



OVERVIEW OF WESTERN AFRICA ENERGY EFFICIENCY SAVING ASSESSMENT FOR LIGHTING, APPLIANCES & EQUIPMENT

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Introduction to United for Efficiency Initiative



Supporting Countries to Save 20% of their Electricity

By accelerating the Global Transition to much more energy efficient lighting and appliance technologies by strengthening country capacities around the world, as well as ensuring environmentally sound management practices.

Building synergies among stakeholders, sharing knowledge and information, helping create strategic policy and regulatory frameworks, and addressing technical and quality issues.

[United for Efficiency \(united4efficiency.org\)](http://united4efficiency.org)



Electric Motors Systems



Outdoor and Indoor Lighting and controls



Domestic and Commercial Refrigerators



Room Air Conditioners



Power Distribution Transformers

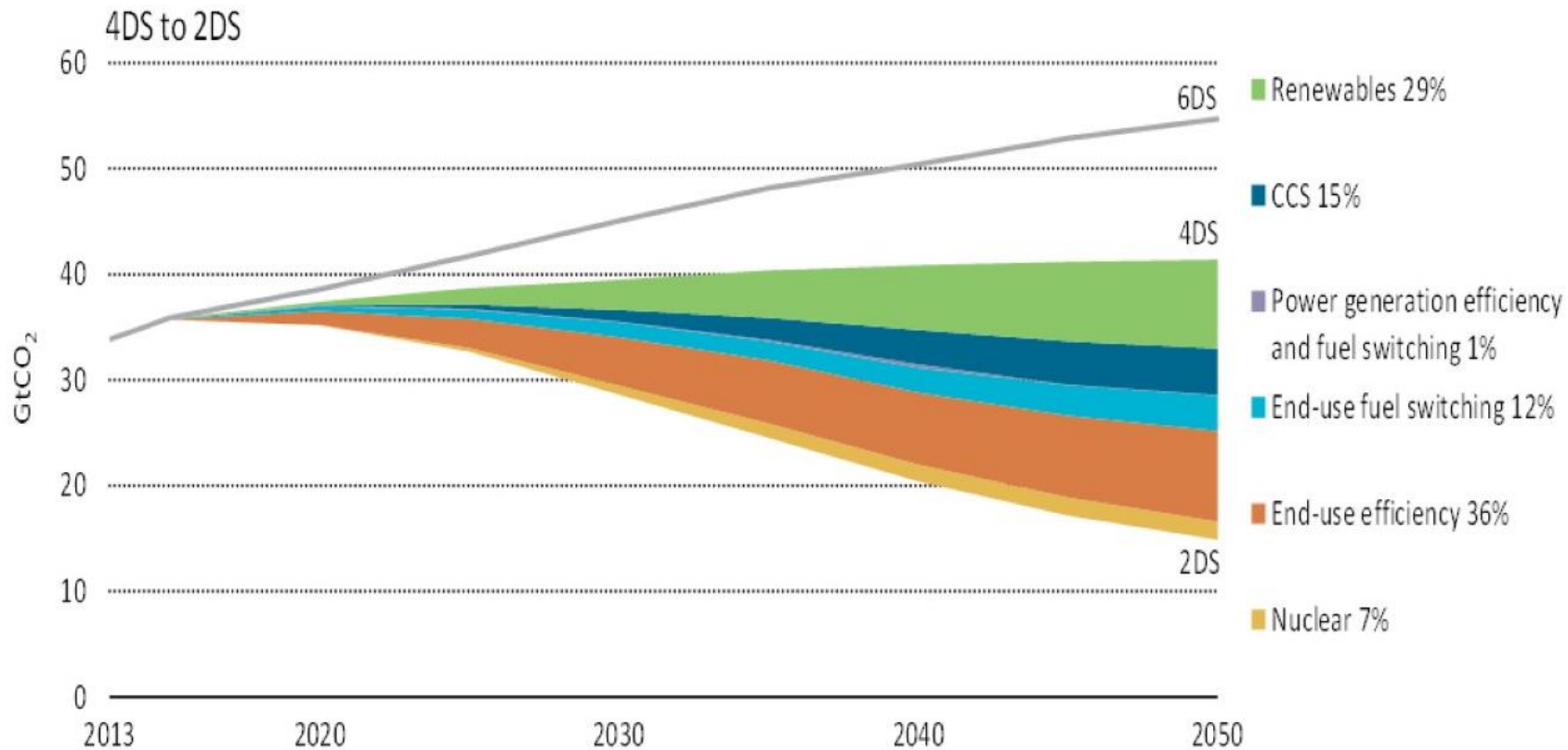


Heat Pumps

Data Centers & Computer Servers

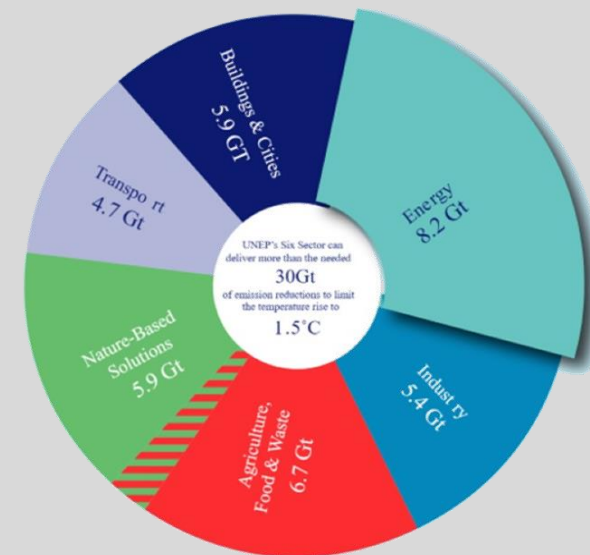


The Largest GHG Reductions to get to 2 Degrees need to come from End Use Energy Efficiency and Renewables

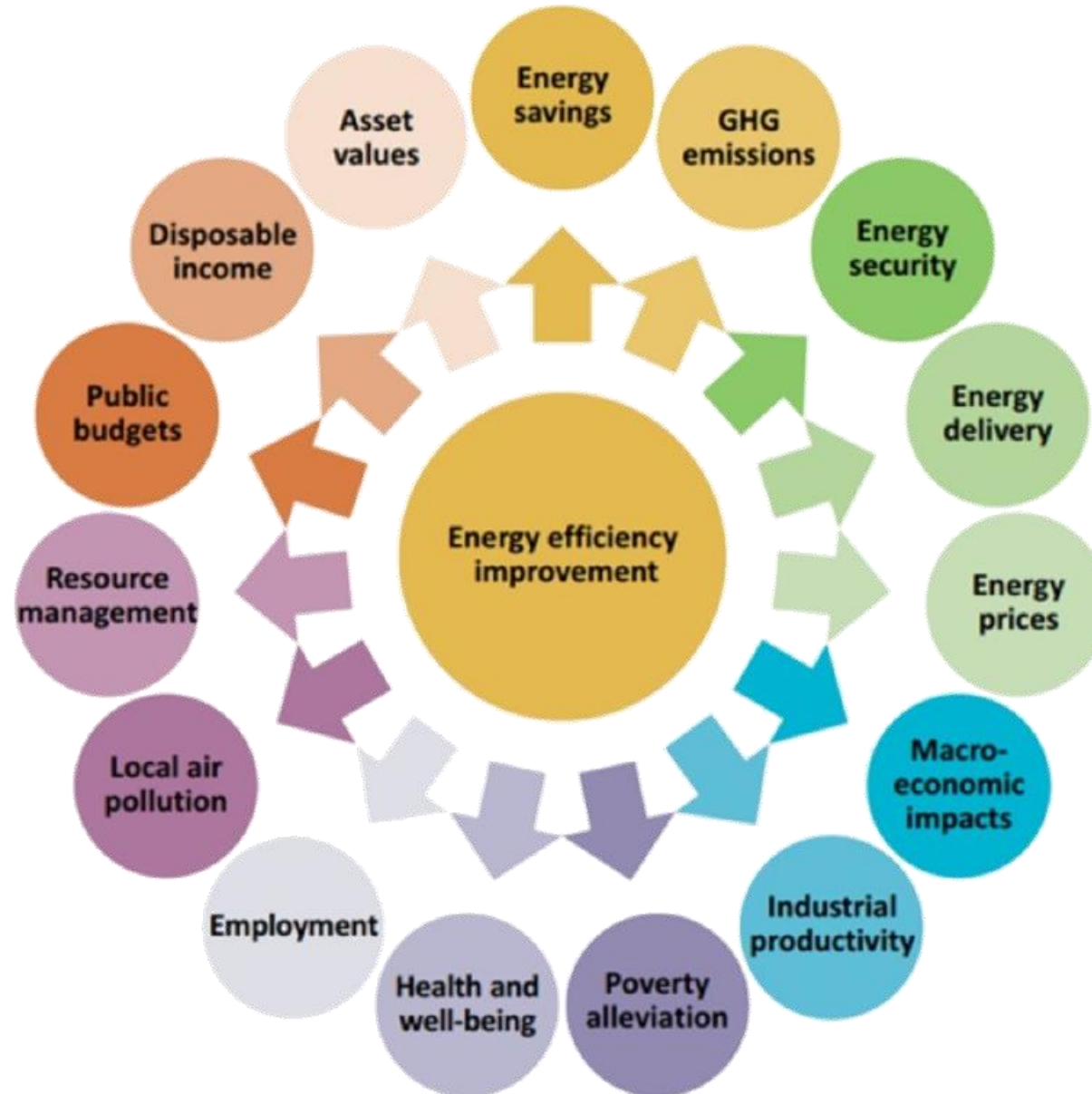


Source: IEA Energy Technology Perspectives

In the energy sector, we can cut **12.5 gigatonnes (Gt)** greenhouse gas emissions annually. No need to wait for new inventions



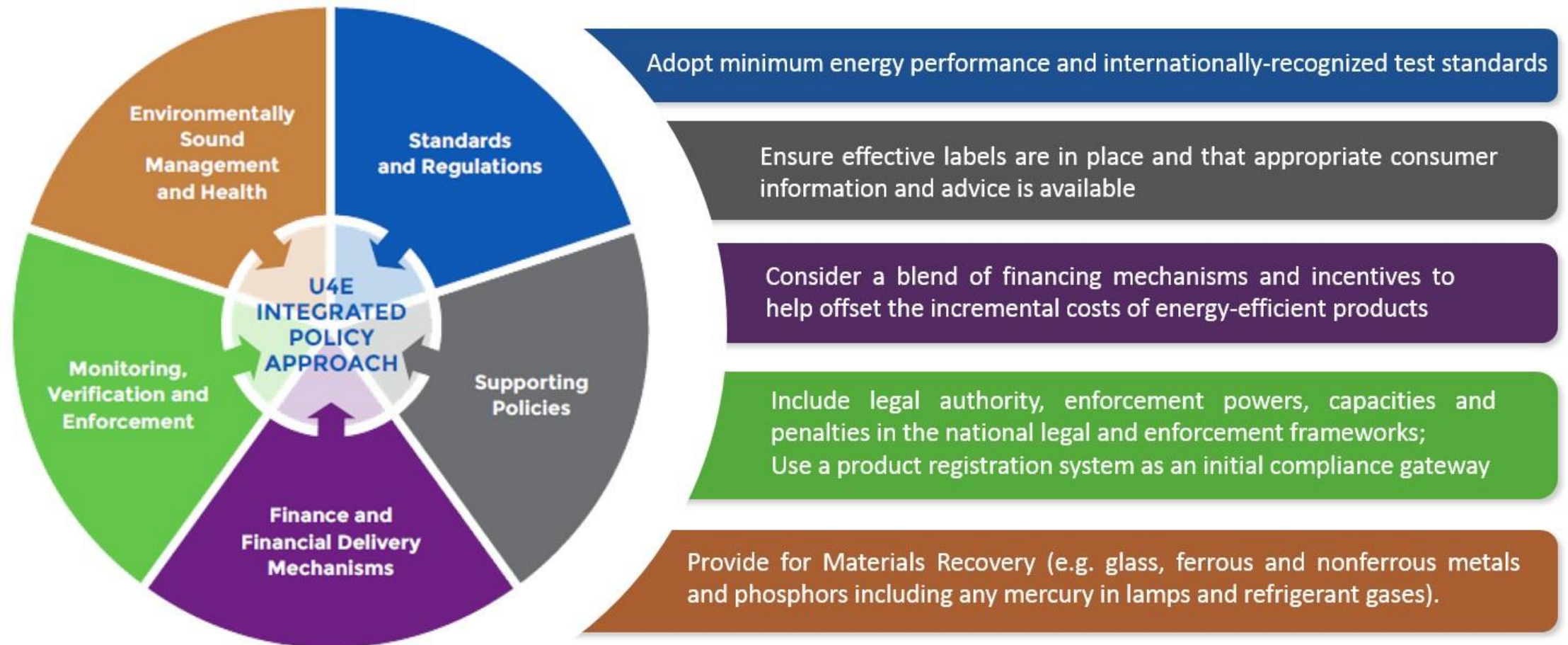
Multiple Benefits of Energy Efficiency



How do we fulfill our Mission?

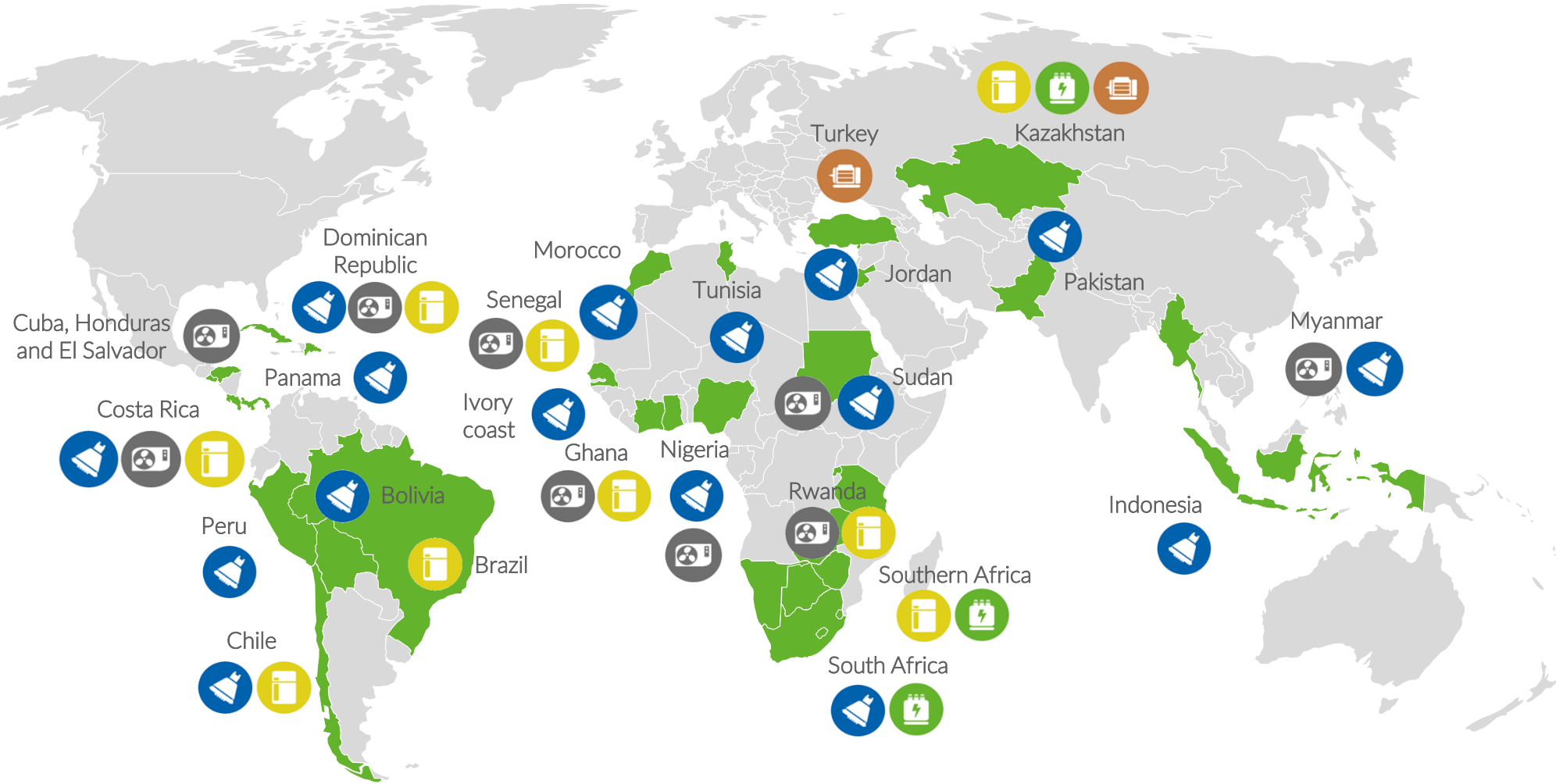
Strategic 5-year Integrated Policy Approach Programmes do work

U4E implements a proven, effective approach to an accelerated, sustainable transformation.



Market Transformation on the ground

U4E National Projects



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U4E Partner Organizations

MANUFACTURERS & INDUSTRY ASSOCIATIONS



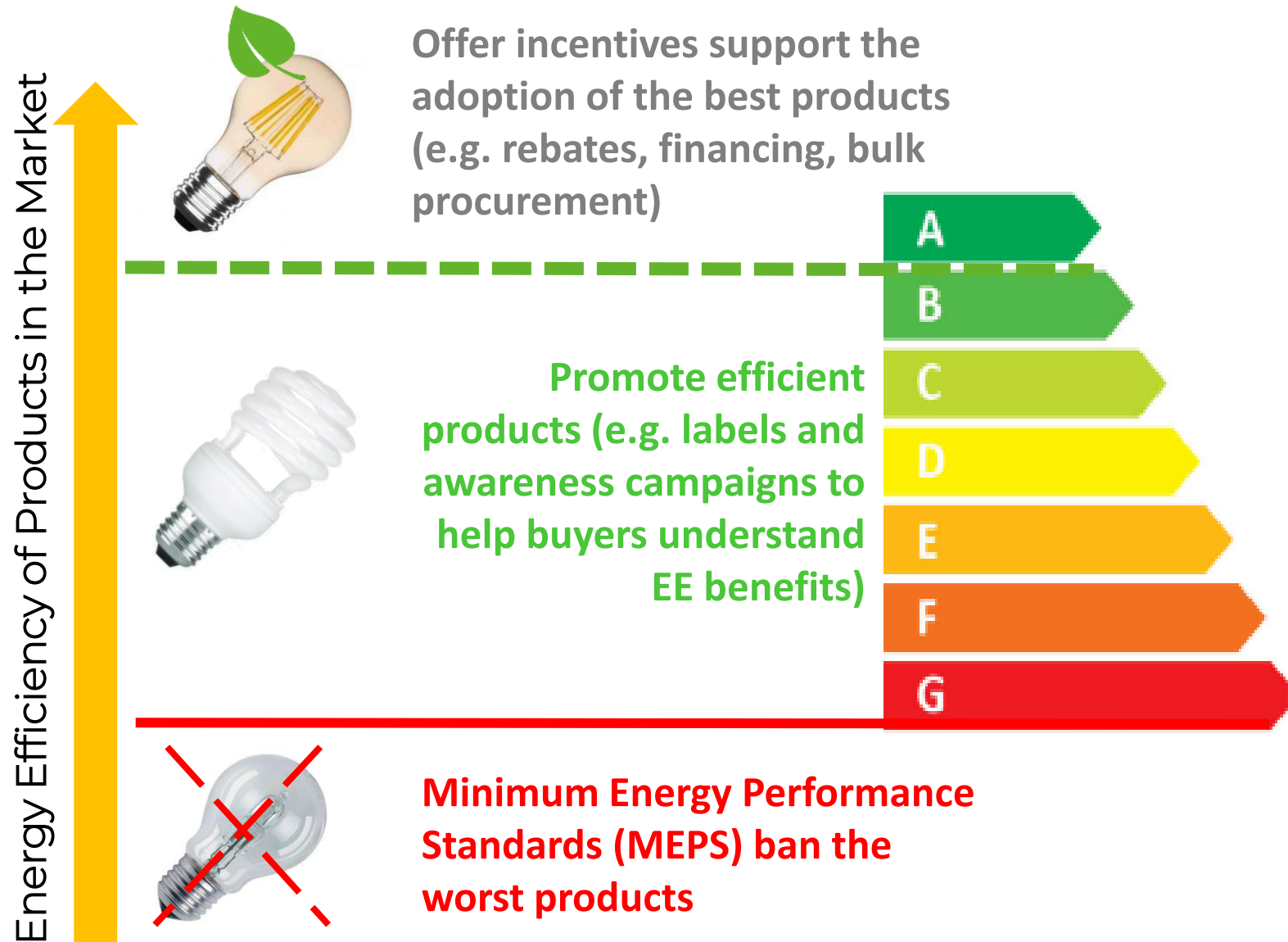
TECHNICAL ORGANISATIONS & INITIATIVES



FUNDERS, FINANCIERS & IMPLEMENTING AGENCIES



STANDARDS, LABELLING, GREEN PUBLIC PROCUREMENT AND MARKET BASED INCENTIVES WORK



Monitor the market for MEPS compliance, test the products and enforce the rules

+

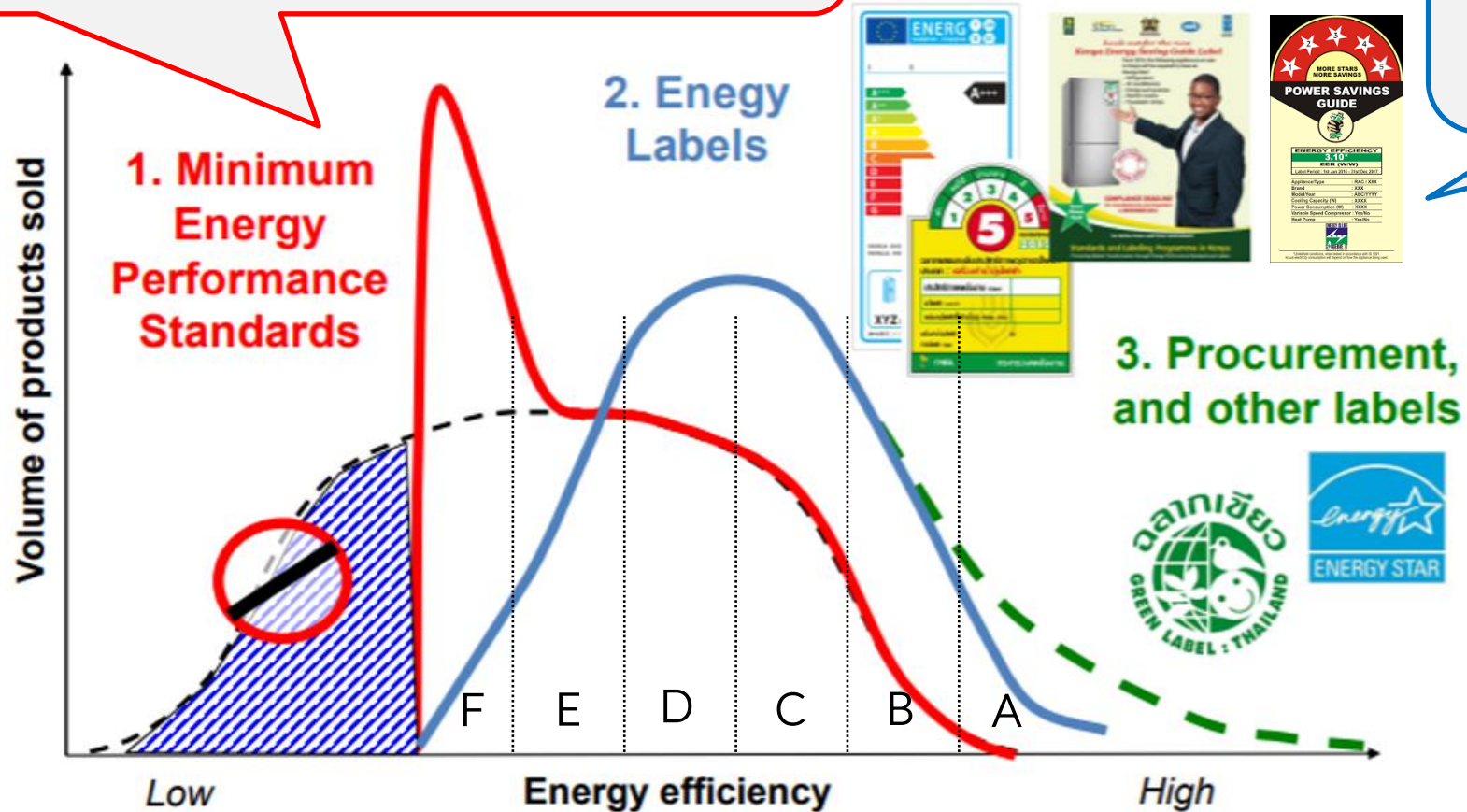
ESM for Recycle & dispose old products in a sustainable way



Policy Matters: MEPS, HEPS and Labels, the framework

RAISE THE FLOOR!
MEPS eliminate products that are obsolete or inefficient from the market and “PUSHES” manufactures to produce more efficient lighting, appliances and equipment.

RAISE THE CEILING!
Stimulate consumer demand for energy efficiency products by providing information to the end user to make informed purchasing decisions.



RAISE THE CEILING FURTHER!
Ambitious performance and eco-design to leverage public purchasing power to drive the national market.

Policy Matters: MEPS, HEPS and Labels, the framework



Challenges

- ✓ **Lack of knowledge of own local and regional market.**
- ✓ **Unawareness of the products/technologies yet globally available** in the market.
- ✓ **Wrongly considering that the market will regulate itself** without the need to introduce performance standards or policies.
- ✓ **Lack of information at the continental and regional levels** that compares the different normative status, level of regulations, level of MEPS and efficiency classes among countries.
- ✓ **Absence of harmonized regulations** among countries and lack of framework that foster it.
- ✓ **No reference** to update policies regularly.
- ✓ **Technical limitations** to respond to common questions, such as:
 - What is the scope of products that have to be included in the norm/regulation?
 - What are the parameters and metrics that I should use to assess the energy efficiency of products?
 - What are the test methods that I should use/reference to measure energy consumption?
 - What is a good level of efficiency to be used as MEPS and HEPS for Public Procurement?
 - What should be the efficiency levels that define the efficiency classes on the label?

The U4E Model Regulation Guidelines and SPP Technical Specifications can help regulatory authorities and policy makers with some of these questions and concerns

U4E Tools and Resources for moving markets to energy efficient products

Country Savings Assessment

- Showing the potential financial, environmental, energy, and societal benefits that are possible with a transition to energy-efficient products.
- 156 developing countries and emerging economies have been assessed.
- Regional Assessments for ASEAN and African regions.
- Explore for each country on: <https://united4efficiency.org/countries/country-assessments/>



Sustainable Public Procurement Technical Guidelines

- Higher ambition technical specifications and guidance on leveraging public purchasing power to drive the national market.
- Tools for environmental/economic impact bids comparison
- More information at: united4efficiency.org/sustainable-public-procurement/

Model Regulation Guidelines

- Minimum Energy Performance Standards and Labels Template for countries considering a voluntary, regulatory or legislative framework for market transformation interventions.



MR Guideline on the following products: General Service Lamps and Linear Lighting, Commercial and Domestic Refrigerators, Room Air conditioners and Fans, Electric Motors and Transformers.

U4E Tools and Resources for moving markets to energy efficient products

Product Registration System



- Prototype product regulation system which is an off-the-shelf tool that can be tailored to a countries individual needs and the complementary regional product database that can facilitate regional sharing of market and compliance information.
- Guidance and notes about PRS to provide guidelines to countries in building their own system.
- More information at: <https://united4efficiency.org/product-registration-systems/>

Policy and Supporting Guidelines

- Complementary guides on fundamental elements for a successful market transformation, such:
 - ✓ Guidelines on Harmonized System Customs Codes and National Statistical Codes for Energy-Efficient Lighting
 - ✓ Finance to Accelerate Adoption of More Energy-Efficient and Climate-Friendly Appliances
 - ✓ Model Quality and Performance Guidelines for Off Grid Refrigerators
 - ✓ Energy Labelling Guidance, among others.



Case Studies and Factsheets

Reports with detailed insights from project outcomes, activities implementation and lessons learn worth expreding to replicate similar successful pathways in other countries.

U4E Project examples:

Ivory Coast EE Lighting Project – “ Promotion of Energy Efficiency Lighting in Public, Commercial and Residential Buildings ”.



Main components

- Development of a **Market Assessment** on the current national lighting situation.
- Consensus among National Stakeholders for a **National Lighting Strategy**.
- Development of a regulatory framework for **Minimum Energy Performance Standards (MEPS), including LED lighting products** and the adoption of UEMOA labelling.
- Propose a **regulatory framework for lighting product waste management** to be incorporated in the National Strategy, recycling service organization (CRSO) and training on international regulations, extended producer responsibility and CRSOs creation and operation.
- Enhancement of **National Testing capacities** through tailored trainings sessions and implementation of a Market Surveillance System through the proposal of a National Product Registry System for lighting products.



Q4 2017 – Q2 2019

Donor:



Partner:



U4E Project examples:

Nigeria EE ACs Project – “Scaling-Up Energy-Efficient and Climate-Friendly Cooling in Nigeria’s NDC Revision”.



Main components

- Conduct a **Market Assessment on Air Conditioners (AC)** and leverage existing data
- **Update AC MEPS and Energy Labels** to enhance energy efficiency and address refrigerant global warming potential (GWP)
- Recommend **monitoring, verification and enforcement protocols** and provide capacity building to strengthen compliance.
- Conduct an **Awareness Campaign** for vendors and consumers
- Train technicians on energy-efficient & climate-friendly room ACs
- Recommend **cooling targets in the Nationally Determined Contribution (NDC)** to the Paris Climate Agreement



Q1 2022 – Q4 2024

Donor:



Clean Cooling
COLLABORATIVE

Partner:



U4E Project examples:

SADC and EAC Regional Harmonization projects.



Main components

- Development of **regionally harmonized Minimum Energy Performance Standards and Labelling** for the East African Community (EAC) and Southern African Development Community (SADC) → Total of 21 countries (16 SADC & 6 EAC).
- Facilitate **stakeholder engagements** including technical committee meetings and public enquiry.
- **National adoption** of the MEPS by the country members.
- **Public awareness** including preparation of public sensitisation materials.
- **Capacity building** for customs agencies, standards organizations, and other important stakeholders



Q1 2022 – Q4 2024

Donor:



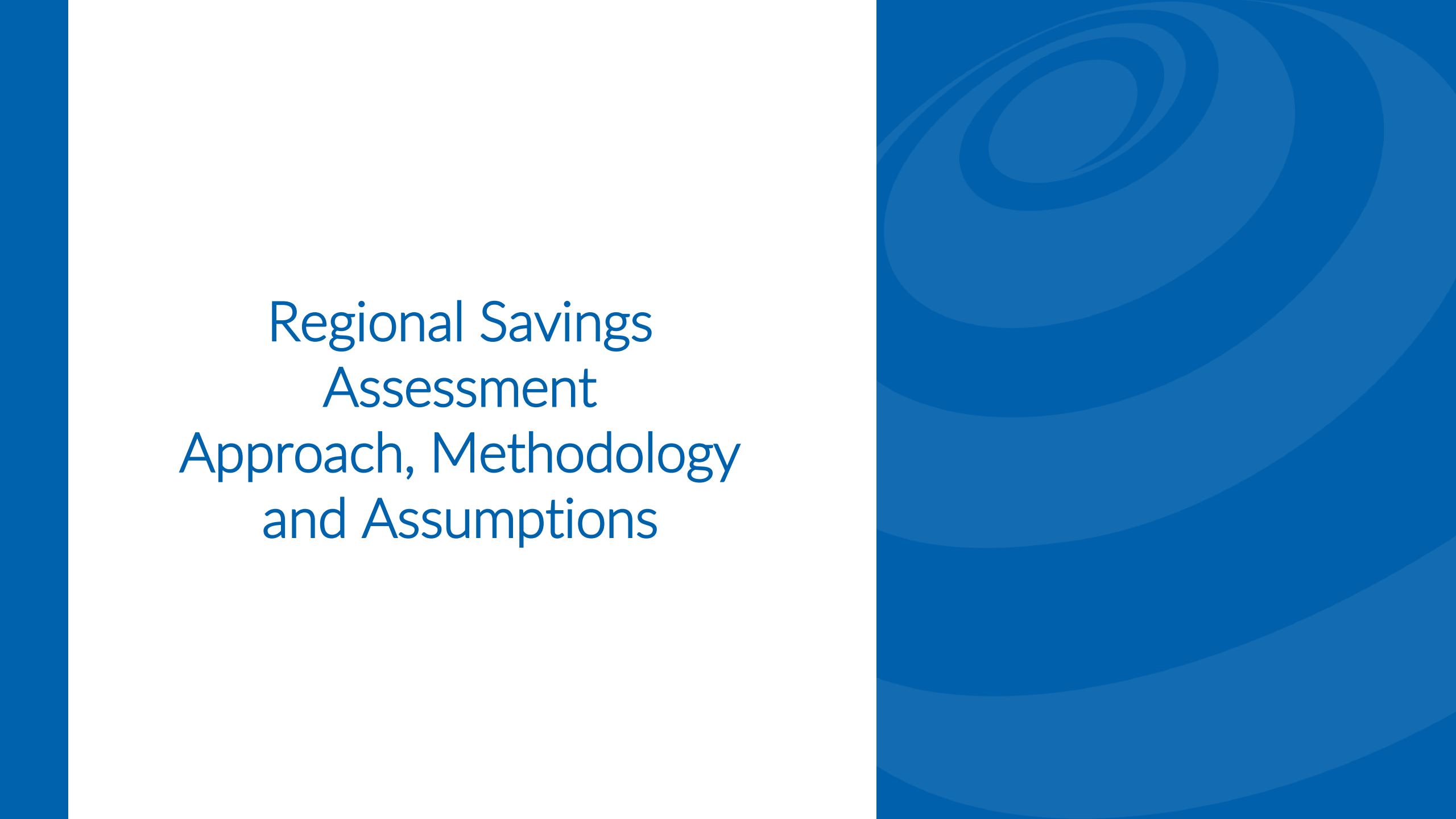
Clean Cooling
COLLABORATIVE



Department
for Environment
Food & Rural Affairs

Partner:





Regional Savings
Assessment
Approach, Methodology
and Assumptions

Country Savings Assessments



Objective

Analysis on potential impact of adopting Model Regulation guidelines for lighting, room air conditioners, residential refrigerators, commercial refrigeration equipment, industrial electric motors and distribution transformers.

These product categories are responsible for >50% of electricity usage today.



Overview

- The assessment provides three scenarios: **Business As Usual Scenario (BAU)**– No policy intervention; **Minimum Ambition Scenario** – assumes Minimum Energy Performance Standards (MEPS) implemented; **High Ambition Scenario** – Assumes MEPS are implemented at a higher level of ambition for six products.
- The **energy savings potential** is calculated till 2040 and is computed based on the difference between total energy consumption in the ambition scenarios and that of the BAU scenario and is expressed in terms of **GHG emissions mitigated, Capacity (Power plants) avoidance and Financial savings.**

COUNTRY SAVINGS ASSESSMENT

Nigeria

ANNUAL SAVINGS IN 2040*

- Reduce electricity use by over **15.0 TWh** which is over **47%** of the total current national electricity use
- Save electricity **1.8 billion US\$** equivalent to more than **7 power plants** worth over **[500MW each]**
- Reduce electricity CO₂ emissions by over **10 million tonnes** equivalent to over **5.8 million passenger cars**

ELECTRICITY SAVINGS OVER TIME*

OTHER BENEFITS ACHIEVED IN 2040*

- Increased grid connection to **7.9 million households**
- Reduced annual electricity subsidies by **190 million US\$**
- Reduced cumulative direct GHG emissions by **10 million tonnes**

UNEP Country Savings Assessment, Nigeria, July 2022

OVERVIEW OF BENEFITS

ANNUAL SAVINGS IN 2040*

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HIGHER AMBITION TO HELP REACH ENERGY AND CLIMATE GOALS

THE MORE AMBITIOUS THE REGULATION, THE MORE SAVINGS ARE POSSIBLE

By 2040, electricity consumption is projected to increase by **222%**. Minimum ambition scenario could reduce this to **152%**. More ambitious policies could reduce this to **8.7%**.

MEET GLOBAL CLIMATE GOALS BY SIGNIFICANTLY DECREASING EMISSIONS

Annual CO₂ emissions in 2040 (Billion tonnes)

- Business As Usual: 47,400
- Minimum Ambition Scenario: 23,400
- High Ambition Scenario: 17,200

PRODUCT SHARE OF CO₂ EMISSIONS SAVINGS BY 2040 AND 2040*

- Lighting: 21.8%
- Residential Refrigeration: 19.4%
- Commercial Refrigeration: 16.1%
- Room Air Conditioners: 14.2%
- Industrial Electric Motors: 11.3%
- Distribution Transformers: 9.1%

UNEP Country Savings Assessment, Nigeria, July 2022

DETAILED BENEFITS AND TYPICAL PRODUCT ASSUMPTIONS

ANNUAL SAVINGS IN 2040 AND 2040*

Product	2040	2040	2040	2040
Residential Refrigerators	1,100	2,900	4,500	11,000
Commercial Refrigeration	120	26	71	1,300
Room Air Conditioners	710	1,900	150	410
Industrial Electric Motors	87	9.2	12	29
Distribution Transformers	510	54	70	170

CUMULATIVE SAVINGS BY 2030 AND 2040*

Product	2030	2040	2030	2040
Residential Refrigerators	4.6	25	1.0	3.4
Commercial Refrigeration	5.0	2,800	110	610
Room Air Conditioners	3.0	17	0.8	4.5
Industrial Electric Motors	8.6	10	0.3	2.3
Distribution Transformers	7.6	1,300	51	280

PRODUCT CONTRIBUTION TO CUMULATIVE ELECTRICITY USE & SAVINGS BY 2040

UNEP Country Savings Assessment, Nigeria, July 2022

SAVINGS POTENTIAL IN CONTEXT

OTHER OPPORTUNITIES COMPARED WITH MEPS BY 2040

Minimum Energy Performance Standards are developed specifically to improve product efficiency in a market, but other important steps can be taken to reduce electricity consumption further.

ROOM AIR CONDITIONERS

- Ensuring products are correctly sized at the time of installation
- Implementing best practice ongoing maintenance practices
- Raising the temperature set point for MEPS-compliant units from 22°C to 24°C can save between 6-10% per degree up to 37°C
- The use of control systems, sensors and thermal zoning. The savings from AC controls varies greatly depending on the situation but typical savings can be:
 - 28-35% for small offices
 - 12-35% for small retail
 - 24% for supermarkets

LIGHTING

- Occupancy & daylight sensors used in all appropriate settings can typically save up to:
 - 40% in commercial settings
 - 30% in industrial settings
 - 25% for street lighting

INDUSTRIAL ELECTRIC MOTORS

- The use of variable speed drives in all suitable applications could give an average saving of as much as:
 - 20% when used with pumps
 - 20% when used with fans/blowers
 - 10% when used with compressors
 - 3% when used on mechanical applications

DISTRIBUTION TRANSFORMERS - SMART GRIDS

- Using Smart Grids brings other benefits including:
 - Reducing projected increases in peak demand by as much as 24%, allowing:
 - Reduced capacity cost
 - Delays in maintenance/replacement requirements
 - Reduced CO₂ emissions from peaking plant
 - Enabling transformers to be correctly sized at the time of installation
 - Implementing best practice ongoing maintenance and rewinding

UNEP Country Savings Assessment, Nigeria, July 2022

COUNTRY DATA, TYPICAL PRODUCT ASSUMPTIONS AND METHODOLOGY

GENERAL INFORMATION

Parameter	Value
Population	211 Million
GDP per capita	2,165 US\$
Electricity Grid Loss	8.0%
AC Voltage Factor	0.95 V/Vm

ELECTRICITY MARKET

Parameter	Value
Residential electricity tariff	0.11 US\$/kWh
Transmission and distribution loss factor	16.1%

TYPICAL PRODUCT ASSUMPTIONS

Product	2018 Unit Energy Consumption (kWh/year) or Efficiency Level	Type of Product
Residential Refrigerator	100 (EER 10)	4-Door, 180L, 180L
Commercial Refrigerator	330 (EER 12)	2-Door, 180L, 180L
Room Air Conditioner	3,900 (EER 12)	1.5 Ton, 180L, 180L
Industrial Electric Motor	4,219 (IE3)	3-Phase, 380V, 180L
Distribution Transformer	See note	Level 1, Level 2

METHODOLOGY

The analysis uses the United4Efficiency Country Savings Assessment Model to estimate the impact of implementing policies that improve the energy efficiency of each product analysed. The model methodology is provided below (click on the links for more information).

The costing analyses for refrigerators, commercial refrigeration and air conditioners use a bottom-up stock model approach combined with market size and typical product performance. Future growth is projected based on established relationships between country and other market measurement indicators.

The lighting analysis uses a bottom-up stock model with market size and typical products to estimate current light demand. This is compared to the total electricity use in the country to estimate the potential for energy savings. The savings potential is calculated by comparing the current electricity use with the potential electricity use based on assumptions about future trends in light saving and product efficiency in different settings.

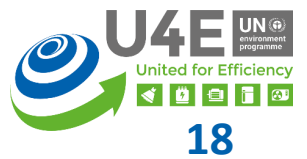
The equipment models are both top-down estimates. The electricity use of motors is based on a typical relationship to industrial GDP, while distribution transformers are based on the typical electricity use in the country. The savings potential is shared between several typical products and applications based on market size. In both cases, the improvement in average stock efficiency is based on an analysis of stock turnover and new sales.

The savings potential in each scenario assumes Minimum Energy Performance Standards (MEPS) are introduced in 2022 at the different levels of ambition (medium and high) as shown in the Typical Product Assumptions table above.

Further details of the modelling approach and assumptions are available on the [UNEP website](#) for more information source: [unep-uef.org](#)

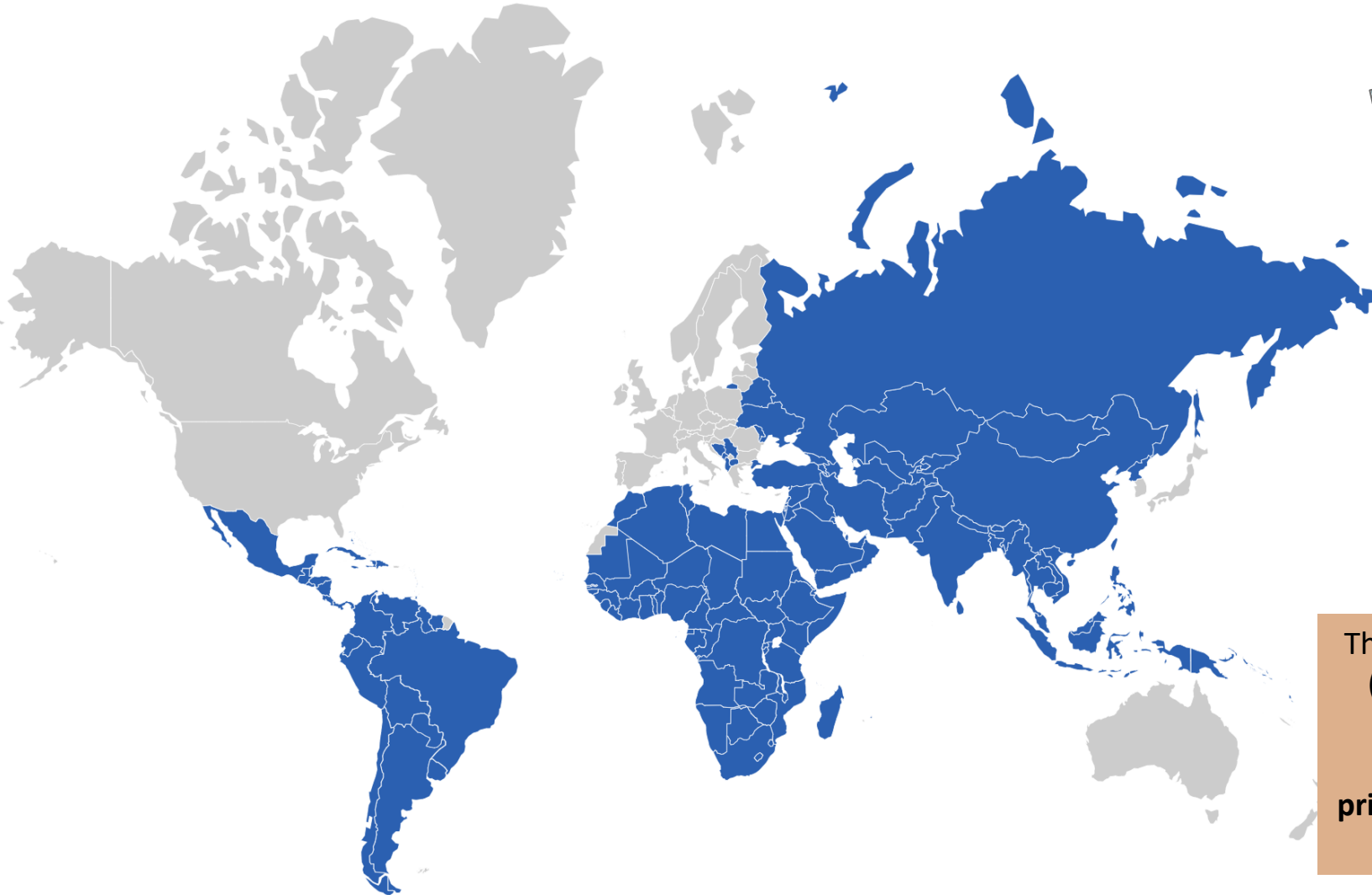
UNEP Country Savings Assessment, Nigeria, July 2022

* Available in English for all 156 developing and emerging economies. French and Spanish translations are available for select countries





U4E Country Savings Assessments - Updated 2022



The CSA serves as a powerful tool by providing **tangible (social, economic and environmental) benefits** that **enable policymakers** to take informed **decisions** in realizing their **climate commitments**. It also helps **prioritizing countries** for funding/implementing climate change mitigation projects.

- 156 developing countries and emerging economies have been assessed under the U4E Country Saving Assessments
- Explore for each country on: <https://united4efficiency.org/countries/country-assessments/>
- U4E Country Savings Assessments Factsheet is available [here](#)

Regional Savings Assessments

Objective

Analysis on **potential impact** of adopting Model Regulation guidelines for lighting, room air conditioners, residential refrigerators, commercial refrigeration equipment, industrial electric motors and distribution transformers for a region.



The savings scenarios are similar to the country savings assessment

Overview of the Report

- Introduction
- Overview of Benefits
- The Potential or more benefits
- Detailed annual and cumulative benefits in 2040 by country
- Detailed benefits in 2030/40 by product
- Assumptions by products
- Country data and methodology

West African Region

INTRODUCTION

This Regional Savings Assessment report provides a summary of the benefits attained from improved energy efficiency and climate friendly lighting, cooling appliances, and equipment for the West African Region. A market transformation can be obtained through measures such as Minimum Energy Performance Standards (MEPS), product labelling, market monitoring and verification, and financial incentives. For each product, the analysis considers three different scenarios:

- **Business As Usual:** Assumes that no actions are introduced and that the efficiency of products in the market continues to develop in line with historical trends in the absence of regulation.
- **Minimum Ambition:** In which MEPS are introduced in line with the basic requirements of the United Nations Environment Programme (UNEP) Limited for Efficiency (L4E) Model Regulation Guidelines.
- **High Ambition:** In which more stringent MEPS are implemented in line with the highest levels proposed in the guidelines.

This analysis covers the following countries: Benin, Burkina Faso, Cabo Verde, Côte d'Ivoire, Gambie, Ghana, Guinea, Guinée-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo. Individual country overview reports for lighting, cooling and equipment can be found on the UNEF USE website.

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Page 4	Detailed benefits by country
Page 5	Detailed benefits by product
Page 6	Input assumptions for each product
Page 7	Country data and methodology

OVERVIEW OF BENEFITS

ANNUAL SAVINGS IN 2040*

- Reduce electricity use in 2040 by nearly 26 TWh which is 31 % of current regional electricity use contributing to total cumulative savings of 248 TWh by then.
- These electricity savings are worth 3.6 Billion US\$ a year in 2040 leading to a total cumulative saving on electricity bills of 35.2 Billion US\$ by that year.
- The reduction in electricity demand could prevent the need to build 12 power plants (5000MW each) in the region by 2040.
- The CO₂ emissions saved from these reductions will be 15.5 million tonnes per year by 2040 representing 150 million tonnes to savings over 17 years.
- These emissions savings are equivalent to taking nearly 83 million cars off the road.
- More stringent policies in the high ambition scenario increase annual saving to 49 TWh by 2040 increasing total cumulative savings to 456 TWh by then.

ELECTRICITY SAVINGS OVER TIME TO 2040*

Annual Electricity Savings (Million tonne CO₂ emissions)

Lighting, Room air conditioners, Residential refrigerators, Commercial refrigeration, Industrial electric motors, Distribution transformers

THE POTENTIAL FOR MORE BENEFITS

THE MORE AMBITIOUS THE POLICY, THE MORE ELECTRICITY SAVINGS ARE

BRINGING EXTRA SAVINGS OVER TIME IN BOTH CO₂ AND ELECTRICITY BILLS

Increased grid connection to between 12 – 23 Million households

Reduced cumulative direct GHG emissions by nearly 17 Million tonnes

DETAILED BENEFITS BY COUNTRY

THE SHARE OF ELECTRICITY SAVINGS IN 2040 VARIES BY COUNTRY*

Annual Savings in Minimum Ambition Scenario (TWh)

Country	2030	2040
Benin	0.04	0.30
Burkina Faso	0.05	0.33
Cabo Verde	0.06	0.37
Côte d'Ivoire	0.07	0.41
Guinea	0.08	0.45
Guinée-Bissau	0.09	0.49
Liberia	0.10	0.53
Mali	0.11	0.57
Niger	0.12	0.61
Nigeria	0.13	0.65
Senegal	0.14	0.69
Sierra Leone	0.15	0.73
Togo	0.16	0.77

DETAILED BENEFITS BY PRODUCT

THE SHARE OF SAVINGS IN 2040 ALSO VARIES BY PRODUCT*

Product	2030	2040
Lighting	1,530	1,750
Residential Refrigerators	247	267
Commercial Refrigeration	429	469
Room Air Conditioners	7,080	7,880
Industrial Electric Motors	404	390
Distribution Transformers	2,020	1,500

INPUT ASSUMPTIONS FOR EACH PRODUCT

GENERAL PRODUCT ASSUMPTIONS

Product	Business As Usual	Minimum Ambition Scenario	High Ambition Scenario
Lighting	100	100	100
Residential Refrigerators	180	187	193
Commercial Refrigeration	1,760	1,808	1,864
Room Air Conditioners	420	2786	2021
Industrial Electric Motors	60	62	63
Distribution Transformers	See note	Level 1	Level 2

COUNTRY DATA AND METHODOLOGY

COUNTRY DATA

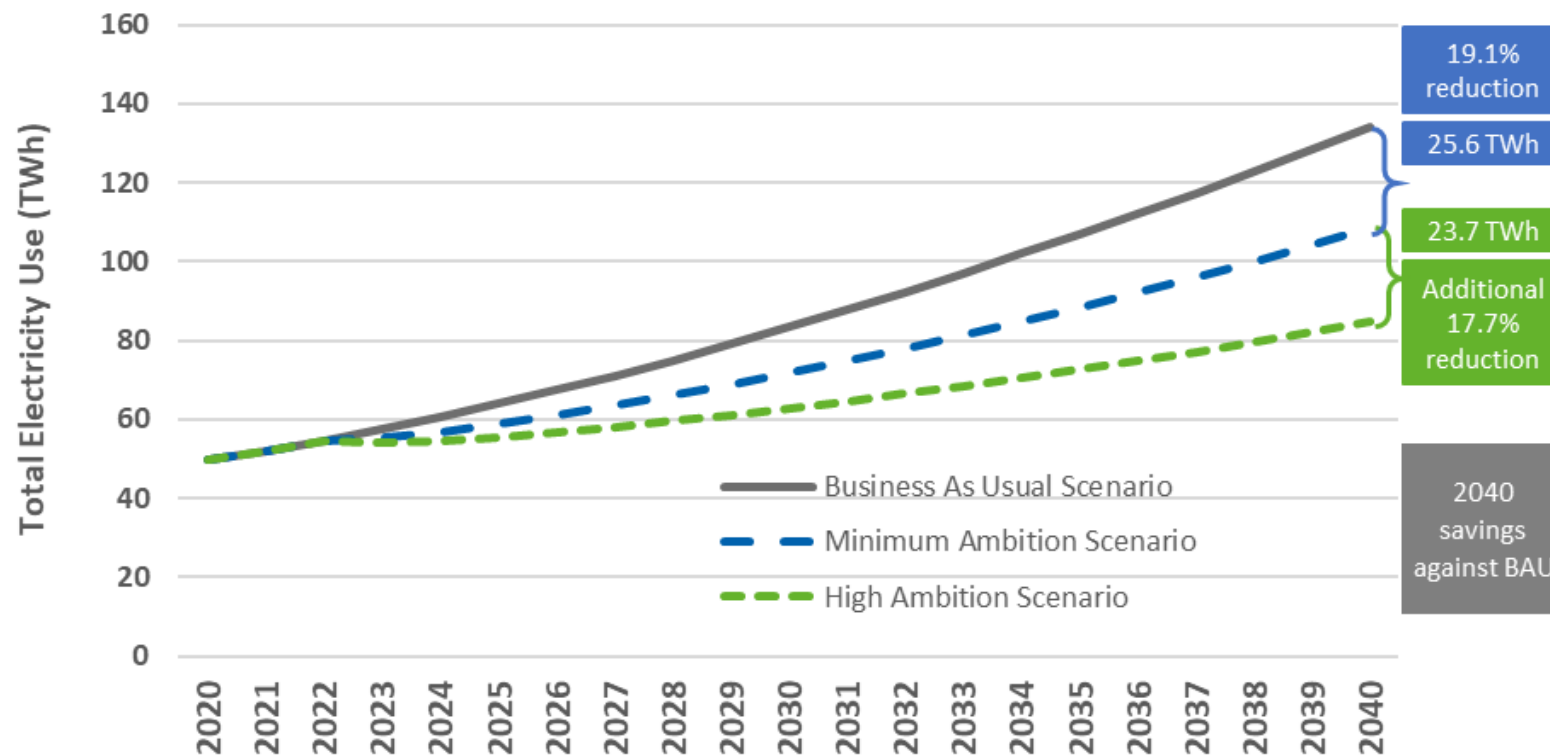
Country	Population (Million)	GDP Per Capita (US\$)	Electricity Intensity (kWh/capita)	CO ₂ Intensity (kg/capita)	Residential Electricity Intensity (kWh/capita)	Transmission Loss Factor
Benin	22.5	1,521	48.36	0.72	0.21	9.2%
Burkina Faso	23.5	884	23.46	0.37	0.24	13.4%
Cabo Verde	0.6	5,128	90.78	0.49	0.26	9.2%
Côte d'Ivoire	27.1	2,387	78.29	0.43	0.33	14.3%
Guinea	12.8	797	62.46	0.49	0.20	9.2%
Guinée-Bissau	2.0	750	10.33	0.25	0.27	9.2%
Liberia	5.2	665	10.86	0.49	0.30	9.2%
Mali	20.9	888	10.86	0.63	0.14	9.2%
Niger	25.1	579	22.09	0.49	0.21	43.2%
Nigeria	213.4	3,165	148.00	0.53	0.33	16.3%
Senegal	17.2	1,543	74.31	0.48	0.18	13.0%
Sierra Leone	6.3	525	24.46	0.40	0.18	38.0%
Togo	8.3	944	36.99	0.21	0.18	71.0%

*Regional savings assessments are available for East Africa, North Africa, Southern Africa, Western Africa and South-east Asia.

Overview of U4E modelling approach

Estimate energy use of each product between 2020-2040 in three scenarios

- *Business As Usual (BAU)*: assumes no policy interventions
- *Minimum Ambition*: assumes Minimum Energy Performance Standards (MEPS) are introduced in line with the U4E model regulations
- *High Ambition*: Assumes MEPS introduced at a more stringent level



Overview of U4E modelling approach

Estimating BAU total national electricity use of a product is done in one of two ways:

1. Bottom up (cooling and lighting):

- A stock model is used to estimate the total installed stock and sales of the product over time
- Typical product energy use then allows an estimate of total annual electricity consumption

2. Top down (equipment):

- Total product electricity use is estimated based on macroeconomic data

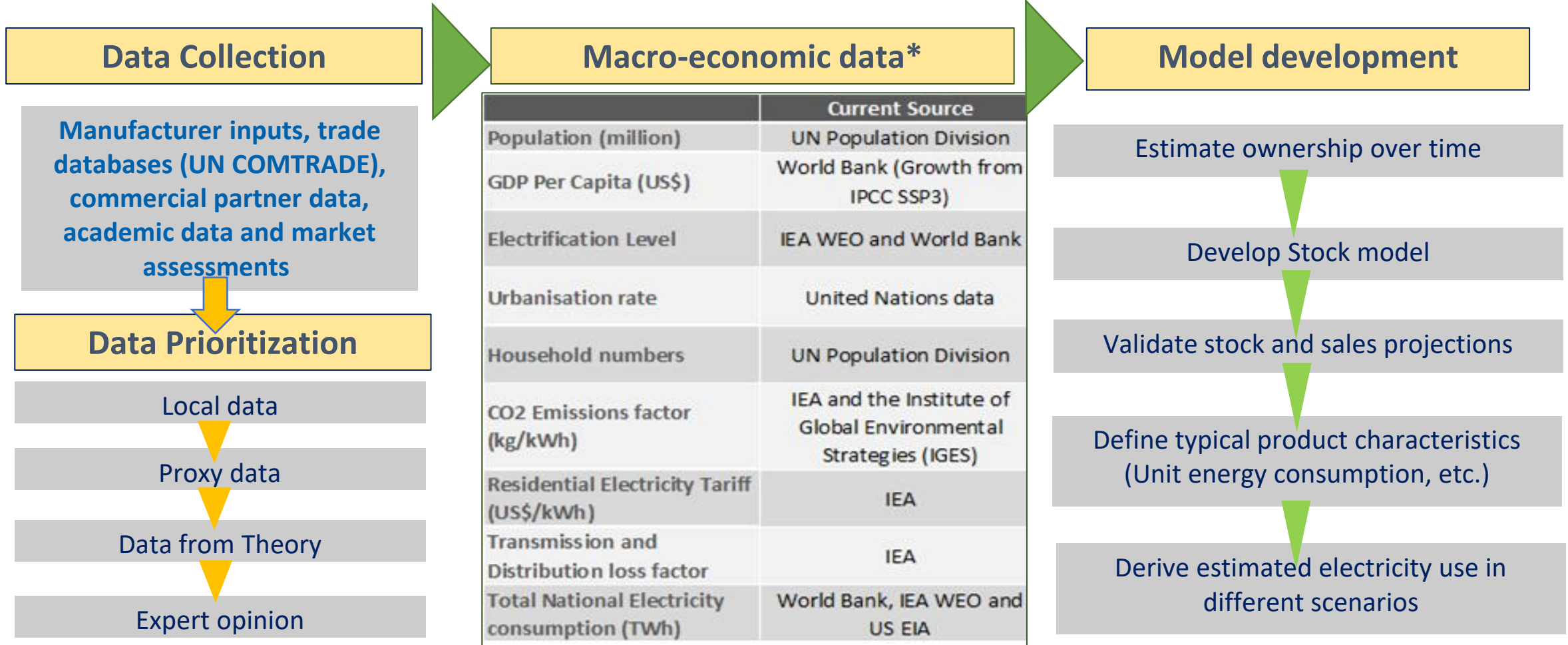
Policy scenarios then assume that new product energy consumption falls allowing savings to be estimated

- Bottom up: All new and replacement product sales from the stock model meet the new MEPS level introduced
- Top down: product lifetime defines a % of electricity use replaced by MEPS compliant products along with any growth in electricity demand

Overview of U4E modelling approach



Methodology



ECOWAS Region Product Assumptions

GENERAL PRODUCT ASSUMPTIONS


		Unit Energy Consumption (UEC: kWh/y) or Efficiency Level (Eff.)				Typical product/usage pattern assumed to be:
Product		Business As Usual	Minimum Ambition Scenario	High Ambition Scenario		
Lighting (UEC)	GSL	15W CFL 15	10W LED 10	7W LED 7	800 lumen light bulb: 1,000 hrs/year	
	Linear	36W T8 108	20W LED 60	16W LED 48	4 foot tube: 3,000 hrs/year	
	HID	70W HPS 307	50W LED 219	40W LED 175	Poletop street light: 4,380hrs/year	
Cooling (UEC)	Residential Refrigerators	330	247	123	2-door refrigerator freezer of average size 210 litres	
	Commercial Refrigeration	3,792	3,398	2,564	A market-weighted average of retail display cabinets (both remote and integral), drinks cabinets, storage cabinets, ice-cream freezers, vending machines and scooping cabinets.	
	Room Air Conditioners	4219	2786	2022	A mix of 3.5 kW and 7 kW split units with a weighted-average cooling capacity of 5 kW	
Equipment (Eff.)	Industrial Electric Motors	IE0	IE2	IE3	3-phase induction motors used in the industrial sector	
	Distribution Transformers	See note	Level 1	Level 2	Three-phase and single-phase liquid-filled and three-phase dry-type power distribution transformers	

Distribution transformers Note: it is assumed that distribution transformers have losses in line with those assumed in the CENELEC harmonization research for the development of the EU standards.

ECOWAS Region Product Assumptions (Country updates)



Variations in climate zone lead to different assumptions on hours of use for Room Air Conditioners. This, in turn, leads to different UEC assumptions in the BAU scenario in all countries listed.

Product	Country	Unit Energy Consumption (kWh/year) or Efficiency Level			Average capacity
		Business As Usual	Minimum Ambition Scenario	High Ambition Scenario	
Room Air Conditioners 	Burkina Faso	3,500	2,406	1,776	5.0 kW
	Cabo Verde	2,776	1,844	1,369	5.0 kW
	Ghana	3,500	2,406	1,776	5.0 kW
	Guinea-Bissau	3,011	2,049	1,503	5.0 kW
	Liberia	3,011	2,049	1,503	5.0 kW
	Niger	3,500	2,406	1,776	5.0 kW
	Senegal	2,776	1,844	1,369	5.0 kW
	Sierra Leone	3,011	2,049	1,503	5.0 kW

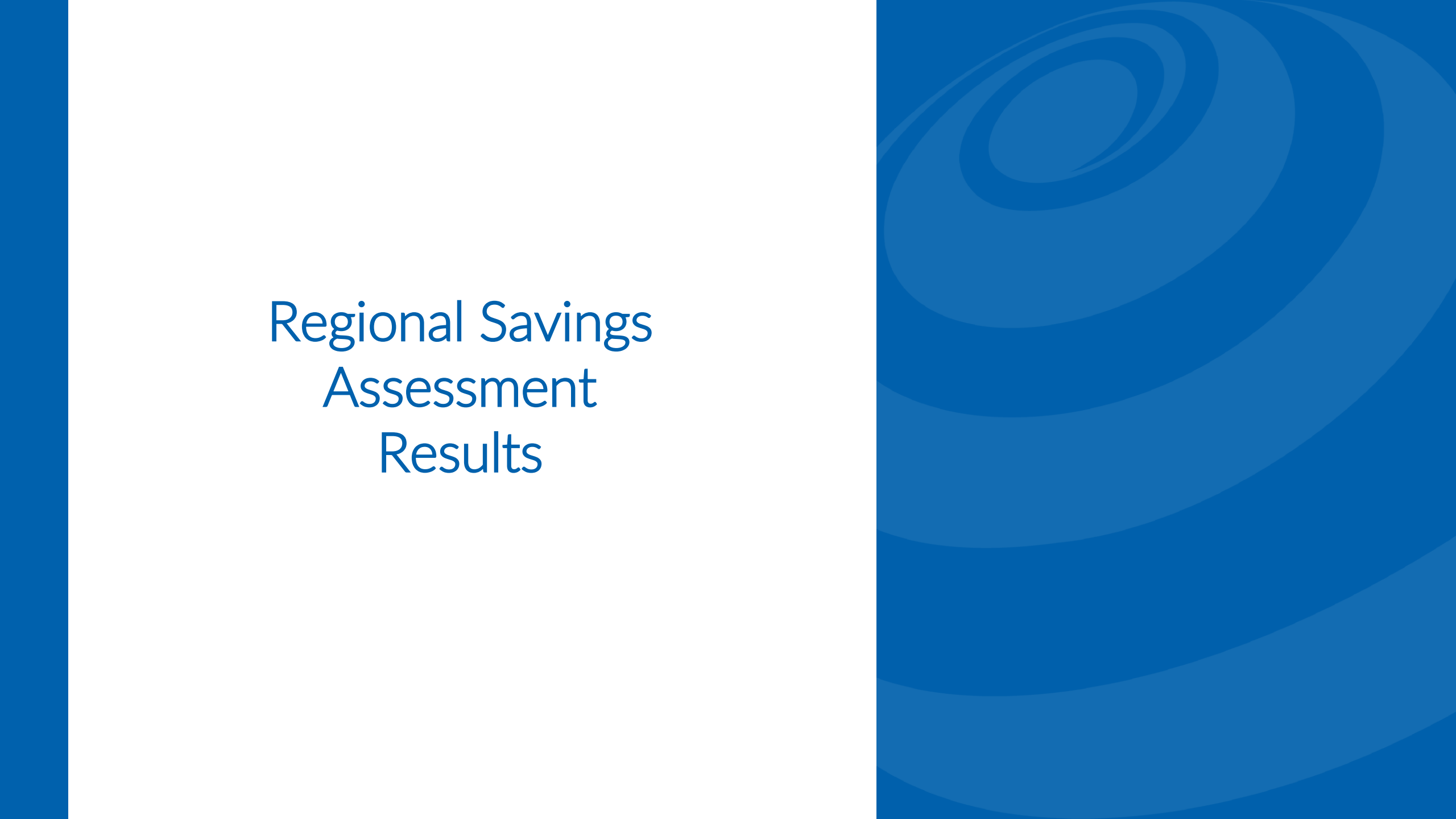
Note:

Ghana has existing MEPS for all products covered in the Minimum ambition Scenario so some CFL lamps are also phased out in that scenario of the analysis.

Improving future analyses

- Good quality data is key to more robust analyses and savings projections
- The hierarchy of data collections methods

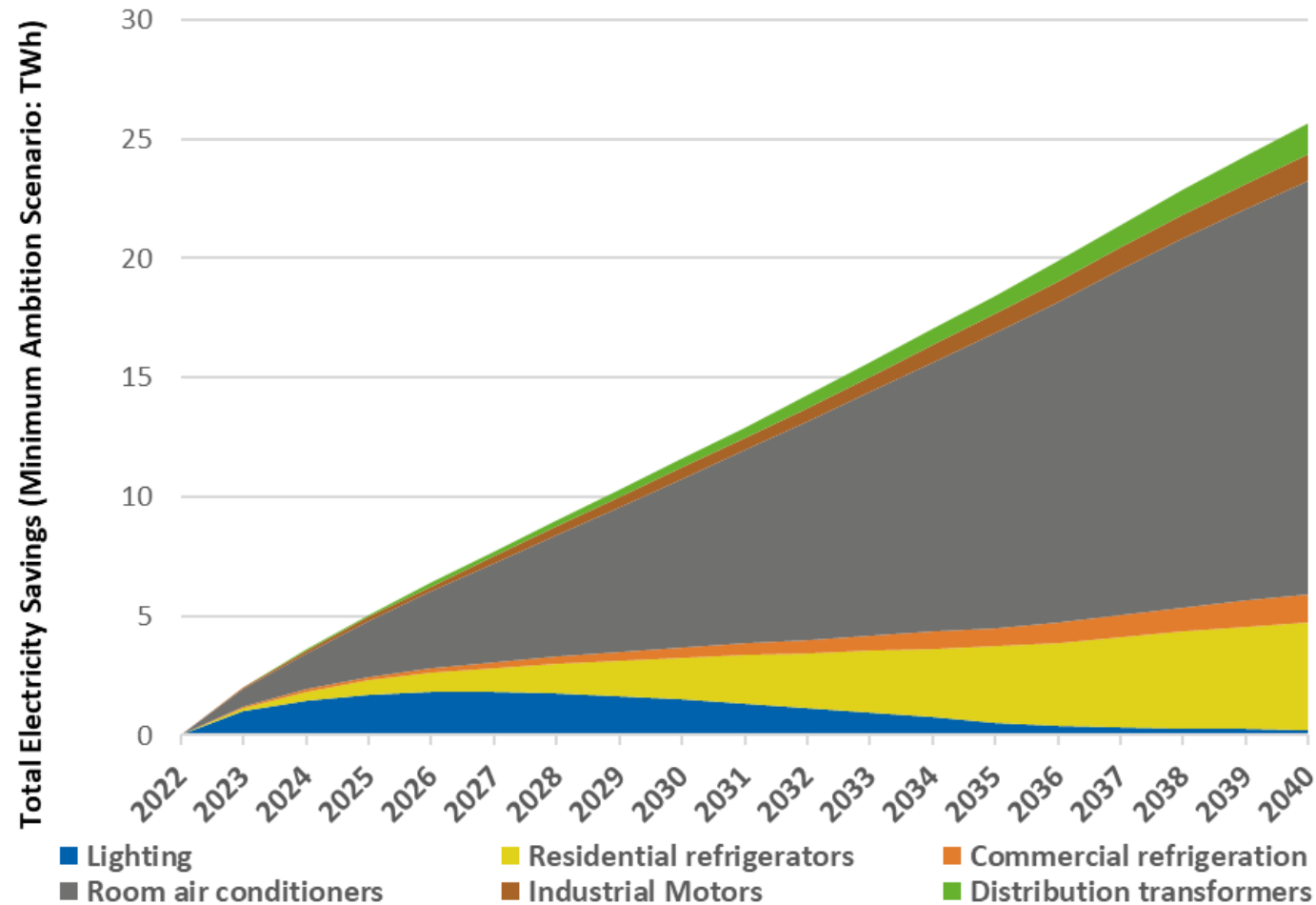
	Product technical data e.g. efficiency	Product price data	Market share/unit sales by product	Product usage data	Energy cost data	Macro socio-economic data	Environmental data - emissions factors and refrigerants	Other analysis specific data
Product Registration System	✓		✓				✓	
Surveys, questionnaires (retail, manufacturer, domestic)	✓	✓	✓	✓	✓			
Customs		✓	✓					
Internet sales	✓	✓	✓				✓	
Market research	✓	✓	✓				✓	✓
Utilities				✓	✓			
International data/Census data						✓		✓



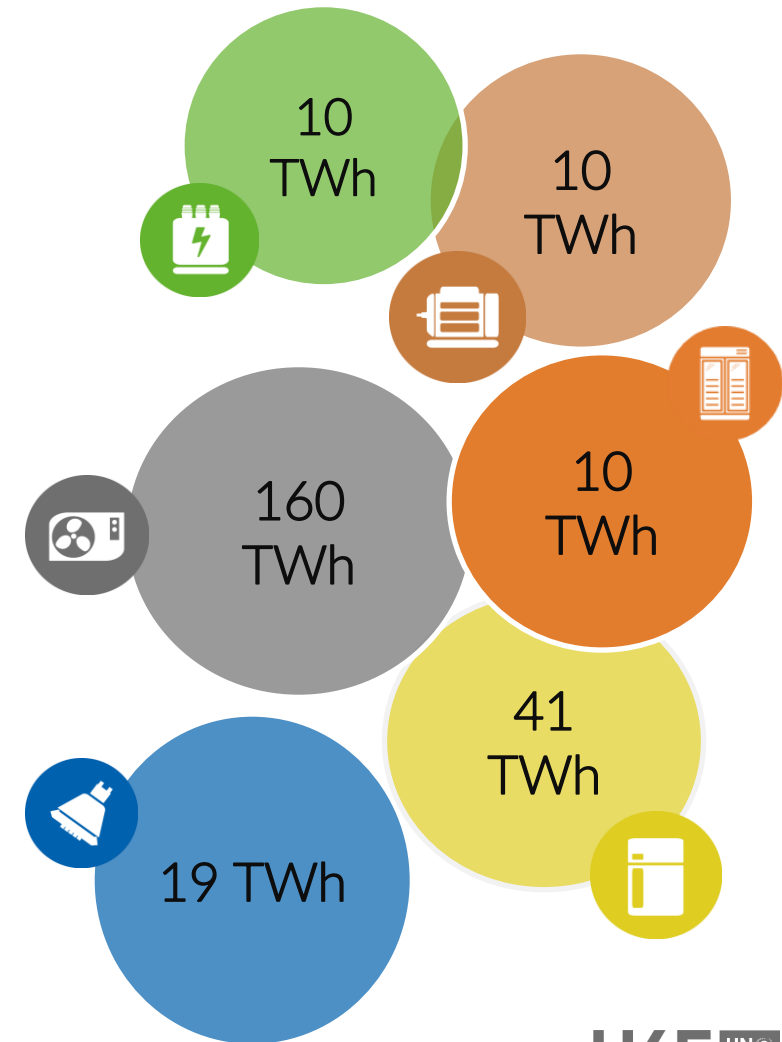
Regional Savings Assessment Results

Savings Potential in Western Africa from Energy-Efficient Lighting, Appliances and Equipment

Total Cumulative Electricity savings to 2040, detailed per product*












*Savings with Minimum Ambition Scenario, displayed savings in 2040



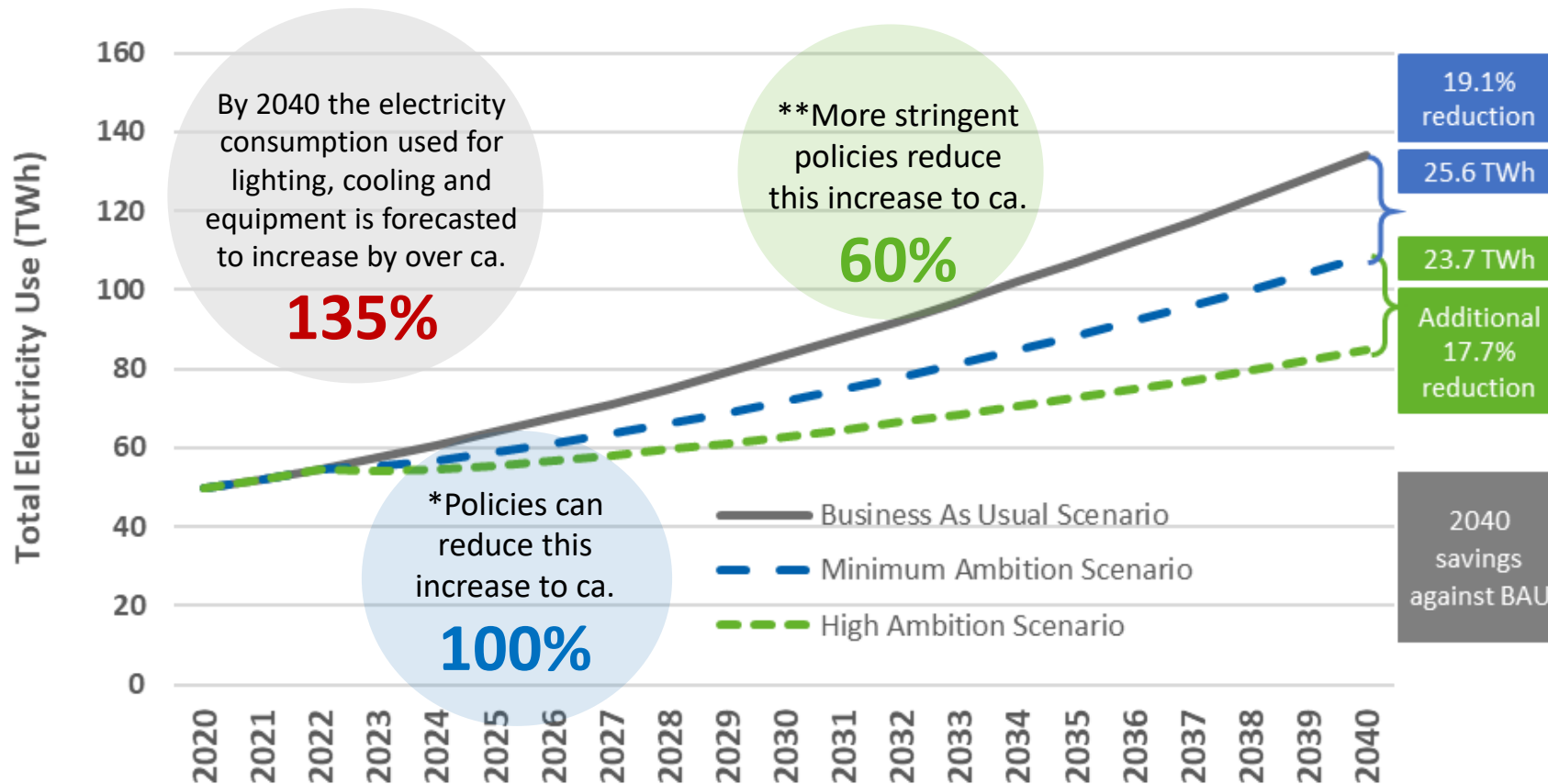
Savings Potential in Western Africa from Energy-Efficient Lighting, Appliances and Equipment

Total Electricity savings to 2040, detailed per product

		Annual (A) Cumulative (C)	Lighting	Residential Refrigerators	Commercial Refrigeration	Room Air Conditioners	Industrial Electric Motors	Distribution Transformers
								
Electricity (GWh) 	A		1,510	1,750	429	7,080	454	390
	C		12,700	7,420	1,840	30,200	2,010	1,590
Electricity Bills (Million US\$) 	A		216	247	247	989	79	62
	C		1,800	1,050	1,050	4,250	349	255
CO ₂ emissions (Thousand tonnes) 	A		932	1,070	1,070	4,270	239	229
	C		7,920	4,520	4,520	18,200	1,050	929

Savings Potential in Western Africa from Energy-Efficient Lighting, Appliances and Equipment

Total Electricity consumption forecast to 2040



Annual Savings by 2040*

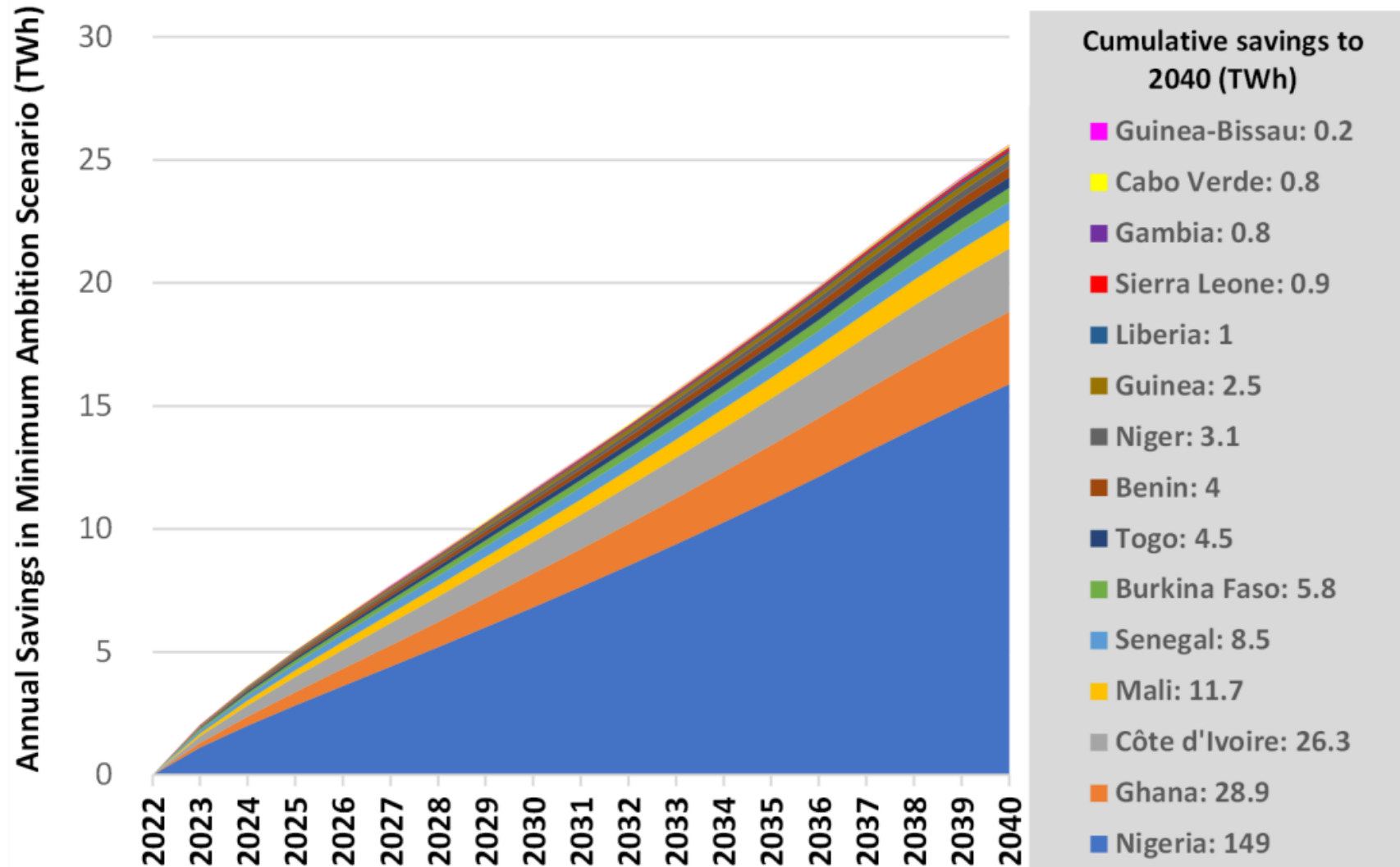
Between **26 to 50 TWh** of electricity consumption, which is equivalent to:

- 30 to 60%** of current regional electricity
- 12 to 22** Power Plants [500MW each]
- 16 to 30 million** tonnes per year of CO₂
- US\$ 3.6 to 7 billion per year** in electricity bill savings

* Range Savings of all five products from a Minimum Ambition Scenario and a Higher Ambition Scenario to current international standards/norms







Savings Potential in Southern Africa from Energy-Efficient Lighting, Appliances and Equipment

Total Electricity Savings to 2040, detail per Country



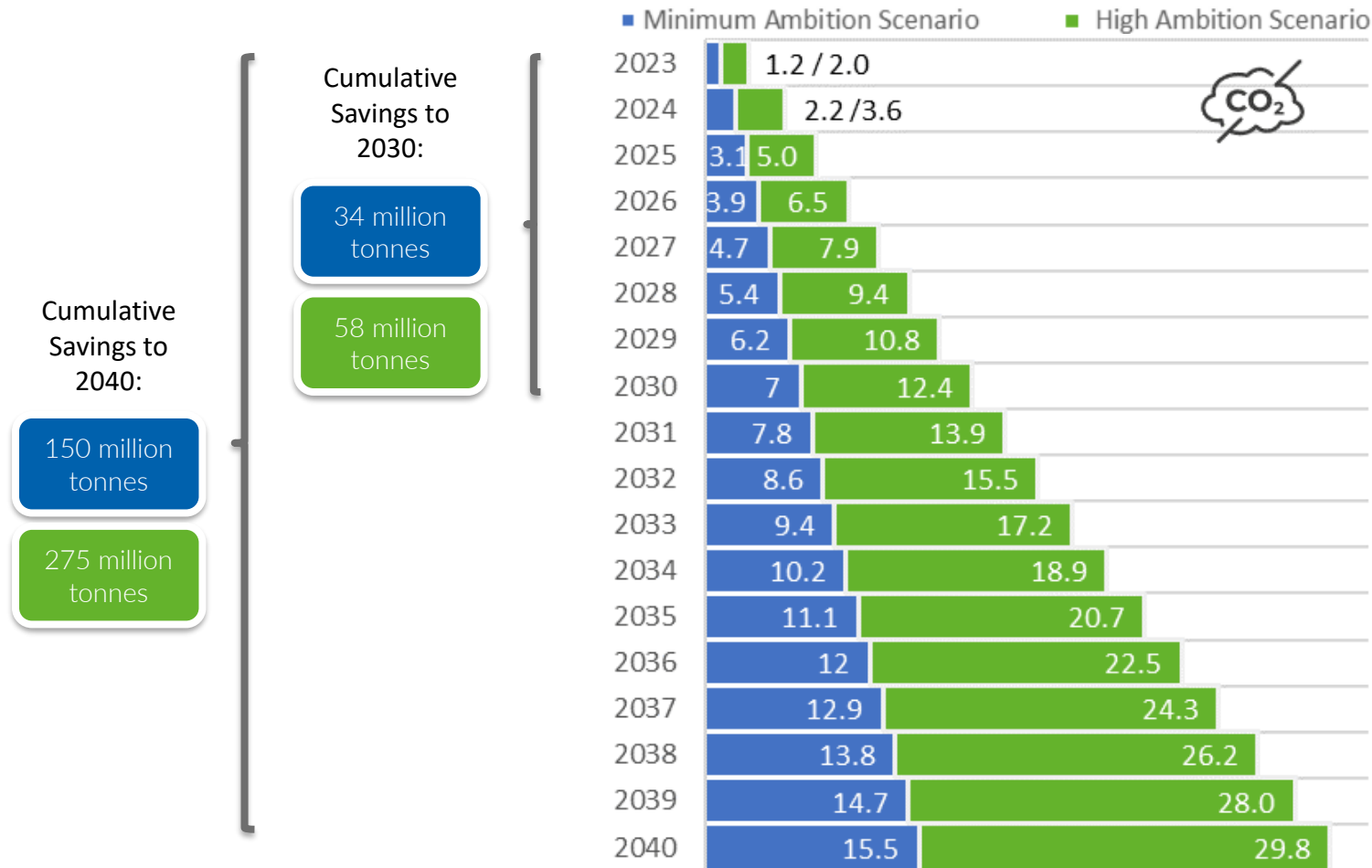
Savings Potential in Western Africa from Energy-Efficient Lighting, Appliances and Equipment

Total Annual and Cumulative Electricity Savings to 2040, Detail per Country

Denotes Savings for Minimum Ambition Scenario	Annual savings in 2040			Cumulative savings by 2040		
	Electricity 	Electricity Bills 	CO ₂ emissions 	Electricity 	Electricity Bills 	CO ₂ emissions 
	(GWh)	(Million US\$)	(Thousand tonnes)	(GWh)	(Million US\$)	(Thousand tonnes)
Benin	404	83	320	3,970	818	3,150
Burkina Faso	565	135	182	5,780	1,380	1,860
Cabo Verde	68	18	37	783	206	422
Côte d'Ivoire	2,570	324	1,290	26,300	3,310	13,200
Gambia	77	16	42	824	166	444
Ghana	2,940	695	957	28,900	6,820	9,400
Guinea	261	53	141	2,470	501	1,330
Guinea-Bissau	20	5	11	182	50	98
Liberia	101	39	55	1,020	397	549
Mali	1,160	165	825	11,700	1,660	8,320
Niger	294	63	247	3,070	653	2,580
Nigeria	15,900	1,780	10,400	149,000	16,700	97,800
Senegal	742	135	578	8,520	1,550	6,640
Sierra Leone	92	17	60	947	171	614
Togo	445	78	318	4,490	790	3,210

Savings Potential in Western Africa from Energy-Efficient Lighting, Appliances and Equipment

CO₂ Emissions Savings (Million Tonnes)



These emissions savings by 2040 are equivalent to taking between **19 to 32 million*** fossil fuelled cars off the road.

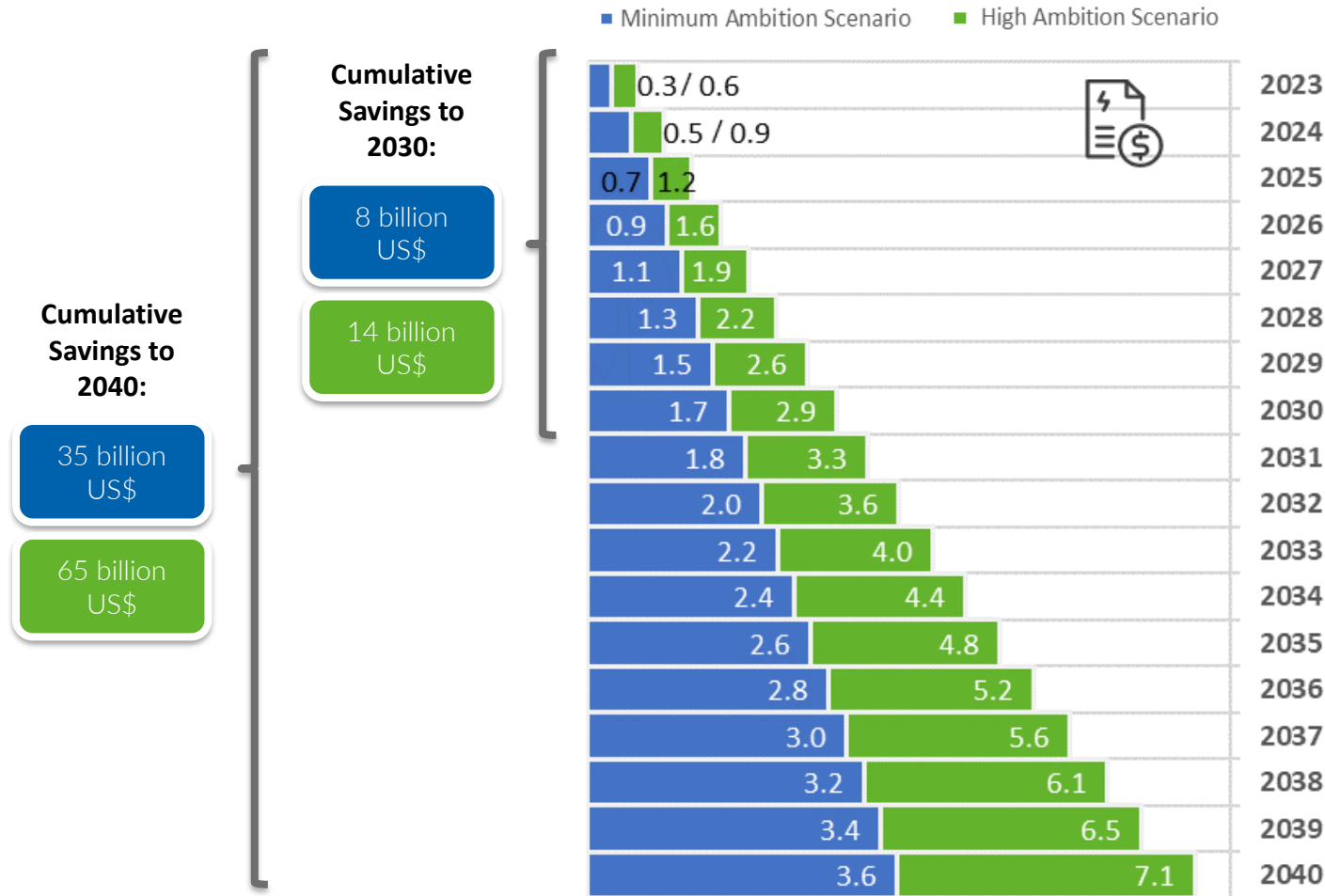


Reduced cumulative direct GHG emissions from refrigerants by **17 million tonnes***

* Range Savings of all six products from Minimum Ambition Scenario and High Ambition Scenario

Savings Potential in Western Africa from Energy-Efficient Lighting, Appliances and Equipment

Economical Savings (Billion \$ USD)



Reduced annual electricity bills between **3.6 – 7 billion US\$***



Increased grid connection to between **12 - 23 million households***

* Range Savings of all six products from Minimum Ambition Scenario and High Ambition Scenario

Western Africa Regional Savings Assessment

Available in multiple languages:



English



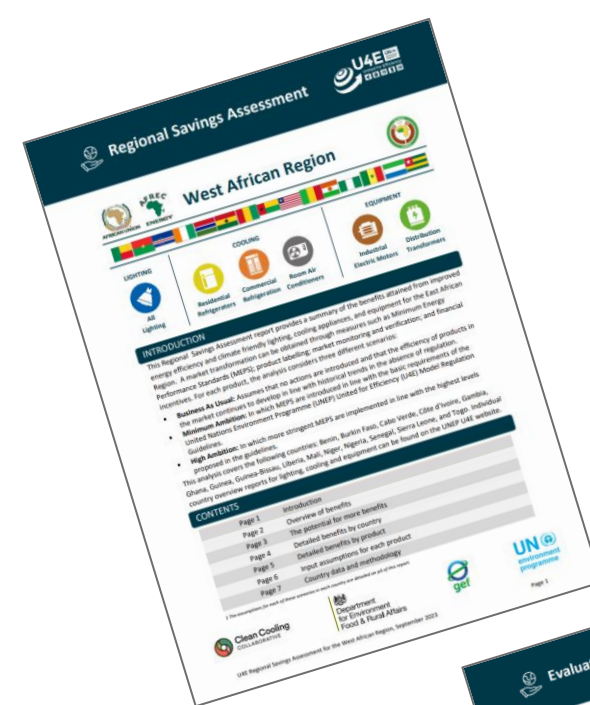
French



Portuguese

Regional Savings Assessment and Assumptions:

<https://united4efficiency.org/countries/country-assessments/>



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Need a quick introduction to our project? Our three-minute general video is at:

[EN http://united4efficiency.org/accelerating-the-transition-to-high-efficiency-products/](http://united4efficiency.org/accelerating-the-transition-to-high-efficiency-products/)

Want to know more about AFREC-U4E African Energy Efficiency Programme? See our factsheet at:

<https://united4efficiency.org/resources/african-energy-efficiency-program/>



**WE NEED MORE
ENERGY EFFICIENCY
TO COOL THE WORLD**



U4E 

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Contact

TRANSFORMING MARKETS TO ENERGY-EFFICIENT PRODUCTS

Thank you



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