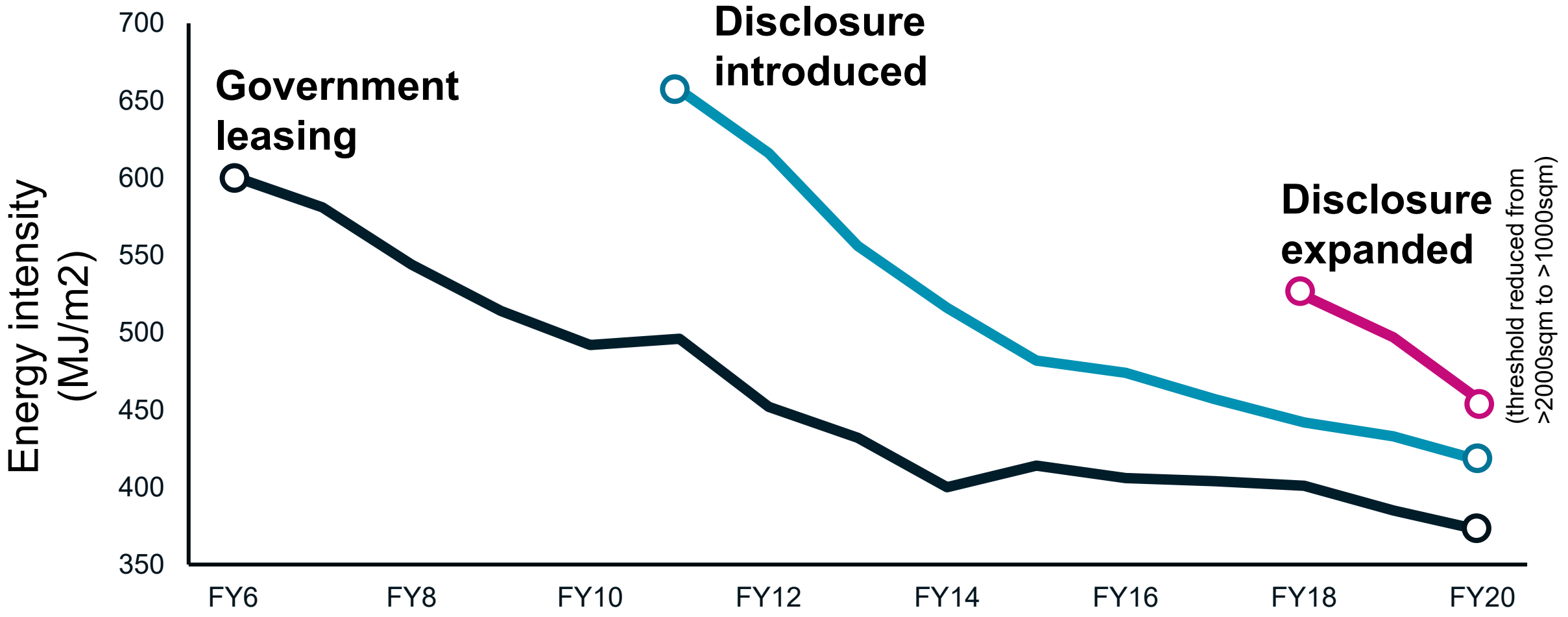
Energy savings following CBD Program



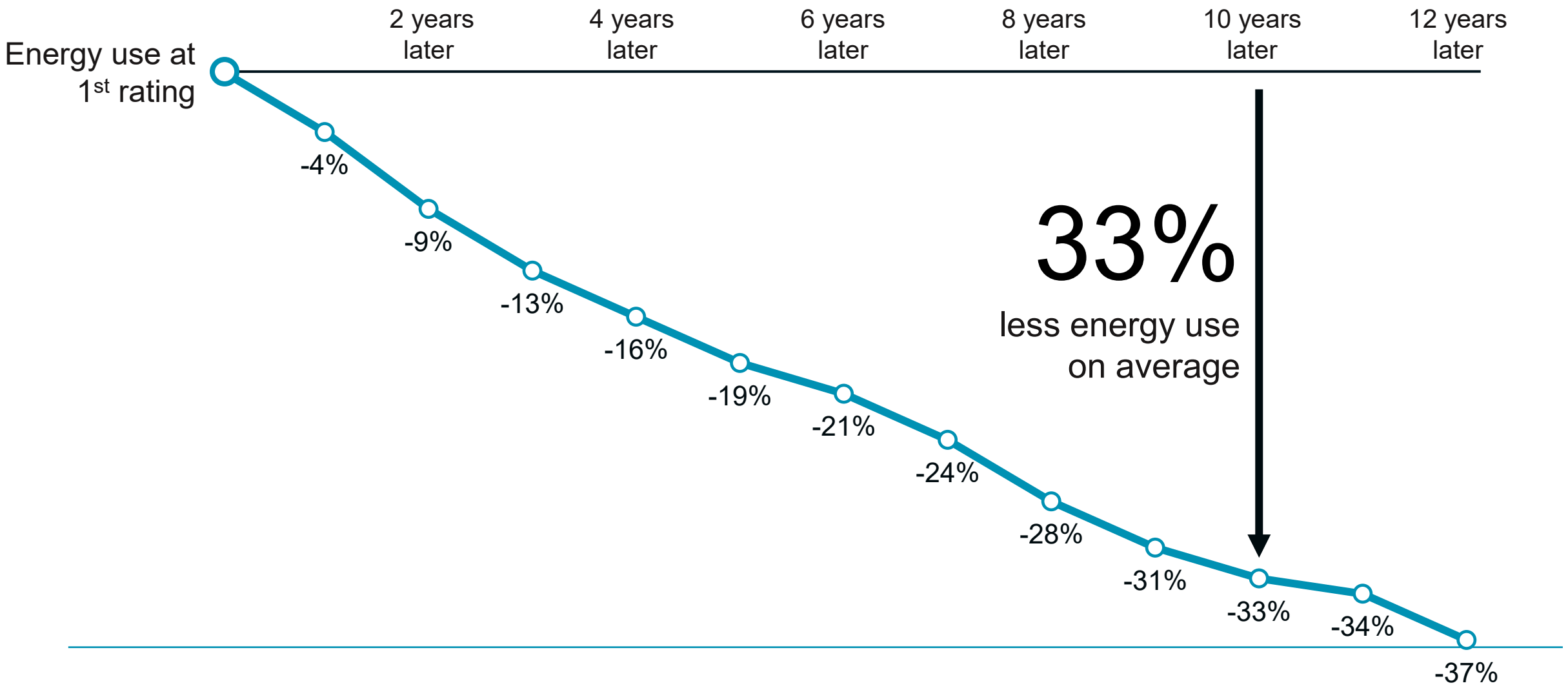
Energy savings following CBD Program



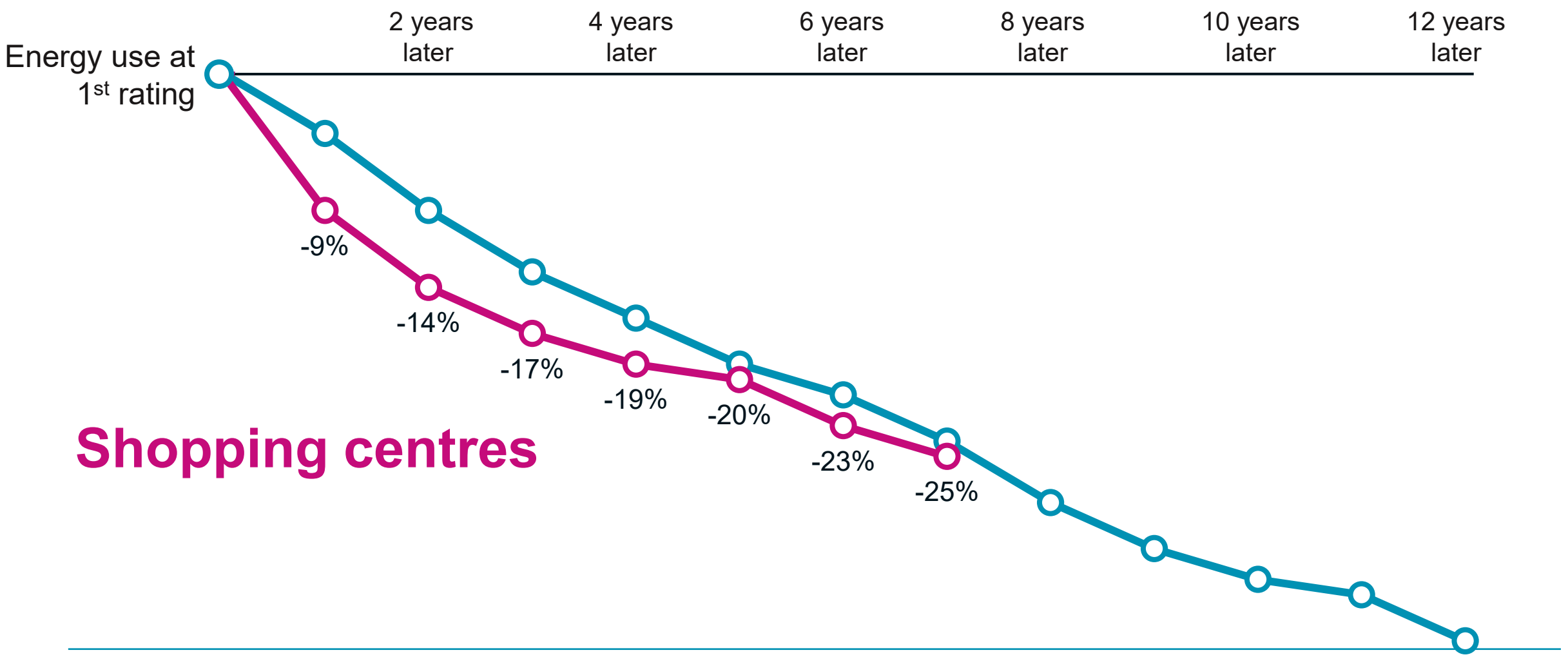
Energy savings following CBD Program



#1 NABERS-certified buildings reduce energy use at one of the fastest rates in the world



Annual energy savings from NABERS users



Useful resources

www.CBD.gov.au
www.nabers.gov.au
NABERS global guide - https://www.nabers.gov.au/publications/energy-efficiency-commercial-buildings

OVERVIEW OF THE KEY POLICIES AND ACTIONS TO IMPROVE ENERGY EFFICIENCY IN BUILDINGS IN SOUTH AFRICA

IEA Sub-Sahara Africa Training on Policy Packages

By

Mr. Teslim Yusuf – Acting General Manager

Ms. Nqobile Ngcobo – Data Analyst & EPC Lead

South African National Energy Development Institute

mineral resources & energy
Department:
Mineral Resources and Energy
REPUBLIC OF SOUTH AFRICA

sanedi
South African National Energy Development Institute

2030 NDP

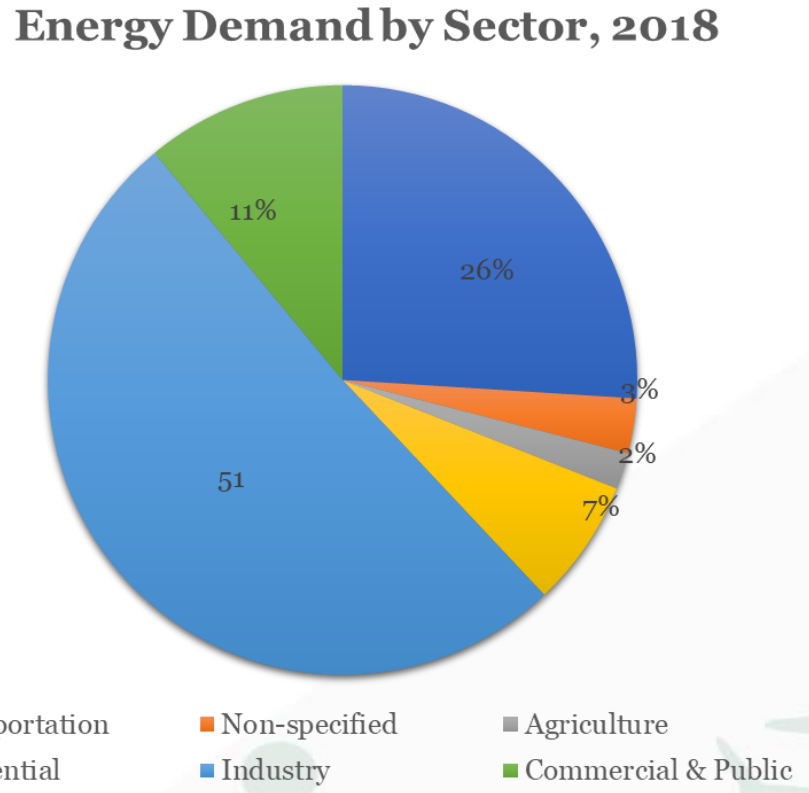
OUTLINE

- The South African Context
- Energy Efficiency – First Fuel
- South Africa's Legislative Instruments
- Goals & Targets in post – 2015 NEES
- Initiatives in Achieving the Targets
- Energy Drivers in Building
- Implementation of Targets – EPCs
- Implementation of Targets – MEPS
- Implementation of Targets – ESCO Market Development
- Key Takeaways
- Conclusion

The South African Context

KEY FACTS AND FIGURES

12th	Largest GHG emitter globally
40%	SA shares of electricity supply in Africa
350,000	Projected job loses due to load shedding
33,9%	SA unemployment rate, highest in the world
8% to 10%	SA's lost economic growth potential
250,000 to 350,000	Estimate of that require EPCs



Source: DoE Energy Balance, 2018

mineral resources & energy
Department:
Mineral Resources and Energy
REPUBLIC OF SOUTH AFRICA

sanedi
South African National Energy Development Institute.

2030 NDP

Energy Efficiency – First Fuel

Department of Mineral Resources and Energy's Strategy

UN Sustainability Developmental Goals

Local Government

Women & Youth Development

National Development Plan 2030

SANEDI's Strategy

Other National Departments (NT/DFFE/dtic/DPWi)

Broad-Based Black Economic Empowerment

Medium Term Strategic Framework

National Energy Efficiency Strategy and the Implementation of Interventions

- Energy Security of supply also addressing our supply constraints
- Environmentally friendly, health & wellbeing and lowering GHG emissions
- Industrial productivity and competitiveness to other markets
- Enabling investments that accelerate economic and inclusive growth
- Increase asset value and useful life of assets
- Increase financial benefits for public budgets, reduce utility bills and operational cost for companies

South Africa's Legislative Instruments

- White Paper on the Energy Policy (1998)
- White Paper on Environmental Management Policy (1998)
- National Energy Act 34 of 2008
- Mandatory Provision of Energy Data
- Regulations in terms of section 12L, 12I (Greenfield)
- **Draft Post-2015 NEES**
- IPAP and Master Plans
- Carbon Tax Act 15 of 2019/Offset Regulations (2019) – encourage GHG emissions reduction
- Integrated Resource Plan (IRP 2019)
- Women Empowerment and Gender Equality (WEGE) Strategy for the Energy Sector 2021-2025

Goals & Targets in post- 2015 NEES

The Public Sector

Goal	Accelerate the current rate of improvement in the energy consumption per square meter in buildings occupied by the public sector at the national, provincial and municipal levels
Target	A 50% reduction in the specific energy consumption (measured as GJ annual energy consumption per m2 of occupied floor area) by 2030 relative to a 2015 baseline.

The Commercial Sector

Goal	Accelerate the current rate of improvement in the energy consumption per square meter of lettable/ inhabited floor space in the commercial sector
Target	A 37% reduction in the specific energy consumption (measured as GJ annual energy consumption per m2 of lettable / habitable floor area) by 2030 relative to a 2015 baseline

Initiatives in Achieving the Targets 1/2

The Public Sector

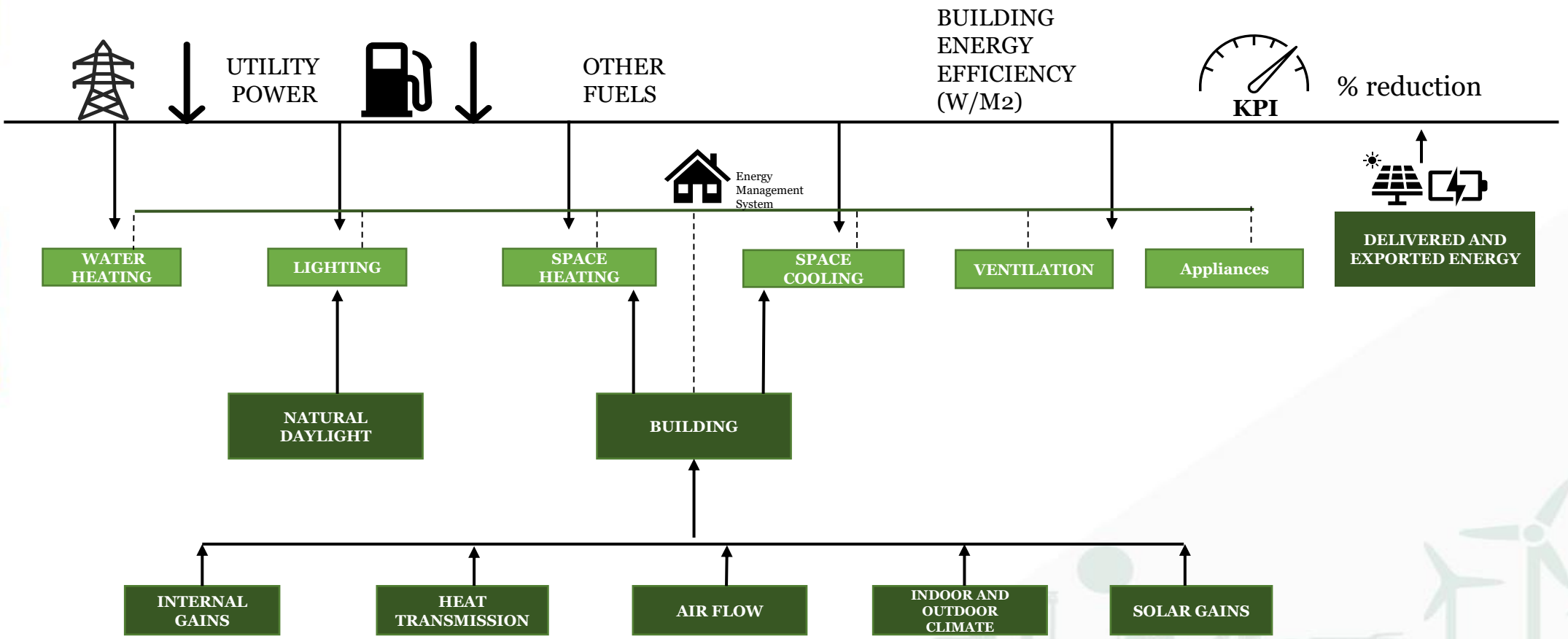
- **Develop the Brand** – Raising awareness of government employees and their roles in improving energy efficiency within public buildings.
- **Successive Tightening of Building Standards** – Tightening building standards through the National Building Regulations like SANAS 10400 XA-2021.
- **Energy Performance Certificates** – Implementation of the Regulation for the Mandatory Display and Submission of EPCs for buildings.
- **Green Procurement** - Initiatives of green procurement introduced within Department of Public Works and Infrastructure (largest landlord in South Africa).
- **Minimum Energy Performance Standards** – Implementation of MEPS Regulation to protect consumers from purchasing appliances that use a wasteful amount of electricity. It is illegal to sell appliances that do not meet or exceed the MEPS that are defined in the South African Regulations.
- **Innovative Financing Models** – Exploring these models for public sector such as encouraging partnerships between local and international energy service companies (ESCOs) to secure the financing for large-scale renovations.
- **ESCo Incubator** - Implementation of large public-sector projects through energy performance contracting, using local private sector ESCOs as sub-contractors

Initiatives in Achieving the Targets 2/2

The Commercial Sector

- **Successive Tightening of Building Standards** – Tightening standards which feed from the National Building Regulations (SANAS 10400 XA-2021)
- **Energy Performance Certificates** – Implementation of the Regulation for the Mandatory Display and Submission of EPCs for buildings
- **Minimum Energy Performance Standards** – Implementation of MEPS Regulation to protect consumers from purchasing appliances that use a wasteful amount of electricity. It is illegal to sell appliances on the South African market that do not meet or exceed the MEPS that are defined in the Regulations.
- **Alternative Financing Solutions**– Assist in the renovation of existing building stock in the commercial sector as, for the most part, tenants are responsible for the energy bills, removing the incentive for landlords to act, as they do not see a return on the investment.
- **ESCo Incubator** - Implementation of large public-sector projects through energy performance contracting, using local private sector ESCOs as sub-contractors

Energy Drivers in Buildings



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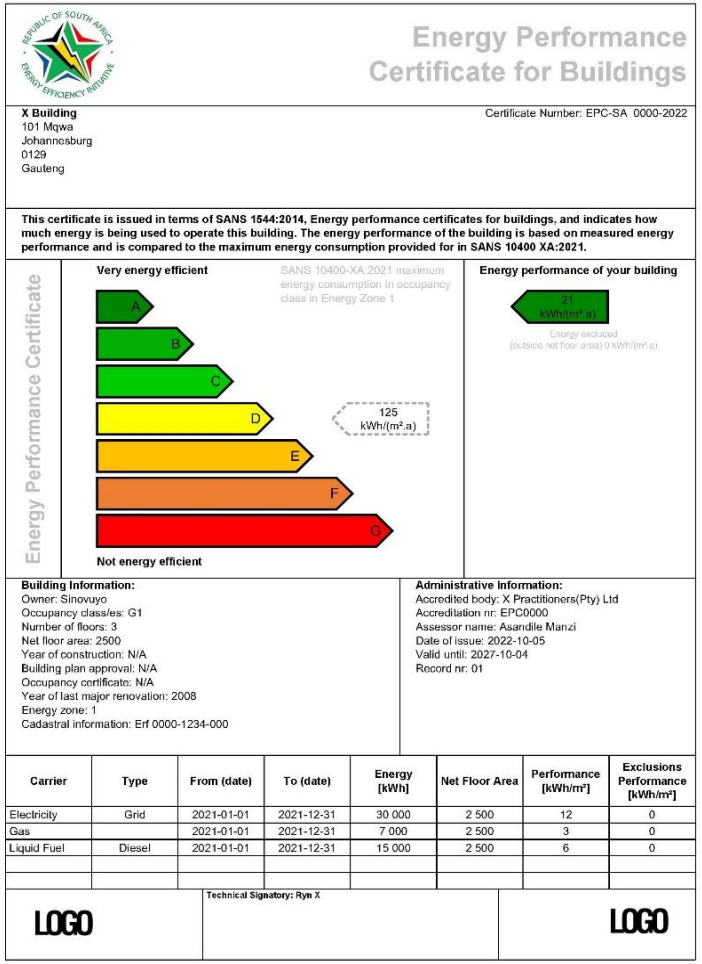
Implementation of Targets – EPCs 1/2

Background

On the 8th of December 2020, the Minister of Mineral Resources and Energy **under section 19(1) (b) of the National Energy Act of (2008)** issued and promulgated the **Regulations for Mandatory Display and Submission of Energy Performance Certificates for Buildings**.

The Regulations introduced mandatory requirements for building with a **net floor area of 2000m² for privately owned buildings** and **net floor area equal or more than 1000m² for government owned, operated or occupied buildings** to display and submit an EPC to South African National Energy Development Institute (SANEDI) within 3 calendar months of the date of issue of the certificate.



Energy Performance Certificate for Buildings

X Building
101 Mqwa
Johannesburg
0129
Gauteng

Certificate Number: EPC-SA 0000-2022

This certificate is issued in terms of SANS 1544:2014. Energy performance certificates for buildings, and indicates how much energy is being used to operate this building. The energy performance of the building is based on measured energy performance and is compared to the maximum energy consumption provided for in SANS 10400 XA:2021.

Energy Performance Certificate

Very energy efficient

SANS 10400-XA:2021 maximum energy consumption in occupancy class in Energy Zone 1

A
B
C
D
E
F
G

125 kWh/(m².a)

Not energy efficient

Energy performance of your building

21 kWh/(m².a)

Energy excluded (outside net floor area) 0 kWh/(m².a)

Building Information:
Owner: Sinovuyo
Occupancy class/es: G1
Number of floors: 3
Net floor area: 2500
Year of construction: N/A
Building plan approval: N/A
Occupancy certificate: N/A
Year of last major renovation: 2008
Energy zone: 1
Cadastral information: Erf 0000-1234-000

Administrative Information:
Accredited body: X Practitioners(Pty) Ltd
Accreditation nr: EPC0000
Assessor name: Asandile Manzi
Date of issue: 2022-10-05
Valid until: 2027-10-04
Record nr: 01

Carrier	Type	From (date)	To (date)	Energy [kWh]	Net Floor Area	Performance [kWh/m²]	Exclusions Performance [kWh/m²]
Electricity	Grid	2021-01-01	2021-12-31	30 000	2 500	12	0
Gas		2021-01-01	2021-12-31	7 000	2 500	3	0
Liquid Fuel	Diesel	2021-01-01	2021-12-31	15 000	2 500	6	0

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Technical Signatory: Ryn X

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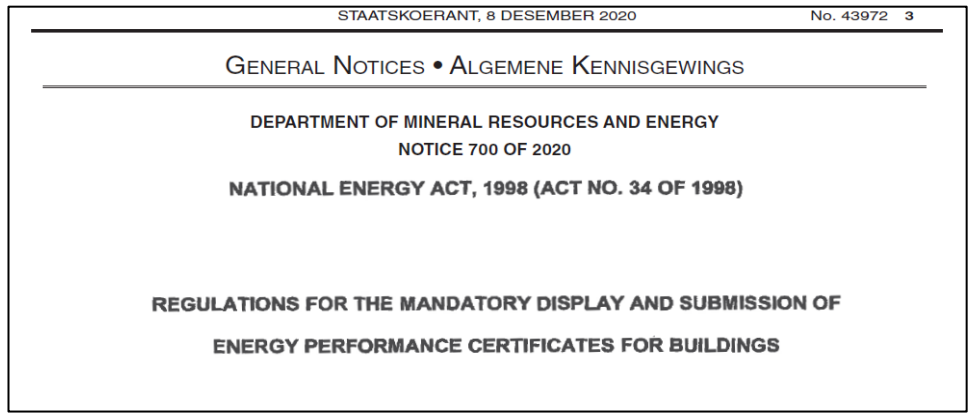
Regulation for Energy Performance Certificate (EPCs)

The Regulation for the Mandatory Display and Submission of Energy Performance Certificates for Buildings was promulgated by Mr. SG Mantashe, the Minister of Mineral Resources and Energy of South Africa **on 8 December 2020 in the Government Gazette Notice 700 of 2020**. The objective of this Regulation is to introduce **mandatory requirements for the display of EPCs for public and private owned non-residential buildings**, and to provide for the submission of EPCs by Accounting Officers of organs of state and buildings owners.



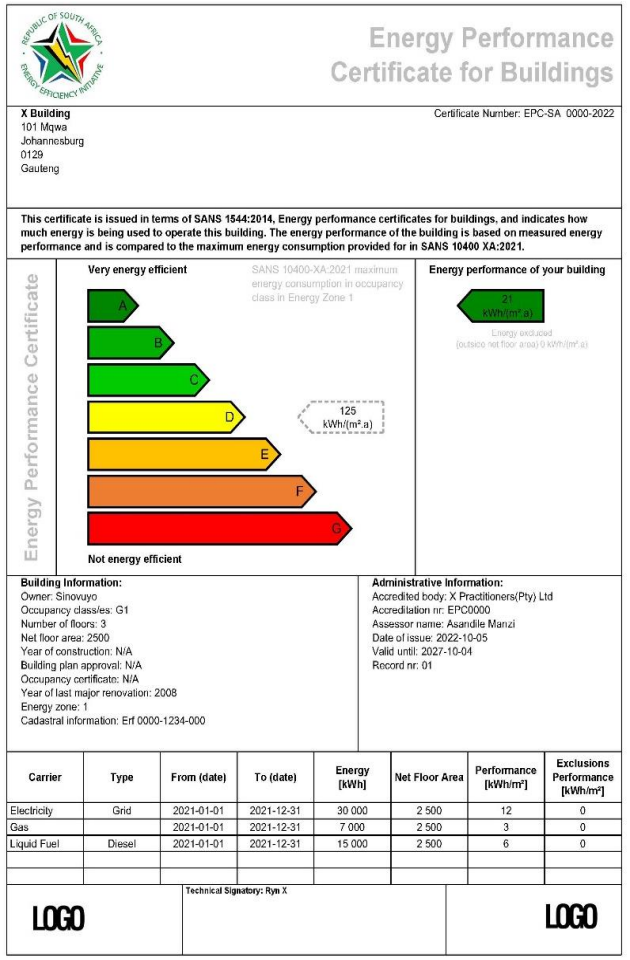
STAATSKOERANT, 8 DESEMBER 2020 No. 43972 3

GENERAL NOTICES • ALGEMENE KENNISGEWINGS

DEPARTMENT OF MINERAL RESOURCES AND ENERGY
NOTICE 700 OF 2020

NATIONAL ENERGY ACT, 1998 (ACT NO. 34 OF 1998)

REGULATIONS FOR THE MANDATORY DISPLAY AND SUBMISSION OF ENERGY PERFORMANCE CERTIFICATES FOR BUILDINGS



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Technical Signatory: Ryn X

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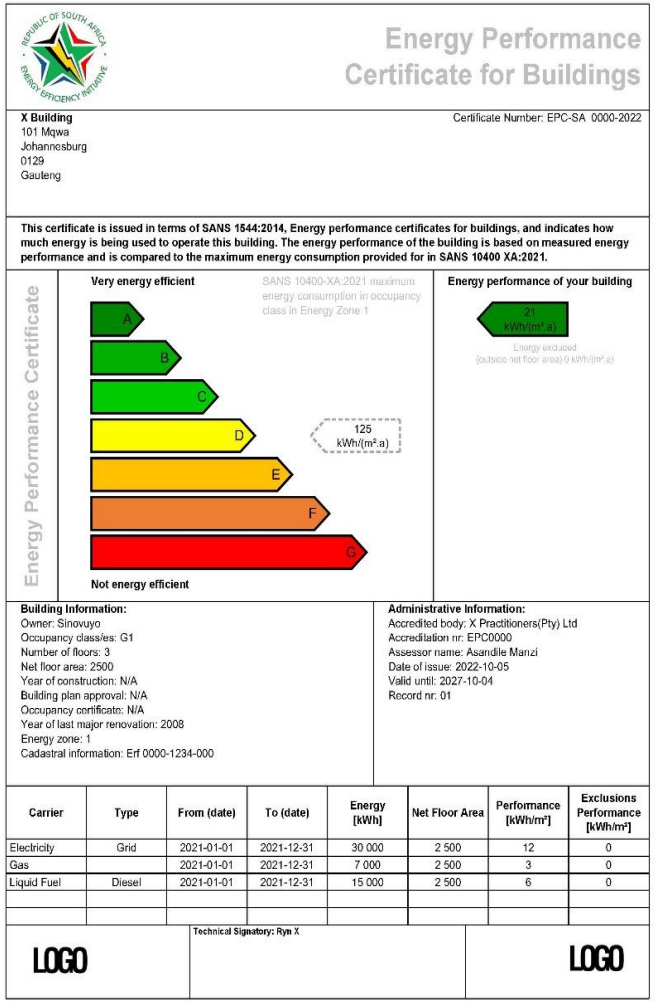
What is an EPC? (1/2)

It is a certificate issued by an accredited body in respect of a building in accordance with the SANS 1544:2014 Energy Performance Certificates for buildings, published by the South African Bureau of Standards in terms of the Standards Act, 2008 (Act No. 8 of 2008) that indicates the energy performance of that building.

"It shows how efficiently the building is being used"



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Technical Signatory: Ryn X

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The Purpose of EPCs

- EPCs for buildings are used as tools to indicate how much energy is being used to operate the building.
- To make building owners /accounting officer aware of their energy consumption and encourage them to be more efficient.
- EPCs depict the energy performance of the building.

Why EPCs in South Africa?

- To promote Energy Efficiency and save energy costs.
- Reducing our contribution to greenhouse gas emissions in South Africa.
- Create an understanding of our energy consumption in buildings across South Africa.
- To create jobs for South African.

Buildings Affected by the EPC Regulation

- **Public buildings**: owned, operated or occupied by an organ of state with a net floor area of over **1000m^2**
- **Private buildings:** buildings not owned, operated or occupied by an organ of state with a net floor area of over **2000m^2**

Occupancy Classifications	Description
A1: Entertainment and Public Assembly	Occupancy where persons gather to eat, drink, dance and participate in other recreation
A2: Theatrical and Indoor sports	Occupancy where persons gather for viewing of choral, theatrical or sport performance
A3: Places of Instruction	Occupancy where school children or students assemble for the purpose of learning
G1: Office Buildings	Large multi-story office buildings, banks, consulting rooms and stand-alone blocks

Existing buildings that have been in operation for 2 years or longer, and have not been subjected to a major renovation or change of occupancy within the year before assessment period

Buildings which fall under the above mentioned occupancy classifications and net floor area must display the EPC publicly at the entrance.

Key Role Players & Stakeholders

The Department of Mineral Resources and Energy is the custodian of all energy policies and energy security in South Africa and is also the Regulator of EPCs. They are also responsible for compliance monitoring.

The South African National Energy Development Institute is responsible to develop, deploy and maintain the National Building Energy Performance Register and to issue unique EPC numbers.

Accounting Officers or Building Owners whose buildings fall under the requirement of the Regulation are mandated to display and submit EPCs by 07 December 2022.

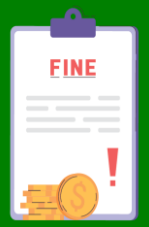
SANAS Accredited EPC Inspection Bodies issues EPCs to buildings which fall under the requirements of the Regulation.

SABS Standards division is to develop, promote and maintain South African National Standards

Who is Accountable for Compliance?

- **Owners** of private buildings in the relevant building category
- **Accounting officers** of public buildings in the relevant building category

Penalties for non compliance as stated in the National Energy Act 34 of 2008 (the building owner and/or organ of state will be guilty of an offence):



(a) a fine not exceeding five million Rand;

(b) imprisonment for a period not exceeding five years ; or

(c) both such fine and such imprisonment.

EPC Application process

Step 1

- Determine if your building falls within the required occupancy classifications and net floor area size.
- If yes, then collect all the necessary data

Renewal after every 5 years

Step 2

- Once step one is complete, register your building on the NBEPR

Step 3

- Contact and appoint a SANAS accredited inspection body to assess the Energy Performance of your building

Step 4

- The SANAS accredited EPC IB will conduct the Energy Performance Assessment (EPA) According to SANS 1554: 2014

Step 5

- SANAS accredited EPC IB submits all gathered data to SANEDI
- SANEDI to Issue a unique EPC Certificate number

Step 6

- SANAS accredited EPC IB to issues the EPC to the building owner/ accounting officer for the display at the entrance of the building

Step 7

- The building owner / accounting officer must submit a certified copy of the EPC to SANEDI within 3 months from the date the EPC is issued

DMRE to commission random annual spot-check compliance audits

Building Owner/ Accounting Officer

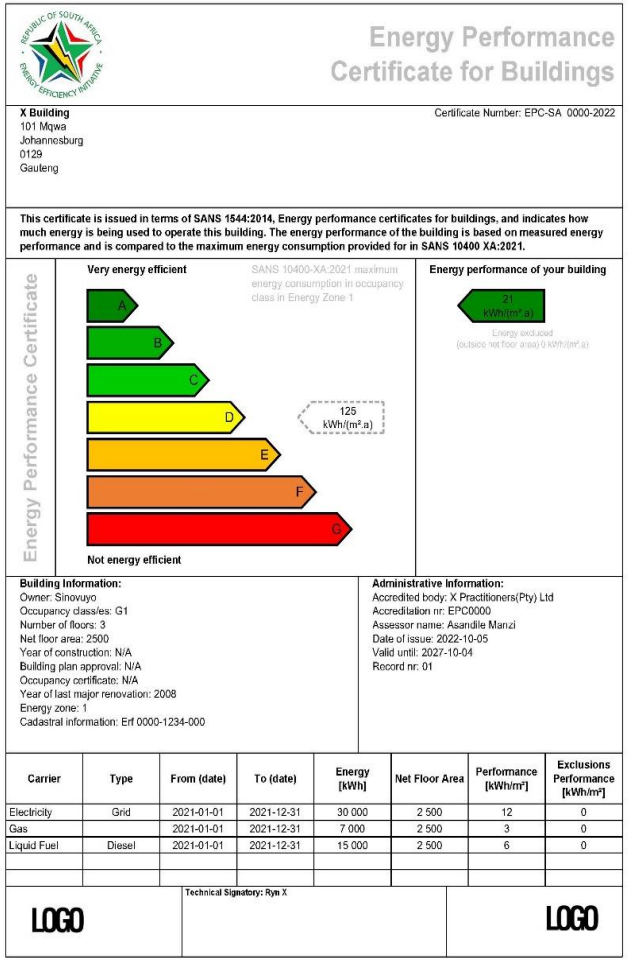
SANAS Accredited EPC IB

SANEDI

Energy Performance Certificate (EPC)

Energy Performance Certificate

An Energy Performance Certificate (EPC) is document that indicates what the Energy Efficiency rating of a particular building is based how much energy is used to operate the building



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Technical Signatory: Ryn X

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Owner/AO Information and Data

- Building Name
- Address (Street Name) (City) (Province) (Zip Code)
- Owner
- Occupancy Class/es
- Number of floors
- Year of construction
- Building plan approval
- Occupancy certificate
- Year of last major renovation
- Climatic zone
- Cadastral information
- Net floor area

EPC Information and Data

- Occupancy rate (in net floor area)
- Energy Source From (date) End (date)
- Energy used [KWh]
- Energy Source (Percentage Share) From (date) End (date)
- Energy Source From (date) End (date)
- Energy used outside nett floor area [kWh/(m2.a)]
- Benchmark [kWh/(m2.a)]
- Performance [kWh/(m2.a)]
- Exclusion Performance [kWh/(m2)]
- Multiple of reference value Performance scale
- Accredited body
- Accreditation number
- Assessor name
- Date of issue
- Valid until
- Certificate details and Logos

250,000 to 350,000 buildings that meet this requirements

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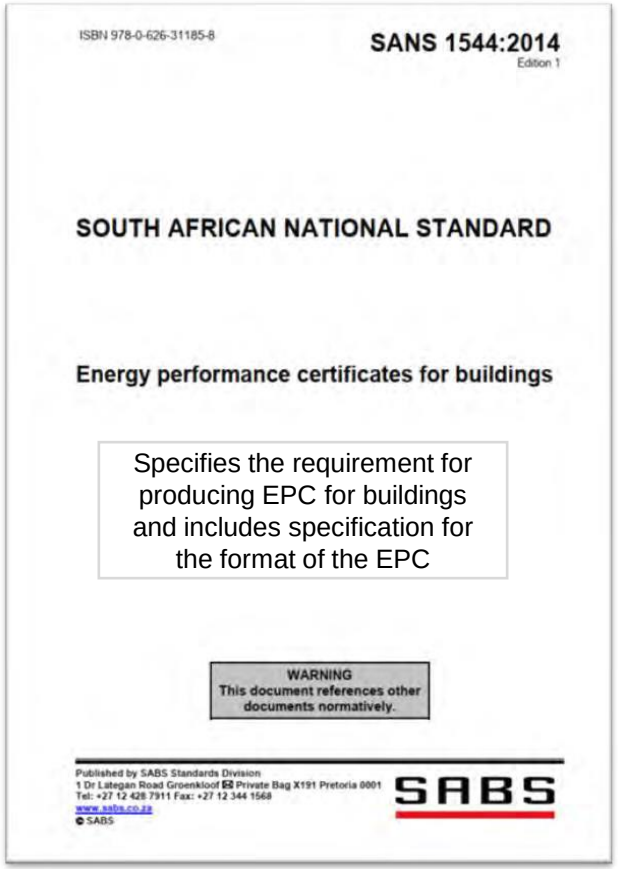
South African National Standards

The assessment of energy performance of a building is guided by the following South African National Standards



Implementation of Targets – EPCs 2/2

Statistics

488

EPCs Issued To Date

13

SANAS Accredited Inspection Bodies

27

Technical Signatories to IBs

14%

Certified Public Sector

86%

Certified Private Sector buildings

Provincial Footprint

63% Gauteng

27% Western Cape

7% KwaZulu-Natal

3% OTHERS (FS, LP, EC, NW, NC)

Occupancy Class

1% A1

0% A2

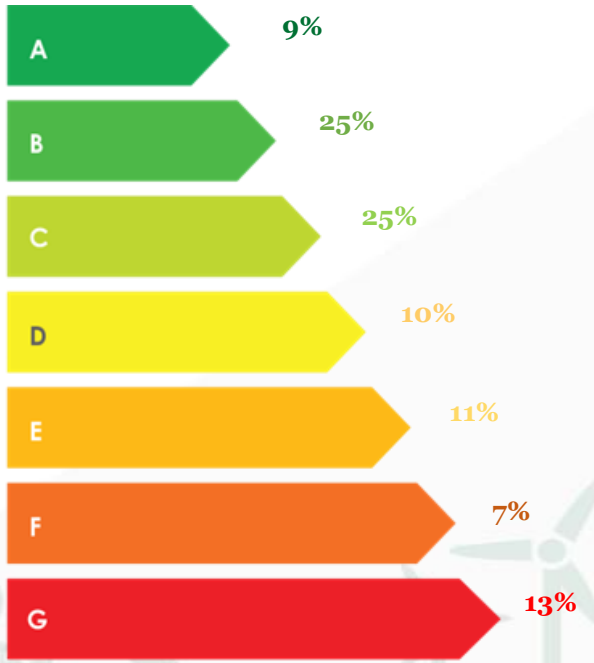
3% A3

87% G1

8% Mixed

1% Voluntary

Performance Scale



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Implementation of Targets – MEPS 1/3

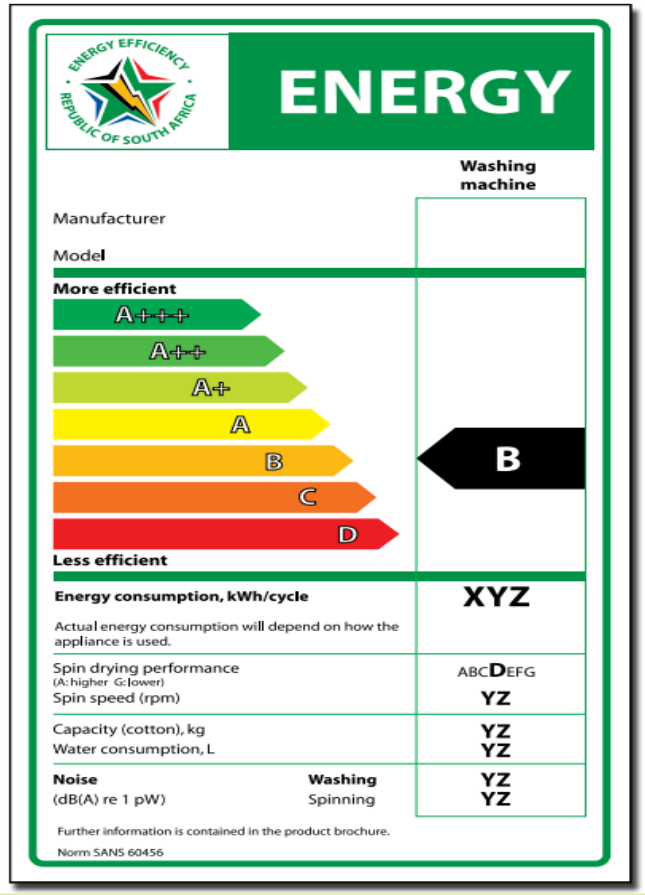
Background

South Africa has put in place regulations that require **appliances sold in South Africa to meet Minimum Energy Performance Standards (MEPS)**. MEPS define the minimum level of energy performance that an appliance must meet or exceed before it can be sold..

MEPS are put in place to **improve the energy efficiency of appliances.** Since MEPS define a minimum energy performance rating for appliances, energy inefficient appliances are prevented from entering the market and being sold to consumers. In addition, **MEPS send a signal to manufacturers to improve the energy efficiency of their appliances.**

Sizes of the labels

The actual size (100%) of a 110mm x 200mm label is shown below:
Label not to specified dimension.



Implementation of Targets – MEPS 2/3

South African Energy Efficiency Label Requirements

Appliance Category	Minimum Energy Performance
Air Conditioners	Minimum Energy Efficiency Rating of Class B
Audio-visual Equipment	In passive standby mode power consumption should not exceed 1 W, except for set-top boxes which must not exceed 3W
Dishwashers	Minimum Energy Efficiency Rating of Class A
Electric Ovens (Large)	Minimum Energy Efficiency Rating of Class B
Electric Ovens (Small & Medium)	Minimum Energy Efficiency Rating of Class A
Freezers	Minimum Energy Efficiency Rating of Class C
Fridges	Minimum Energy Efficiency Rating of Class B
Fridge-freezers	Minimum Energy Efficiency Rating of Class B
Storage Water Heater	Minimum Energy Efficiency Rating of Class B

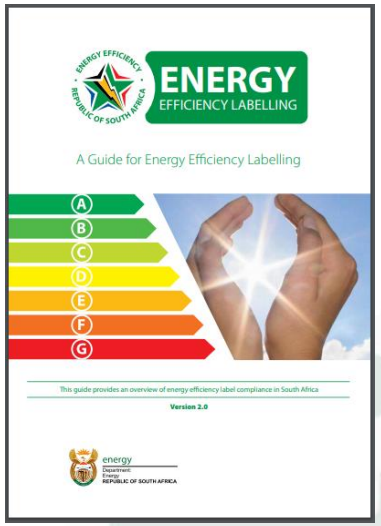
Implementation of Targets – MEPS 3/3

South African Energy Efficiency Label Requirements

Appliance Category	Minimum Energy Performance
Tumble Dryers	Minimum Energy Efficiency Rating of Class D
Washer-dryers	Minimum Energy Efficiency Rating of Class A
Washing Machines	Minimum Energy Efficiency Rating of Class A

Guide to Energy Efficiency Labelling

https://savingenergy.org.za/wp-content/uploads/2017/11/A-guide-to-energy-efficiency-labelling.pdf



Implementation of Targets – ESCo

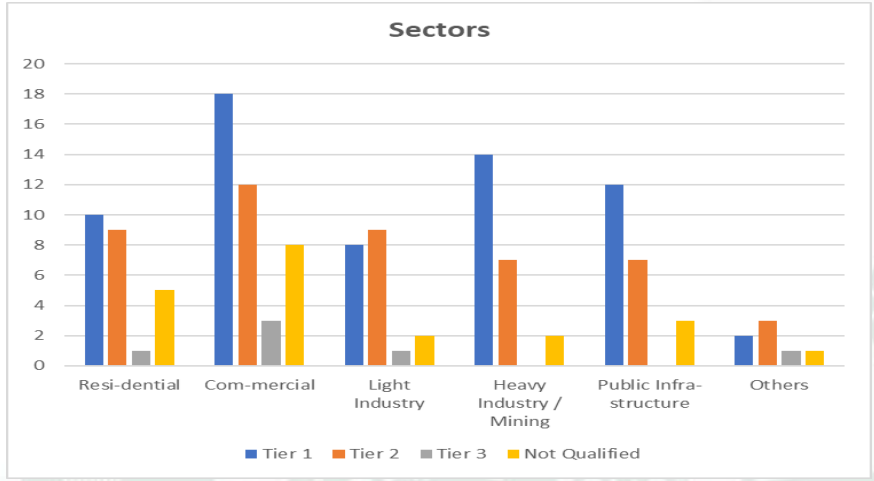
SANEDI ESCo Market Development

Tier 1 Tier 1 ESCos have to score more than 80 % on the ESCo Register criteria. 2022: 51 ESCos

Tier 2 Tier 2 ESCos have to score more than 60 % on the ESCo Register criteria. 2022: 61 ESCos

Tier 3 Tier 3 ESCos have to score more than 50 % on the ESCo Register criteria. 2022: 19 ESCos

The ESCo register is an important tool to facilitate the market development and growth of ESCo's in South Africa and is utilised by both the public and private sector organizations to identify, plan, develop, finance or implement energy efficiency projects, including energy efficiency demand side management (EEDSM) and small-scale renewable energy embedded generation. Africa.



Key Takeaways

- We must improve upon **data quality**, you require energy data for policy making, intervening and retrofit levels (building owners and facility managers) - Modeling future use, Tracking performance, M&E, Enforcement, Quantifying GHG potential reduction
- **Building metering** is a major gap we must close by thinking of the end in mind while we design our distribution networks (LV), also using Energy Management Systems is key
- **Develop better energy efficiency indications** – Aggregated data to disaggregated data (Energy use, floor area, economic activity etc.)
- To achieve NetZero in buildings, have to look at the **entire value chain and lifecycle of buildings** (Construction to emollition)
- Electricity usage in buildings is also been driven by **increased use of appliance and plug loads**, hence, Standards and Labeling programmes
- **We are lacking in areas** of developing incentives for privately owned buildings, skills and proper target setting for driving Energy Efficiency in buildings (we do it in programmes for public buildings by DMRE)
- **Learn from others and share good practices** - locally, regionally and internationally

The best way to predict the future is to design it

…Buckminster Fuller

THANK YOU

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