Global Cooling Pledge Signatories Focal Points Meeting June 13 - 14 2025 | Bonn, Germany

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14 June 2025

Session 2 MEPS and Product Registration



Federal Ministry for the Environment, Climate Action, Nature Conservation and Nuclear Safety



وزارة الطاقـــة والبنيـــة التحتيـــة MINISTRY OF ENERGY & INFRASTRUCTURE

Opening remarks Presentation on Energy efficiency in cooling and the U4E initiative





Federal Ministry for the Environment, Climate Action, Nature Conservation and Nuclear Safety





Energy Efficiency: A fundamental role within Climate Action

Global cooling pledge: Reduce cooling-related emissions by 68% relative to 2022 by 2050.



Commitments related to energy efficiency

- (#6) Commit to work together to support increased market penetration of highly efficient air-conditioning equipment and innovative technologies and collectively increase the global average efficiency rating of new air-conditioning equipment sold by 50% by at the latest 2030 from global 2022 installed baseline.
- (#7) Commit to establish Minimum Energy Performance Standards
 (MEPS) by at the latest 2030 and aim to routinely raise ambition and progress consistent with respective national laws with a view to achieve net-zero emissions by 2050 and noting best available technology and available model regulation guidelines.
- (#8) Commit to establish or update public procurement policies and guidance for low-GWP and high efficiency cooling technologies and innovative solutions where feasible or ensure broader arrangements are in place that drive such approaches in public procurement at the latest by 2030.
- (#3) Commit to support robust action through the Montreal Protocol Multilateral Fund [MLF] for early action to **reduce HFC consumption and to promote improved energy efficiency** for the hydrochlorofluorocarbon (HCFC) phase-out and the HFC phase-down



The U4E Initiative



Supporting Countries to Save 20% of their Electricity

By accelerating the Global Transition to <u>much more energy efficient lighting and appliance</u> <u>technologies</u> 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.





How to promote energy efficiency in Cooling appliances and equipment?

U4E Integrated Policy Approach

- Implementation of **Policies, Regulations and Standards**, such as Minimum Energy Performance Standards and Sustainable Public Procurement and dedicated policies for refrigerants.
- **Supporting Policies**, which includes Labelling schemes and communication campaigns.
- Strengthening of a National **Monitoring, Verification and Enforcement** (**MVE**) capabilities, infrastructure and tools for cooling appliances.
- Development and implementation Financial Mechanisms.
- Waste Management for proper disposal of obsolete products and sound treatment/recycling/destruction of refrigerants and foam blowing agents.





How to promote energy efficiency in Cooling appliances and equipment?





Minimum Energy **Performance Standards** (MEPS) ban the worst products



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 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!

Stimualte consumer demand for energy efficiency products by provideing 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.



How to promote energy efficiency in Cooling appliances and equipment?





Policy Matters: MEPS, HEPS and Labels, the framework

Establishing appropiate levels of MEPS is critically important – these should be **realist and appliacable** at the same time. Thus, countries face several challenges:

- Lack of knowledge of own local and regional market and normative status/level of regulations among countries.
- Unawareness of the products/technologies yet globally available in the market.
- 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 need to be included in the norm/regulation?
 - What **parameters and metrics** should be used to assess the energy efficiency of products?
 - What **test methods** should be used or referenced to measure energy consumption?
 - What is an **appropriate efficiency level to set for MEPS** and Public Procurement?
 - What efficiency levels should define the efficiency classes on the label?

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



U4E Tools & Resources – Model Regulation and Public Procurement



- Provide guidance on establishing MEPS and Labels for countries considering a voluntary, regulatory or legislative framework
- Provide a **benchmark for proven best practices** and leverage global technological and policy trends.
- **Promote the harmonization of requirements** to reduce trade barriers, unlock economies of scale and make products more affordable.



- Higher ambition technical specifications and guidance to leverage public purchasing power and help define the bidding process/requirements for public procurement.
- Reference for technical specifications for the procurement of cooling equipment in pilot projects

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 & Resources – Country and Regional Savings Assessment



- Report **detailing the potential financial, environmental, energy, and social benefits** that can be achieved through the transition to energy-efficient products.
- Assessment of the impact of adopting the levels recommended in the MRG and SPG, comparing three scenarios:
 - BAU scenarios: without policy intervention
 - Low Ambition scenario: where the MRG MEPS levels are applied
 - *High Ambition scenario: a higher efficiency level is applied in line with the Public Procurement Guidelines.*
- Available for more than **156 developing countries and emerging economies**.
- **Global assessments of the savings potential** of implementing energy efficiency standards for ceiling fans and heat pumps.
- Regional assessments for Asia and Africa.
- Available in **multiple languages** (English, Spanish, Portuguese, French, and Arabic)





Potential Impacts of MEPS in Developing & Emerging Economies

- Energy savings and avoided indirect emissions if U4E Model Regs adopted and enforced
- Additional direct emissions could be avoided by regulating the GWP of refrigerants





U4E Tools & Resources – Product Registration System



- The PRS is a system for loading products, which must be registered before entering a specific market. This allows for the creation of a database with product and market information for proper monitoring of compliance with current regulations.
- It also allows for the **generation of a regional product database that facilitates the exchange of market information** and regulatory compliance.
- The U4E PRS prototype is a ready-to-use, open-source tool that is easy to adapt to each country's individual needs.



• Additional guides provide guidelines and guidance on the PRS for countries in creating their own system.





 $\langle \overline{a} \rangle$

MVE

records









The importance of a Multi-country Approach

Benefits from a Regional Energy Efficient efforts

- Integrated, common and transboundary energy efficient policies, strategies, instruments and business models allow for a **more effective and sustainable market transformation**;
- - 2. Correct mapping of activities in the Region: **avoidance of isolated or stand-alone efforts or their duplication** to address common challenges/barriers among neighboring countries;
 - Efficient use of limited resources through economies of scale and from spreading the market 3. transformation costs:
 - **4**. Greater impact and achievements from the **engagement of a wider net of national and regional** stakeholders to secure political willingness and commitment;
- - **5** Knowledge/information exchange and peer collaboration. Fostering intelligent agreements for countries to share capacities, tools, methods and infrastructure otherwise excluded
 - **6 Reduction of commercial barriers** that impede a much bigger regional market demand for higher efficiency products that are already widely available on the international market: larger markets make products more affordable and attractive for investments, for consumers and institutional procurers



Regional Project Examples

Regional Harmonization and National Implementation in SADC and EAC

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** (on a voluntary basis) of the MEPS by 4 country members (Eswatini, Mozambique, Zambia, and Zimbabwe)
- Public awareness including preparation of public sensitisation materials.
- **Capacity building** for customs agencies, standards organizations, and other important stakeholders







Clean Cooling COLLABORATIVE







Presentation Ghana's Sustainable / Green Public Procurement to transform its Cooling Market.



Hubert Nsoh Zan

Assistant Manager, Energy Efficiency Regulation/ Energy Transformation Expert, Ghana



Federal Ministry for the Environment, Climate Action, Nature Conservation and Nuclear Safety







To equip Administrators, procurement officers, and facility managers with the knowledge and tools to implement Green Public Procurement (GPP) for cooling appliances, reducing energy consumption, costs, and carbon footprints while advancing sustainable development goals (SDGs 7, 12, and 13)



Background 1/5

Drivers

1. Climate

- I. Increasing ambient temperatures
- II. Level of humidity

2. Demographic factors

- I. Increasing population;
- II. Growing middle-class population; and
- III. High urbanization rates (about 59.5% in Ghana). GSS 2024 Pop. Projs.

•Globally, energy demand for space cooling (2,000 TWh) accounts for nearly 50-55% of the total electricity used in buildings in 2023, especially in tropical and subtropical areas.

•About 1 GtCO_{2eq} emission in 2023.

•Without serious interventions, electricity demand for space cooling in buildings could triple by 2050. Source: The Future of Cooling (2018, updated in 2023 analyses)



Background 2/5



ACs Statistics Globally:

•2016: ≈ 1.6 billion AC units installed globally.

•2020: ≈ 1.9 billion AC units.

•2030: Projected \approx 4.5 billion units (aligned with SDG timeline).

•2050: Projected \approx 5.6 billion units (under current policies – Net-zero

economy).

Making space cooling the leading driver of electricity demand in buildings.

Source: UNEP & IEA – Cooling Emissions and Policy Synthesis Report (2020, 2023 Updates)

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ACs Statistics in Ghana:

Currently, about **4 million installed ACs**, accounting for **60 – 80%** of **electricity consumed** in offices of **public and commercial buildings** Consuming in the range of **3,000 – 5,400 kWh/yr** due to their **low energy efficiency ratings (EERs)**. About **88%** of **Ghana's AC market** is **dominated** by **non-ducted single-split ACs** Cooling capacities between **12,000 and 18,000 BTU/hr** (3.5 kW - 5.3 kW or **1.5 – 2.0 HP**).

Source: Energy Commission



Background 3/5

• The **2023 Regulated Appliance Market Performance Report** indicated that **3 in 4 (75%)** of the ACs imported and used in Ghana **exist in the lowest EER categories (1 and 2 stars). Source: EC**

• Shifting the AC market into higher EER categories (3- to 5-star equivalent) having refrigerants with low GWP and ODP of zero (0) has a saving potential of 10,400 GWh by 2030, resulting in energy cost savings of about US\$ 1.96 billion. Source: https://doi.org/10.1016/j.jclepro.2019.05.067

• The **Public Procurement Act 2003**, (Act 663) as amended in 2016 with Act 914 has **laid down procedures and guidelines** for the **procurement of goods and services, including air conditioners**, by public entities.

• No consideration of the energy use or life cycle cost or environmental implications of refrigerant in electrical appliances such as Refrigerators and ACs in the Act.

- The Act considers only the first or purchase cost which does not give an indication of the cost of operation.
- The Act allows officials to set the technical characteristics of the equipment to be purchased.
- Yet, Regulations on the EE of ACs, passed in 2005 (LI 1815), have been in operation since 2006.



Fortunately, we now have Public Procurement Regulations, 2022.

General Provisions on Procurement:

- Environmentally compliant sustainable procurement.
- The head of the entity shall ensure that a tenderer complies with Section 2 of the Act with regard to environmentally and socially sustainable procurement.

Public Procurement Regulations, 2022



This training is intended to provide technical specifications/parameters regarding procuring cooling appliances that meet life cycle cost (LCC) and the lowest global warming potential (GWP) criteria and builds capacity for participants to implement these practices in their organisation.

Technical Specifications will include:

1. Energy efficiency ratio (EER) and energy efficiency index (EEI)

2. Energy guide label

3. Types of refrigerant

4. Global warming potential (GWP) of the refrigerant

5. Ozone depletion potential (ODP) of the refrigerant

6. Energy consumption (kWh/y)

7. Life Cycle Cost Analysis (LCCA)



HCFC PHASE-OUT SCHEDULE UNDER MP

Developed countries; Freeze from 1996, 35% reduction by 2004, 75% reduction by 2010, 90% reduction by 2015, Total phase-out by 2020

Developing Countries; Freeze in 2013 at a base level calculated as the average of 2009 and 2010 consumption levels, 10% reduction by 2015, 35% reduction by 2020, 67.5% reduction by 2025, Total phase-out by 2030

Establishment of a licensing and quota system to regulate the import and exportation of HCFCs and HCFC-based equipment



Hydrochlorofluorocarbon Phase-Out Management Plan (HPMP)



PUBLIC NOTICE

PN.038022022



PHASING OUT OF THE IMPORTATION OF HYDROCHLOROFLUOROCARBON-BASED AIR CONDITIONERS IN GHANA

In partial fulfilment of Ghana's obligations to phase out the consumption of Hydrochlorofluorocarbon (HCFCs), mainly R22 under the Montreal Protocol, a Hydrochlorofluorocarbon Phase-out Management Plan (HPMP) was developed to guide the implementation of the phasing out process.

As part of measures to fulfil this obligation, controls on the importation of R22 and R22 based equipment including air conditioners (ACs) was incorporated into the legislative instrument (L.I 1812) in tandem with the phase-out reduction scenario. Furthermore, in view of the need to take necessary measures to avoid dumping on our markets as the phase-out date approaches, the EPA in collaboration with the Energy Commission, hereinafter referred to as the implementing institutions held a stakeholder meeting with importers of air conditioners and reached an understanding to enforce an implementation of a quota system to control the volumes of R22 based ACs imported into the country starting January 1, 2022. The quota allocation was based on historical importation data of importers for the years 2018-2021

All importers who have been allocated importation quotas will be written to and are expected to heed to the quantities approved effective January 2022.

The Energy Commission will from same date (January 2022) reject applications for import from non-quota beneficiaries.

For further information please contact, Mr. Emmanuel Osae-Quansah on 0501301418; Mr. Joseph Baffoe on 0501301478 or Mr. Hubert Zan on 0242867902.

Please take note and comply accordingly.



Ghana's ac equipment refrigerants transformation





Ghana's refrigerator equipment refrigerants transformation





HFC Phase-down schedule under KIGALI AMENDMENT

TABLE 1. HFC phase-down schedule under Kigali Amendment⁵

	Non-A5 (developed countries)	A5 (developing countries) Group 1	A5 (developing countries) Group 2
Baseline HFC component	2011-2013 (average consumption)	2020-2022 (average consumption)	2024-2026 (average consumption)
Baseline HCFC component	15% of baseline	65% of baseline	65% of baseline
Freeze	-	2024	2028
1st step	2019 - 10%	2029 - 10%	2032 - 10%
2nd step	2024 - 40%	2035 - 30%	2037 - 20%
3rd step	2029 - 70%	2040 - 50%	2042 - 30%
4th step	2034 - 80%	-	-
Plateau	2036 - 85%	2045 - 80%	2047 - 85%
Notes	Belarus, Russian Federation, Kazakhstan, Tajikistan, Uzbekistan, 25% HCFC component and 1st two steps are later: 5% in 2020, 35% in 2025	Article 5 countries not part of Group 2	GCC (Saudi Arabia, Kuwait, United Arab Emirates, Qatar, Bahrain, Oman), India, Iran, Iraq, Pakistan

Source EIA Briefing to the COP22



Ghana's Current Refrigerator Market

Energy Guide for Refrigerators (Old)



Energy Guide for Refrigerators (New)



New EEI Scale

New Star Rating	New EEI - Ref
7 – Star	EEI<22
6 – Star	22≤EEI<33
5 – Star	33≤EEI<40
4 – Star	40 ≤ EEI< 45
3 – Star	45 ≤ EEI<55
2 – Star	55 ≤ EEI<70
1 – Star	70 ≤ EEI<85



Ghana's Current Air condition Market



*ER (Energy Efficiency Ratio) is the measure of energy efficiency for Air Conditioners, expressed as Wait of cooling per Wait of electric al power hput. Only models between 2.5 and 11.5 kW/hr cooling capacity and with the same features are used for this scale. The given data are a coording to Ghana Energy Efficiency Labelling requirements for non-ducted air conditioners under Ghana Standard Number G S62. **Based on 2,000 hours use. Actual consumption may vary depending on actual use of the product.

Removal of this label before first retail purchase is an offence under LI 1541

Energy Guide for Aircondition (New)

* THE MORE STARS ン HE MORE ENERGY EFFICIENT guide Air Conditioner Type: Split/Multi split/portable Trademark: name/logo Model Identifier Indoor Unit: abc123 Model Identifier Outdoor Unit: abc 123 Cooling Capacity: XY, kW/hr Compressor Type: Fixed/Variable Speed Noise Level Indoor/Outdoor: XY/xy, dB AEER: 123 TCSPF: 123 Refrigerant: RXXXX **Global Wartming Potential:** XXX Country of Origin: xyz Total Energy Consumption of this Unit is 123 kWh/year

Person located in account datases with DB INC SERIES Actual Energy Constant plane will depend on how the applicance in the definition of its account Product of the product is a actual of the Dependence Energy and whether the actual the applicance is not

New EEI Scale

Star rating	TCSPF value					
7	11.5 ≤	TCSF				
6	10.0 ≤	TCSPF	< 11.5			
5	8.5≤	TCSPF	< 10.0			
4	7.0 ≤	TCSPF	< 8.5			
3	5.5≤	TCSPF	< 7.0			
2	4.0 ≤	TCSPF	< 5.5			
1	2.6 ≤	TCSPF	< 4.0			



F-gas schedules for refrigerants

Product bans and hfc phase-out

	CAPACITY	BAN	YEAR
	SINGLE SPLIT < 3 kg charge	≥750 GWP	2025
	SPLIT AIR-WATER ≤ 12kW	≥150 GWP	2027
	SPLT AIR-AIR ≤ 12kW	≥150 GWP	2029
SPLIT AIR CONDITIONERS	SPLIT ≤ 12 kW	NO F-GAS	2035
		≥750 GWP	2029
	SPLIT >12 Kw 2.6 ≤	≥150 GWP	2033



What is Public Sector Procurement?

Acquisition of goods, services and work by governments or public sector organizations through a public contract" (Witjes & Lozano, 2016). It is a key economic activity of governments and public institutions.

It represents between **12 and 20%** of national gross domestic product (**GDP**) in OECD countries and up to **30% in developing countries.**

What is Sustainable Public Procurement (SPP)?

Public procurement takes into account the environmental, economic and social impacts of goods, services and works throughout their life cycle.

What is Green Public Procurement (GPP)?

A process whereby **public and semi-public authorities meet their needs for goods, services, works and utilities by choosing solutions** that have a **reduced impact on the environment throughout their life-cycle**, as compared to **alternative products/solutions**.



Green public procurement (GPP)

- If environmental criteria obtain extensive focus during the procurement procedure, it is Green Public Procurement (GPP).
- GPP is a public procurement that takes into account the environmental impact of goods, services and works throughout their life cycle.
- Green Cooling Appliances must conform to low-GWP refrigerants and high energy efficiency ratios.
- The aim of GPP is to reduce the impact of procurements on the environment and human health.



Relationship between the Three Pillars of SPP





Three Sustainability Aspects of AC procurement

		Assessment areas within each aspect					
"Green"	Environmental	Ozone depletion	Direct GHG emissions (refrigerant)	Ind er (e ge	irect GHG nissions electricity eneration)	Hazardous substances	Waste minimisation
(Social	Effect of lighting and cooling on quality of life Budget implications			Worker right	S	
€\$	Economic			Local job creation		tion	



Products and Services covered under S/GPP



- IT equipment computers, displays, imaging equipment
- Vehicles and transport services
- Lighting (indoor and outdoor)
- Data centre services
- Medical and catering equipment, etc.



GPP Barriers and Enablers (1/2)

Types of Barriers	Enablers
Financial barriers	1. Consider life cycle cost
Higher initial investment or upfront costs	2. Eliminate financial hurdles
Perception of higher cost	Egs: On-wage
Return on investment may take longer	On-bill
Institutional barriers	1. Buy-in mgt support (Bring
Lack of management support	leadership in support of GPP
Lack of cooporation between institutions	2. Increase collaboration within
Resistance to change	and between institutions
Perception of low quality	3. Persue joint/bulk public
	procurement
Technical barriers	1. Establish clear policies and
Lack of established criteria for	guidelines for GPP
environmentally friendly products	2. Establish clear definition of
Limited product availability meet the	GPP
environmental criteria	3. Increase availability of green
	products.



GPP Barriers and Enablers (2/2)

Types of Barriers		Enablers
Information and capacity-related barries		1. Increase awareness on GPP
Lack of practical tools		issues among procurement
Lack of knowledge and legal expertise		officials
		2. Build capacity and increase
		legal expertise
		3. Develop applicable tools
		4. Interact and consult the market
		players and invest in R&D
	1	
Regulatory and political barriers		1. Develop common
Lack of stronge policy commitment		understanding of best practices in
Lack of regulatory action plans		policies
Lack of monitoring policies		2. Inprove planning, strategies
		and goat-setting
Structural barriers		Use LCC to demonstrate the
GPP is unrecognised tool		enormuos economic and
It splits incentive		environmental benefits (savings).
GPP is not a priority for support		
Fear of complexity and increased costs		
GPP is new for many countris		



Benefits of GPP

- Environmental benefits: Lowest negative impact on the environment throughout their life cycle: Reducing the electricity cost, mitigating the carbon footprint, and relieving the demand on the power sector.
- **Political benefits:** Demonstration of a public authority's commitment to environmental protection.
- Social and health-related benefits: (In)directly improve quality of life due to high environmental standards.
- Economic benefits: Provides incentives for the industry to innovate, promote green products and save money. Innovative products are cheaper through economies of scale, shifting the entire market towards greener products. i.e. a tool to help shift the low EER RAC categories to higher ratios (3 – 5 star ratings).
- Achieve SDGs 7, 12, and 13 by 2030.
- Net-zero Agenda by 2050



Selection & Award Criteria

There are two possible ways of choosing the winner(s)

1. Lowest Price Criteria

The **cheapest bid is awarded** the contract (**bid with the lowest price**) on basis of the purchase price. <u>But, purchase price only accounts</u> <u>for a portion of the total cost generated by a public purchase</u>. There are **other costs too**.



Direct and indirect costs in public procurement

2. "Most economically advantageous tender" (MEAT) award criterion

- Proposed to be introduced in procurement regulation.
- MEAT takes both TCO and environmental considerations into account in the competition.
- The approach used most frequently considers various dimensions of economic and environmental quality as award criteria (such as EER/EEI, refrigerant, GWP, ODP, energy consumption & noise level).
- The contract is awarded to the bidder that achieves the highest overall "score," i.e. weighted average between the purchase price and environmental dimensions.
- It is recommended that the maximum weighting share of environmental criteria should be 55%.

Reducing the weight of the purchase price and increasing the weight of quality and environmental dimensions, results in more economical projects over their lifetime.

Move away from Lowest Price to Best Economic Criteria (MEAT).



Proposed admissibility criteria for single split ACs (1/3)

Criteria	Feature	Metric	Description	Max Points
	Technical Specifications		Must be an inverter type split AC	Minimum Criteria
Technical	Energy Efficiency	Star Rating	 3-stars minimum Bidder must provide product description/documentation of EER and results from a third-party accredited laboratory. Example of metric evaluation: 3-star: 5 points 4-star: 15 points 5-star or above: 20 points 	20
Performance	Reliability	Warranty	Minimum 1 year. Example of metric evaluation: 1 year – 2 points 2 years – 4 points 3 years – 6 points 4 years – 8 points 5 years or more – 10 points	10
	Air filter		Indoor units must be fitted with air filters that can be easily cleaned	Minimum Criteria
	Control functions	Scheduling	"Manual on – Auto off" schedule option available	Minimum Criteria



Proposed admissibility criteria for single split ACs (2/3)

Criteria	Feature	Metric	Description	Max Points
Life Cycle-Cost (LCC) Performance	LCC	LCC (GHS)	Including the cost of purchase, installation, repair and maintenance, operation (including energy) and uninstallation. Calculation performed by the procuring entity, using the following estimations: Total installation cost, composed of the equipment price, as submitted in the bid and installation/maintenance costs borne by the procuring entity. Equivalent full load hours of operation: 2,000 hours p.a. Electricity cost: 1.344 GHS/kWh Maintenance labor cost: 52.1 GHS/man-h Annual maintenance. Efficiency according to star rating. Energy cost escalation rate: 5.0% Equipment escalation rate: 10.0% Labor escalation rate: 10.0% Estimated equipment lifetime 12 Discount rate 15% Points = 40 x (lowest life cycle cost of all bids/life cycle cost of this bid)	40



Proposed admissibility criteria for single split ACs (3/3)

	Label		Label must be nationally recognized	Minimum Requirement
Environmental Performance	Refrigerant used	GWP of Refrigerant	AC systems are to be procured, if possible with natural refrigerants. Bidder must provide information on GWP and ODP of contained refrigerant. Refrigerants restricted under the Montreal Protocol (CFCs & HCFCs) are forbidden. Example of assessment points: GWP > 700 = 0 point 10 < GWP < 700 = 10 points GWP < 10 = 20 points	20
	Noise emissions	Decibel	Noise emissions must be stated in the product documentation. Lower than 60 dB for internal unit and 65 dB for external unit and = 10 points Otherwise = 0 points	10
TOTAL				100%



UNEP SPP Tool customized to Ghana (1/2)

			BASELINE					
GENERAL SETTINGS			Units	Capacity	Efficiency	Refrigerant	Estimated AC cost	Manual AC cost
			<mark>150</mark>	3.5 kW	1-star - fixed spe	e R410A	2300	
Country	Ghana		200	5.3 kW	3-star - fixed spe	e R410A	3900	
Electricity cost	1.344	GHS/kWh						
Maintenance labor cost	52.1	GHS/h						
Emission factor	370	kg CO2/MWh						
Energy & CO2 price escalation rate	5.0%	p.a.	SPP PROJ	ECT				
Equipment escalation rate	10.0%	p.a.	Units	Capacity	Efficiency	Refrigerant	Estimated unit cost	Manual unit
Labor escalation rate	10.0%	p.a.	<mark>150</mark>	3.5 kW	4-star - inverter	R32	4301	
Estimated equipment lifetime	12	years	200	5.3 kW	4-star - inverter	R32	5610	
Discount rate	20%							
EXTERNALITIES COSTS								
Carbon price	45	GHS/CO2t	UN @150					
Capital cost per kW to grid	9000	GHS/kW	ervelmenterit programme	SUSTAINABLE PUBLIC P				
Costs of non or poor Occupational Safety & Health Assumed value added by project to raw cost of	4%	GDP (value added)						
materials/services	20%							
Refrigerant leakage during operation	5%	p.a.		A A ALLA				
Refrigerant recovered end-of-life	40%			Contraction of the second seco	A			
Assumptions:								
All loan models assume equal monthly repayments over lo	oan tenor.			PPLIANCES A	ND			
Recycling costs considered in product purchase cost (exten	ided producer respons	ibility)	EC	QUIPMENT				
Cost of grid/generation expansion concurrent con project	(immediate increase ir	n demand)			Construction Construction Construction Construction			
Negligible residual value of product at end of lifetime.			Lasiand Institutes Resolution	moutanome - clotest environmental truckter - coupartment for environment	anness of the PETRIC CONST.			



UNEP SPP Tool customized to Ghana (2/2)

CASE 2: Air Conditioning New installation. Standard project development, own resources.

RESULTS	BASELINE	SPP PROJECT	
Project costs	GHS 1,197,917	GHS 1,840,067	
Initial investment	GHS 1,197,917	GHS 1,840,067	
Nominal lifetime costs (excluding externalities)	GHS 25,687,196	GHS 20,277,703	
Nominal lifetime externalities costs	GHS 4,562,730	GHS 2,868,004	
Simple payback (net positive cummulative cash flow excl externalities)		1.6	years
IRR SPP PROJECT vs BASELINE (excl. externalities)		66.8%	
Discounted lifecycle cost excluding externalities (LCC)	GHS 7,730,927	GHS 6,539,697	
Discounted lifecycle cost including externalities (LCC)	GHS 11,325,754	GHS 8,822,057	

CASE 2: Air Conditioning New installation. Standard project development, own resources.





Conclusion





ENERGY COMMISSION

Securing Ghana's Energy Future Today

Open Discussion Country Perspectives on U4E activities and impact



Moderator:

Hubert Nsoh Zan

Assistant Manager, Energy Efficiency Regulation/ Energy Transformation Expert, Ghana



Federal Ministry for the Environment, Climate Action, Nature Conservation and Nuclear Safety



وزارة الطاقــــة والبنيــــة التحتيــــة MINISTRY OF ENERGY & INFRASTRUCTURE

Open Discussion Country Perspectives on U4E activities and impact

- What are the current national plans or strategies in place to support the commitment to MEPS (Minimum Energy Performance Standards)?
- 2. What key barriers or challenges are countries encountering in implementing or meeting their MEPS commitments?
- 3. What types of support do countries require to effectively fulfill their MEPS commitments?

Session Wrap-up Towards sustainable cooling with U4E initiative



Rocio Soledad Garcia

Project Coordinator and Energy Efficiency Specialist UNEP, United for Efficiency (#7) Commit to establish Minimum Energy Performance Standards (MEPS) by at the latest 2030 and aim to routinely raise ambition and progress consistent with respective national laws with a view to achieve net-zero emissions by 2050 and noting best available technology and available model regulation guidelines.



Federal Ministry for the Environment, Climate Action, Nature Conservation and Nuclear Safety



زارة الطاقة والبنية التحتيية MINISTRY OF ENERGY & INFRASTRUCTUR

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Thank you

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