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INDUSTRIAL DEVELOPMENT ORGANIZATION

Montreal  
Protocol Unit



Workshop on Kigali Implementation Plans

Session 7: Panel Discussion on Synergies with the HPMPs  
in Domestic Air Conditioning Sector

15 June 2023 Vienna, Austria

KIGALI in  
Acti  
ON





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Protocol Unit



15 June 2023  
11:30 – 12:30 a.m. CET time

## Session 7: Panel Discussion on Synergies with the HPMPs in Domestic Air Conditioning Sector



**Mikheil Tushishvili**  
Programme  
Officer, Montreal Protocol,  
UNEP



**Xiaoyan Li**  
Project Officer,  
Foreign Economic  
Cooperation Office,  
Ministry of Ecology and  
Environment, China



**World Bank**  
(Video recording)  
WB experience in KIP  
preparation



**Philipp Denzinger**  
Project Manager Proklima  
International Deutsche  
Gesellschaft für  
Internationale  
Zusammenarbeit (GIZ)



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15 June 2023  
11:30 – 11:40 a.m. CET time

## Session 7: Panel Discussion on Synergies with the HPMPs in Domestic Air Conditioning Sector



**Mikheil Tushishvili**

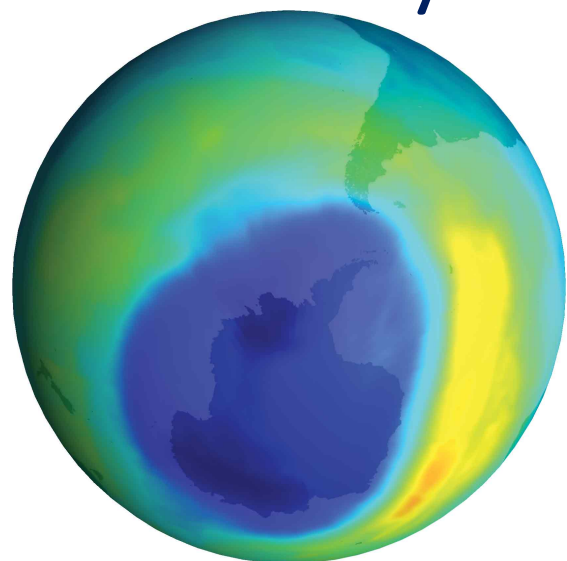
Programme Officer,  
Montreal Protocol  
UNEP

Mikheil holds the degree of Master of Science in Environment Science and Policy from the joint Master Programme of Central European University (CEU) and Manchester University. At present, Mikheil is Montreal Protocol Programme Officer at UNEP in Paris, France.

# OzonAction

## Workshop on Kigali Implementation Plans

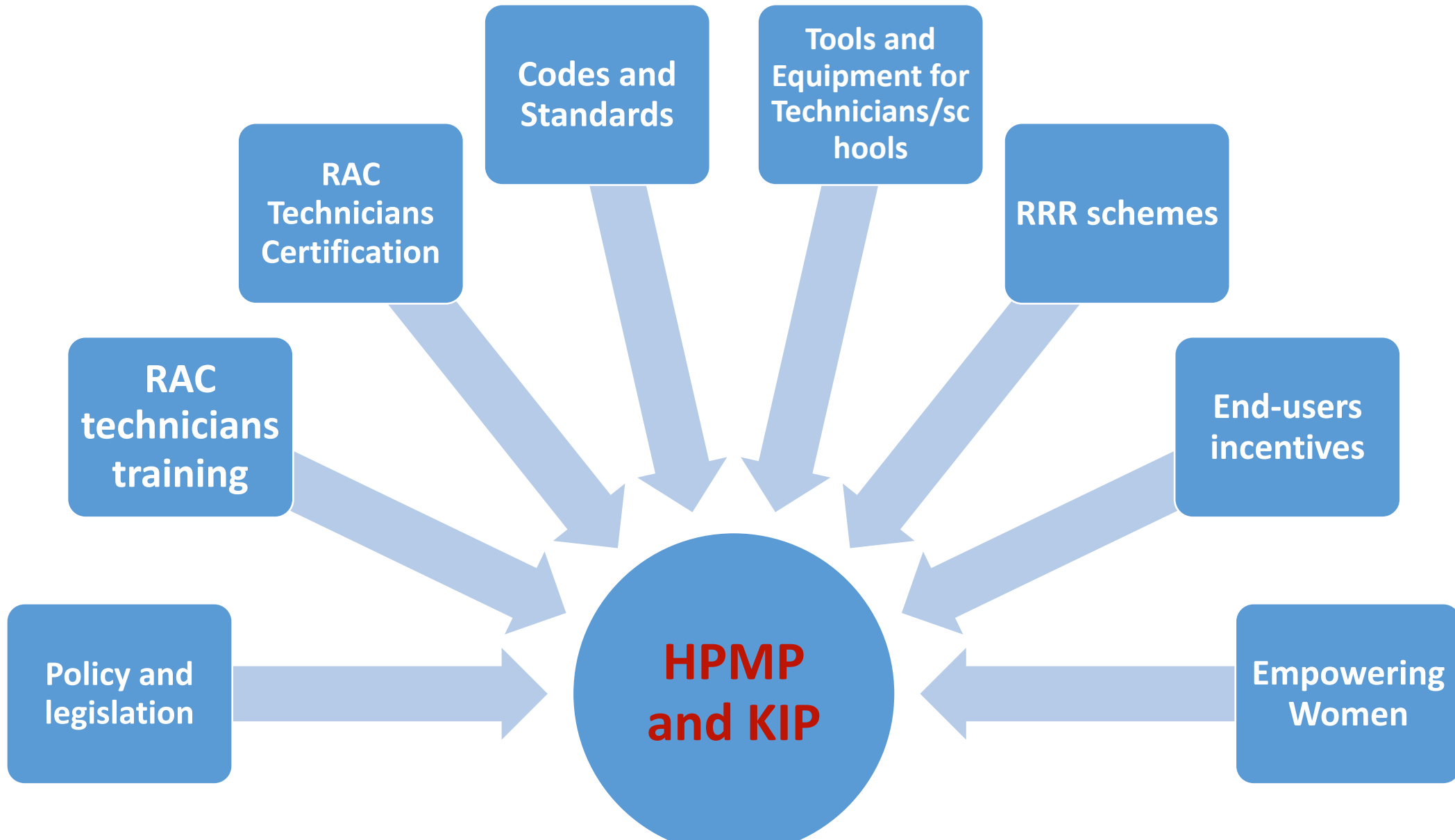
### Synergies between KIPs and HPMPs (Policy and Servicing sector)



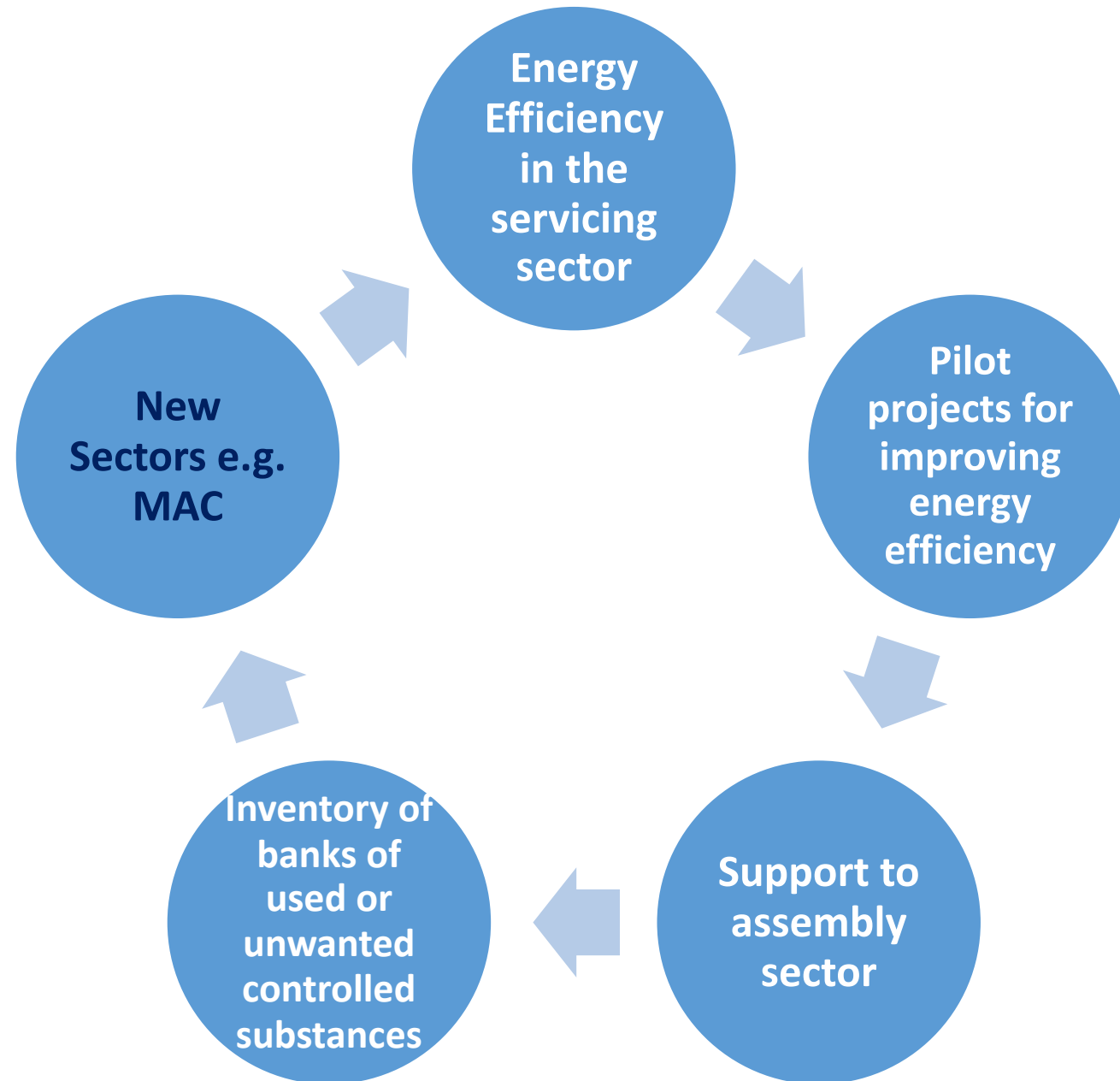
**Mikheil Tushishvili**  
UNEP, Law Division, OzonAction



# Activities which are covered in UNEP's HPMPs and will be considered for KIPs



# New type of activities in the Servicing Sector



# Integrating national policy measures on HCFC & HFC

**Article 5 countries and UNEP in reviewing and designing a national framework of legislation and administrative procedures for HFCs build synergies and integrate systems, where feasible:**

- Build on existing ODS legislation where appropriate**
- Create integrated administrative procedures for HCFC and HFC to gain efficiencies, such as:**
  - ✓ **Integrated system for HCFC & HFC licensing, registration, monitoring and reporting**
  - ✓ **Joint databases on HCFC & HFC**
- Adopt common legal requirements for training and certification schemes for HCFC and HFC, e.g. for RAC technicians, customs/border control, environmental inspectorate**
- Identify possible synergies with climate and energy efficiency policies and measures**
  - ✓ **Developing a national inventory of installed base of HFC equipment etc**
  - ✓ **Measures to promote energy efficiency in sectors relevant to HFC & HCFC (RAC equipment standards, building codes)**

# HFC Phase-Down Strategy – Domestic Air conditioning sector

**An important aspect of Kigali Amendment implementation is for each country to consider its optimum phase-down strategy which is in line with existing HPMP strategy.**

The synergy aspect – understanding of the current consumption of HFCs, HCFCs, alternatives in this sector and type of actions to reduce HFC consumption?

**Top-down data on the bulk consumption of HCFCs, HFCs and alternatives and equipment if possible**

**Actions for new equipment: use and promotion of low GWP technologies through demo projects or end-users' scheme or other incentives/initiatives**

**Bottom-up data on key aspects such as sub sector consumption, equipment, refrigerants, price etc**

**Actions for existing equipment: leak prevention, better servicing practices, standards and R/R/R schemes**

**Which sectors/sub-sectors as well as which activities have the greatest potential for cost-effective actions for freeze and 10% reduction?**



Consumption HFCs in baseline years  
was affected by COVID restrictions

Larger number of substances and  
mixtures in variety of sectors (foam,  
MAC, firefighting...)

Baseline and control targets in CO<sub>2</sub>-eq

Starting Point and Maximum  
Allowable Consumption

Quota setting CO<sub>2</sub>-eq vs metric tones

Alternatives with flammability,  
toxicity, and high-pressure

# There are many opportunities within the KIP new strategies

**New Technologies are available and market acceptance programs**

**Flexibility in designing the HFC phase-down**

**Designing training programs and certification schemes so that they cover HFCs and alternatives + codes**

**Advancing energy efficiency in operation/servicing of RACHP applications**

**New funding opportunities for A5 countries under MLF and other financial mechanisms**

**Empowering women working in the RACHP sector (INWIC | International Network of Women in Cooling)**



# THANK YOU VERY MUCH!

**Mikheil Tushishvili**  
**Programme Officer, ExCom Coordinator**  
**United Nations Environment Programme (UNEP)**  
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**Website: <http://www.unep.org/ozonaction>**



15 June 2023  
11:40 – 11:50 a.m. CET time

## Session 7: Panel Discussion on Synergies with the HPMPs in Domestic Air Conditioning Sector



**Xiaoyan Li**

Project Officer,  
Foreign Economic Cooperation  
Office, Ministry of Ecology and  
Environment, China

Ms. Li Xiaoyan is an esteemed environmental professional with over 20 years of experience as an Ozone Officer in China. She has dedicated her career to implementing the Montreal Protocol and eliminating ozone-depleting substances, with a primary focus on the refrigeration sectors. Ms. Li Xiaoyan's expertise and leadership have been instrumental in formulating effective strategies and regulations in China to combat ozone depletion. She actively advocates for sustainable technologies within the refrigeration industry while raising awareness about the importance of protecting the ozone layer and mitigating climate change. Her contributions have made a significant impact on environmental preservation and sustainability efforts in China.



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Session 7: Synergies with the HPMPs in Domestic Air Conditioning Sector

# The Action on Kigali Amendment and HCFC phase out in the RAC sector

**Xiaoyan Li**  
Foreign Environmental Cooperation Center,  
Ministry of Ecology and Environment, China

June 15 2023 Vienna, Austria

# KIGALI in Acti ON





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# Overview



**The Action on Kigali Amendment in China**



**The Selection of Alternatives in the Refrigeration Sectors**



**R290 in the Room Air Conditioner  
Sector**

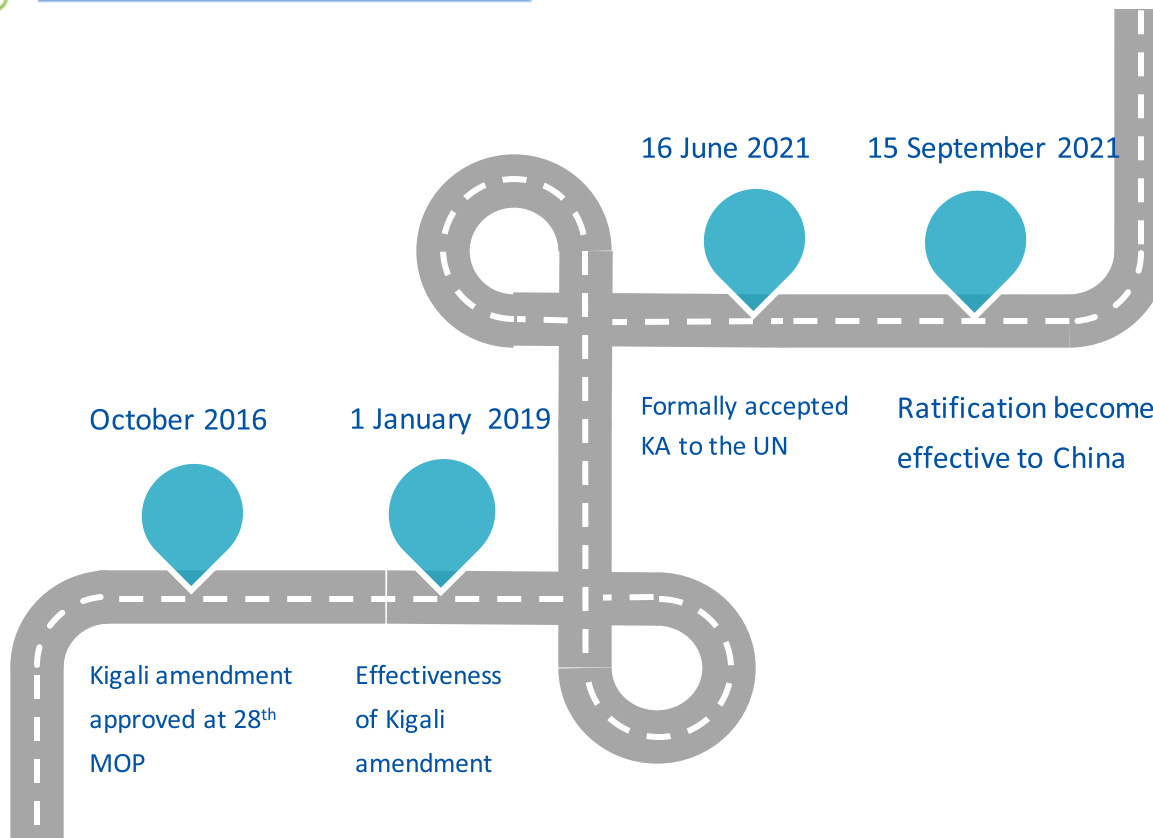


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## Action on Kigali Amendment





## Action on Kigali Amendment

1

Revision of *Regulations on ODS management*, HFCs were listed in the controlled substances.

2

Preparation of *National program on phase-down of HFCs*.

3

*Notice on Control of the First Batch of HFCs Production and Construction Projects* prohibits new construction and expansion of facilities that produce HFC-32, HFC-134a, HFC-125, HFC-143a, HFC-245fa as refrigerants, blowing agents and other controlled uses.

4

*Notice on Controlling of by-product HFC-23*  
By-product HFC-23 should be destroyed and disposed to the extent practicable using MOP-approved destruction technologies.

5

*List of Controlled Ozone-Depleting Substances for Import and Export of China*  
The list was revised to include HFCs in the import and export license management system.

From 1 November 2021, the import and export of HFCs will be officially licensed.

6

Development of *HFCs quota management plan*.  
The Quota for production of HFCs will be applied in 2024 to ensure the freeze target. Quota for consumption sectors will be reviewed and discussed.

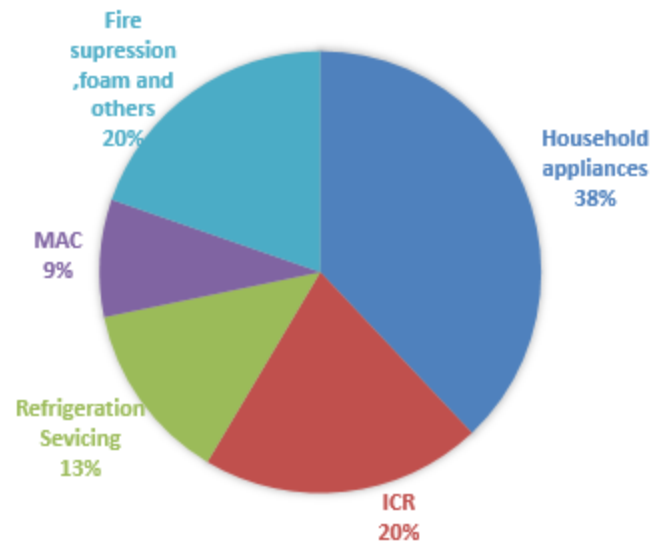




## Action on Kigali Amendment

- ✓ China is the world's largest manufacturer of refrigeration and air conditioning equipment, and the use of HFCs has maintained a rapid growth trend in recent years.
- ✓ HFCs are widely used, involving automotive air conditioning, household air conditioner, industrial and commercial refrigeration, refrigeration servicing, fire suppression, foam and aerosol sectors;
- ✓ HFCs are mainly used as refrigerants, and the use of HFCs in the automotive air conditioning, air conditioner, industrial and commercial refrigeration and refrigeration servicing sector accounts for about 81% of the total domestic HFCs used (calculated by carbon dioxide equivalent).

## CO2 EQUIVALENT





## Selection of Alternatives in the Refrigeration Sectors in China



Capital cost and operation cost



Safety and reliability



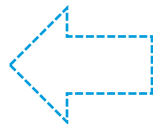
Availability of the technology



Environmental impact



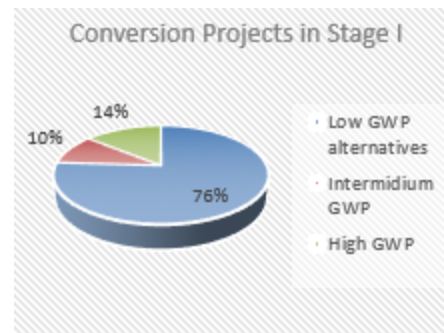
Energy efficiency



In the implementation of HCFCs phase out programs, the refrigeration industries in China are looking for long-term and sustainable solutions.

In stage I HCFCs phase-out management plans: about 76% production lines were converted to low-GWP alternatives.

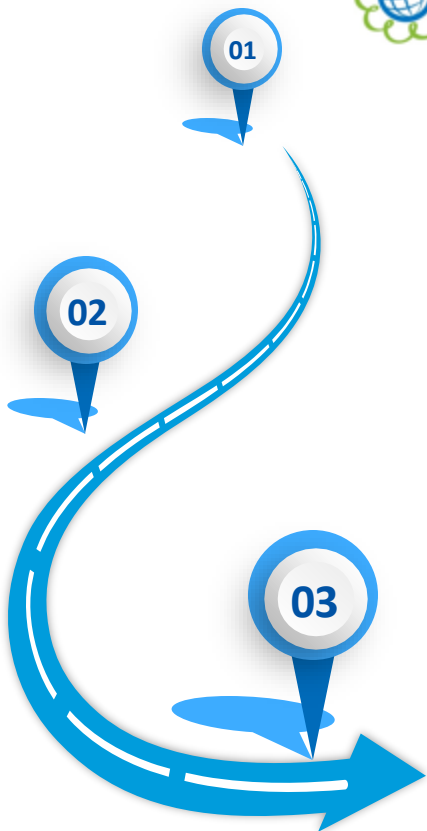
In stage II HCFCs Phase-Out Management Programs: Only low GWP alternatives are supported by the sector plans.





## R290 in the Room Air Conditioner Sector

R290—the choice for future



01



Review and consultation

The Chinese RAC industry started to consider R290 as alternative refrigerant in early 2007~2008



Research and experiment

Two important research projects carried out by Tianjin Fire Science and Technology Research Institute to validate the safety of R290 in ACs

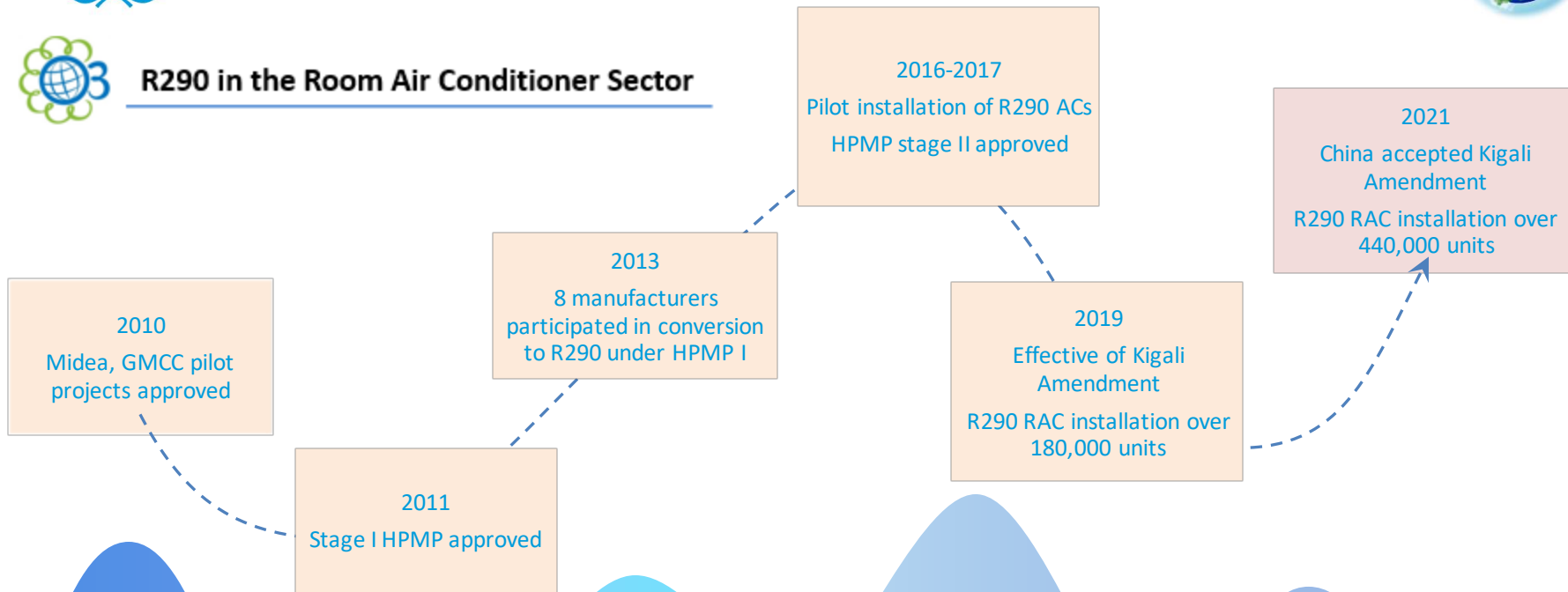


Pilot conversion

Pilot projects with RAC production line and compressor production was approved and implemented



## R290 in the Room Air Conditioner Sector





# R290 in the Room Air Conditioner Sector

## ◆ Conversion of production lines

A total of 30 Room Air Conditioner production lines were converted from HCFC-22 to R290 supported by the RAC HPMP  
7 Compressor production lines converted to R290



XIAOMI 13 ULTRA

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## R290 in the Room Air Conditioner Sector

### ◆ Technology development-to inspire and encourage research activities at enterprise level

#### HPMP Stage I

In stage I, technical research is carried out to address the safety and reliability of the alternatives, product performance and key components of for the conversion.

2022~2026

Research and development will focus on heat pump water heaters.

#### HPMP Stage II

In stage II, in-depth research on R290 technology focusing on compressors, lubricating oil, R290 AC performance and reliability, and improvement of energy efficiency.





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## R290 in the Room Air Conditioner Sector

# Market promotion of R290 ACs

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AUX 奥克斯

### 公司简介

29年专业制冷历程见证成长，奥克斯空调销售遍布中东、欧洲、亚太、非洲、美洲等100多个国家和地区，其中在越南、马来西亚、巴基斯坦、土耳其等20多个国家占有第一，以及印尼、马来西亚、约克等21个大客户ODM整体地位占有第一，并成为全球2022年度10强品牌金圆奖空调类领军品牌，奥克斯拥有强大的研发能力，在变频控制、舒适健康技术、智能前瞻技术领域处于行业先进水平，智能化产品占比达80%。

### 参展产品特点介绍

奥克斯始终秉持绿色环保设计理念，第三代R290空调在节能、环保、安全等方面达到行业先进水平，产品主要技术创新如下：

- ◆ 压缩机柔性转速、低油量技术，降低壳体尺寸和冷凝液量，壳体能效提高2%；
- ◆ 壳体采用精益设计，模块化平台，通用性强高30%；
- ◆ 换热器采用大流量和小管径技术，在降低冷凝流量的同时能效提升5%；
- ◆ 变频久电控，采用密封电控盒及主动散热技术，实际电分离高，且控制液温下降10%；
- ◆ 智能安防，采用冷凝液漏保护技术，智能预警形成双层防火墙。

### 产品核心参数

品牌	型号	额定制冷量 (kW)	额定输入功率 (kW)	额定制冷量 (kW)	额定输入功率 (kW)	能效比 (APF)	能效等级
奥克斯	KFR-35GW/Bp22Q(R)1	3500	820	4800	300	5.27	一级

Hisense  
海信空调

### 公司简介

海信空调创建于1996年，是国内最早从事变频空调研发生产的品牌，集技术研发、生产制造、市场营销、技术服务于一体的专业化企业。多年来，我们始终专注于变频空调的技术创新、产品品质提升和产业的迭代升级，牵头中国变频空调国家标准的制定，坚持自主创新，享有空调行业“变频专家”的美誉。公司拥有海信变频、科龙变频两大品牌，专注变频空调领域26年，2022年在110个国家实现销量2100万台，全球十大空调品牌之一。海信空调设有研发中心、4个工业园区生产基地，拥有员工3.7万人，研发技术人员6548人，231人获得高级职称以上技术职称，博士以上330余人，主持参与发布：64项国家标准、21项行业标准、73项团体标准，在变频、新风、节能等领域处于行业前沿。

### 参展产品特点介绍

- ①主动安全防护技术**  
基于R290制冷剂空调运行特性的主动安全防护技术：使用精密分配比例技术对相关参数直接或间接进行多维逻辑融合分析，制定最优控制模式，实现空调冷凝器智能诊断与决策，将安全风险控制在极低阶段。
- ②防爆保护技术**  
控制R290制冷剂流量，立即开启新风功能，大量引入新鲜空气稀释室内R290浓度，降低爆炸风险；调整室内空气/冷凝器/压缩机/室外机的R290制冷剂流量，降低爆炸风险。
- ③高效可靠运行技术**  
空调独具有低R290制冷剂流量特点，室内外采用高效内循环装置，通过控制R290制冷剂流量的膨胀阀控制精度，精准调节制冷剂流量和分布特性，实现高能效效果，保证高效可靠运行。

### 产品核心参数

品牌	型号	额定制冷量 (kW)	额定输入功率 (kW)	额定制冷量 (kW)	额定输入功率 (kW)	能效比 (APF)	能效等级
海信	KFR-35GW/Q220V-X1	3510	850	5010	310	5.26	一级

### 产品研发 PRODUCT DEVELOPMENT

- ◆ 产品覆盖变频、移动空调、集成灶、热泵热水器等共计4个品类85个型号
- ◆ 累计出货量50.1万台，销往欧洲、北美等全球多个国家和地区

### 全球首个蓝天环保认证

- ◆ 全球首个蓝天环保技术突破：
- ◆ SEER>A、5 SCOP>4.6
- ◆ 能效比>A+++ (一级能效)
- ◆ 制冷剂全球最低用量仅1.2g/1000kcal
- ◆ 室外机噪音降低至<59dB(A)
- ◆ 室内机零有害物质添加



### 全球首个R290新一级能效产品下线

- ◆ 能效领先技术成果应用：
- ◆ 180°自由旋转，实现蒸发器全覆盖
- ◆ R410A变频驱动，制冷上下双效提升
- ◆ 250mm超薄机身
- ◆ APF 5.29，全球新一级能效5.29
- ◆ 750ml/h大新风量



### 产线改造 PRODUCTION LINE TRANSFORMATION

- ◆ 产线覆盖变频、广州、佛山、武汉4大基地，累计改造12条线
- ◆ 资产总额超640万（德国）

### 仓储改造 WAREHOUSE

- ◆ 仓储覆盖全国各基地，累计改造17个
- ◆ 仓储面积超50万㎡，仓储能力提升100%



TCL 空调

### 公司简介

TCL空调事业部1999年10月成立于广东中山南头镇，20余载行业深耕，在广东中山、湖北武汉、江西九江、内蒙、巴西建立五大生产基地，十大数字化工厂，产能超过200万台，年销量超千万，产品销往160多个国家和地区，产销量全球领先，出口位居行业前三，已成为集研发、生产、销售、服务于一体的大型综合家电制造企业。

TCL空调以“专注智慧健康空气管理技术”的研发与产品创新，实现智慧健康空气产品的普及”为追求和愿景，在“智慧空气”转型升级的驱动下，率先提出“新风+变频”双驱动战略，并推出自主研发的“新风变频”产品，通过“大风量”新风系统的普及，带动空调行业的进步，全面提升行业进入第三代空调时代，为行业发展贡献一份力量，为消费者创造健康智慧的生活。

### 参展产品特点介绍

- ◆ 外机：1. 采用大排量双压缩机和小管径换热器设计，减少冷媒量，强化换热，实现一拖双；2. 优化风叶螺旋桨形制，实现低噪“静音”效果，提升用户体验。
- ◆ 内机：搭载TCL自主研发健康新风解决方案，实现用户健康新风品质，并搭载新风热交换技术，进一步提升R290运行能效。

### 产品核心参数

品牌	型号	额定制冷量 (kW)	额定输入功率 (kW)	额定制冷量 (kW)	额定输入功率 (kW)	能效比 (APF)	能效等级
TCL	KFR-35GW/YCGR-R1	3600	890	4900	300	5.15	一级

海尔空调

### 公司简介

海尔空调成立于1985年，发展至今已超30多年历史，在制冷工业时代、互联网时代、物联网时代、空气行业先后经历了产品换代、换代品牌时代、立志品牌时代、先行行业发展的蜕变，海尔一直以“为用户”思维，推动全球行业健康有序变革和持续发展，特别是在物联网时代，海尔空调从“对空调”向“对空气”转型升级，2019年5月对外发布全球安全、低碳、智慧、全场景的空气解决方案，创立全球第一空气生态品牌。

### 参展产品特点介绍

- ◆ R290冷媒，GWP=3, 高效环保
- ◆ 创新全直流变频，保障好空气
- ◆ PID微流量驱动变频，舒适节能
- ◆ 650mm+超薄大风环，快速制冷热
- ◆ 高品质压缩机，低功耗，速冷静热

### 产品核心参数

品牌	型号	额定制冷量 (kW)	额定输入功率 (kW)	额定制冷量 (kW)	额定输入功率 (kW)	能效比 (APF)	能效等级
海尔	KFR-35GW/20BC(R)3	2610/2000/4000	610/220/1500	4220/2000/4800	250	4.15	二级



## ◆ Establishment of standards to ensure effective implementation

### Safety standard

In May 2013, *GB 4706.32-2012 Household and similar electrical appliances - Safety-Particular requirements for heat pumps, air-conditioners and dehumidifiers* was implemented, allowing room air conditioners to use flammable refrigerants. The standard will be updated to be equivalent to the IEC60335-2-40 7.0



### Servicing standards

In January 2015, *Technical Requirements for the Installation, Servicing and Transportation of Room Air Conditioners Using Flammable Refrigerants* was implemented.

In April 2017, *Special Requirements for the Transportation of Room Air Conditioner Products Using Flammable Refrigerants* was implemented.

### Standard for production

In April 2017, *Safety Technical Specifications for the Production of Room Air Conditioners for Household and Similar Uses Using Flammable Refrigerants* was implemented.





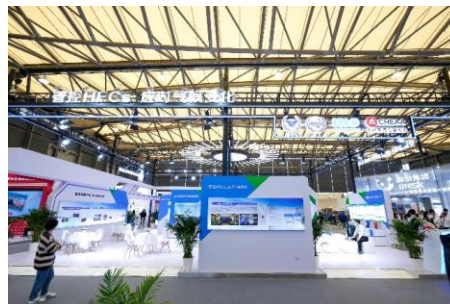
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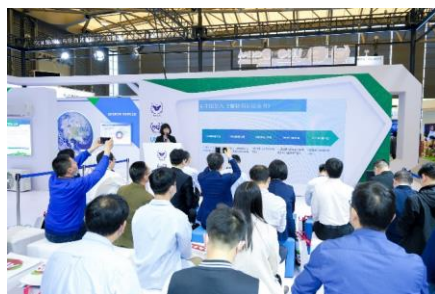


## R290 in the Room Air Conditioner Sector

### Awareness and publicity



Air conditioner low-carbon refrigeration technology exhibition and technology roadshow  
28 April 2023, Shanghai AWE





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## R290 in the Room Air Conditioner Sector

- ◆ **China will continue to promote the application of R290 alternative technology in room air conditioners and heat pumps**



Promote market  
acceptance of R290  
ACs

Strengthen international  
cooperation on R290  
technology application  
and product sales

Continue to support  
technology research  
and development

Strengthen policy  
making and raise of  
public awareness



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## Concluding Comments

- ✓ The Chinese room air conditioner sector has dedicated more than a decade of effort and substantial investments to adopt R290 refrigerant, and we strongly believe that it was the correct and worthwhile decision.
- ✓ By using R290 refrigerant, the direct emission from ACs are significantly reduced, focusing on energy efficiency, effective energy management and promoting responsible user behavior, we can reduce indirect emissions and enhance the overall sustainability of AC systems.
- ✓ China's progress in adopting R290 refrigerant has been driven by the support of the Multilateral Fund and international agencies, as well as bilateral government collaborations. In light of this, China is strongly committed to enhancing cooperation with other countries and international agencies to further advance R290 adoption. This collaborative effort aims to promote the widespread use of R290 and contribute to the achievement of global sustainability goals in the air conditioning sector.



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**Thank you for your  
attention.**

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15 June 2023  
11:50 – 12:05 a.m. CET time

## Session 7: Panel Discussion on Synergies with the HPMPs in Domestic Air Conditioning Sector



The World Bank

**Angela Armstrong**

GEF & Montreal Protocol Coordination Unit  
Environment, Natural Resources and the Blue Economy



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# KIP Preparation: World Bank Experience

Angela Armstrong

GEF & Montreal Protocol Coordination Unit

Environment, Natural Resources and the Blue Economy





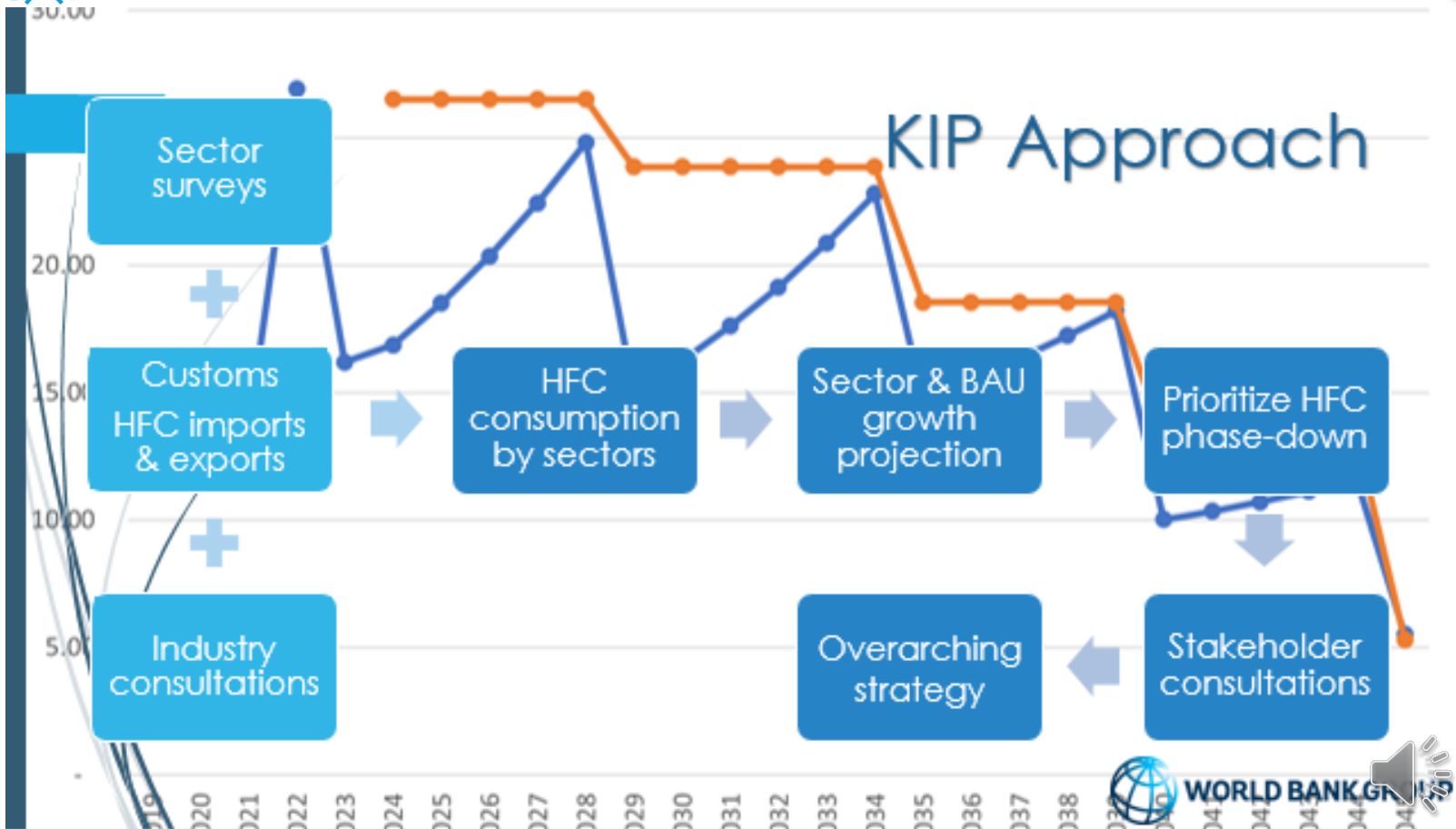
## • Characteristics & Trends

- Large-volume consuming countries (HFC baseline: 5,000-10,000 mt)
- Complex manufacturing sectors: automobiles, residential and commercial air-conditioning, commercial and industrial refrigeration, fire suppression, etc.
- Manufacturing bases for both domestic & export markets
- Growing economy, urbanization, large exporters of agriculture and fisheries products >> increasing AC & cold-chain needs
- HFC baseline impacted by pandemic

## • Considerations

- Minimize economic impacts from HFC phase-down
- Availability and affordability of alternatives/technologies
- Performance benefit/penalty of RAC equipment based on low-GWP alternatives
- Readiness of industry/consumer to adopt flammable refrigerants









# Quota Allocation Model

Objective: To support KA implementation according to phase-down strategy

Features/requirements:

Comply with existing government regulations and not overly complicated for NOU and importers/exporters to implement given the limits is set in CO<sub>2</sub>e. But import/export controls are by weight

Can accommodate both existing and new importers/exporters

Options to incorporate 65% HCFC baseline in quota allocation

Encourage imports of low/lower-GWP alternatives





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15 June 2023  
12:05 – 12:20 a.m. CET time

## Session 7: Panel Discussion on Synergies with the HPMPs in Domestic Air Conditioning Sector



**Philipp Denzinger**

Project Manager

Proklima International Deutsche  
Gesellschaft für Internationale  
Zusammenarbeit (GIZ)

Philipp Denzinger started working for GIZ in 2008 and has been working in and with many countries of the Global South. As a project manager for GIZ Proklima since 2014, he is in charge of implementing projects under the Montreal Protocol (MP) and Paris Agreement (PA) financed by German Ministries responsible for Economic Cooperation and Development (BMZ/MLF), Environment (BMUV), Climate Action (BMWK) and other donors (AfD; EC/EU; KliK Foundation; etc.). He is currently overseeing projects in around 25 countries and always trying to link the MP with the PA and its NDCs or Article 6.



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# Leapfrogging from ODS to low-GWP in domestic air conditioning sector

Philipp Denzinger, GIZ Proklima

15/06/2023, Vienna

# KIGALI in Acti ON





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- 10 new Air Conditioners (ACs) sold every second for the next 30 years (IEA 2018)
- The global stock of ACs will grow from 1.6 billion to 5.6 billion by 2050 (IEA 2018)
- ACs and electric fans already accounts for 10% of all global electricity consumption today (IEA 2018)
- If not addressed, energy demand from ACs will more than triple by 2050, equal to China's electricity demand today (IEA 2018)
- According to IPCC global energy demand of ACs will increase by 33 times between 2000 and 2100 (EIU 2019)

**Therefore, the AC subsector concerns all countries and needs to be addressed in the KIP!**



Refrigerant	Composition	GWP 20	GWP 100	ASHRAE- flammability	PFAS	TFA
<b>R22 HCFC</b>	100%	5690	1960	A1	No	No
<b>R410A HFC</b>	50% R125, 50% R32	4714	2256	A1	Yes	No
<b>R32 HFC</b>	100%	2690	771	A2L	No	No
<b>R454C HFC &amp; HFO</b>	21,5% R32, 78,5% R1234yf	579	166	A2L	Yes	R1234yf up to 100%
<b>R1234yf HFO</b>	100%	1.81	0.501	A2L	Yes	R1234yf up to 100%
<b>CO2</b>	100%	1	1	A1	No	No
<b>R290 HC</b>	100%	0.072	0.02	A3	No	No



# Avoiding emissions by "leapfrogging" to Green Cooling





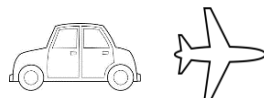
# Exchange of conventional ACs by Green ACs (highly energy efficiency and natural refrigerant R290)

## Over lifetime (10 yrs.) per AC:

- Reduced energy consumption, on average by **5,000 kWh**
- Significant cost reduction for consumers and government
- Reduced emissions on average of **5-10 t CO<sub>2</sub>eq\***

## Equivalent to emissions of:

- Approx. 2-4 return travels **Nairobi - Frankfurt /**
- Approx. **15 - 30,000 km**



\*Source: IPCC 6th Assessment Report

\*depending on grid emission factor, running hours, etc.



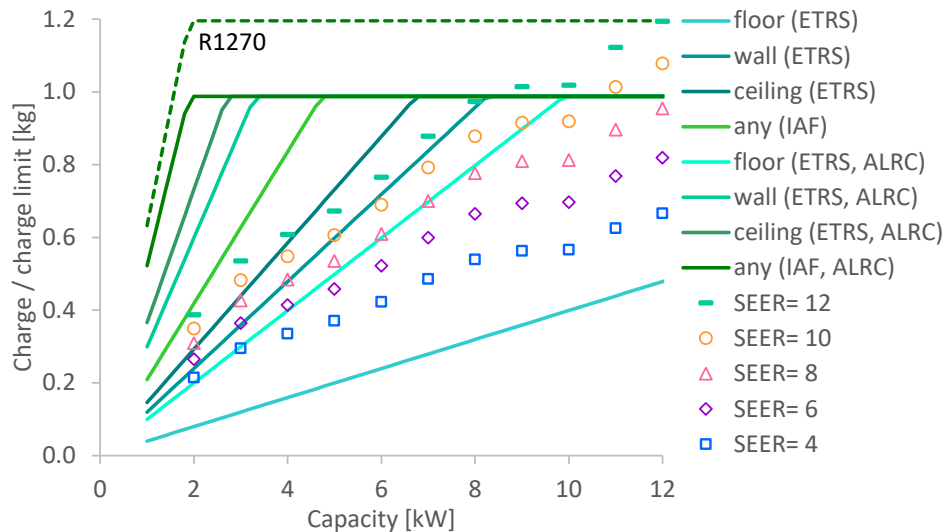
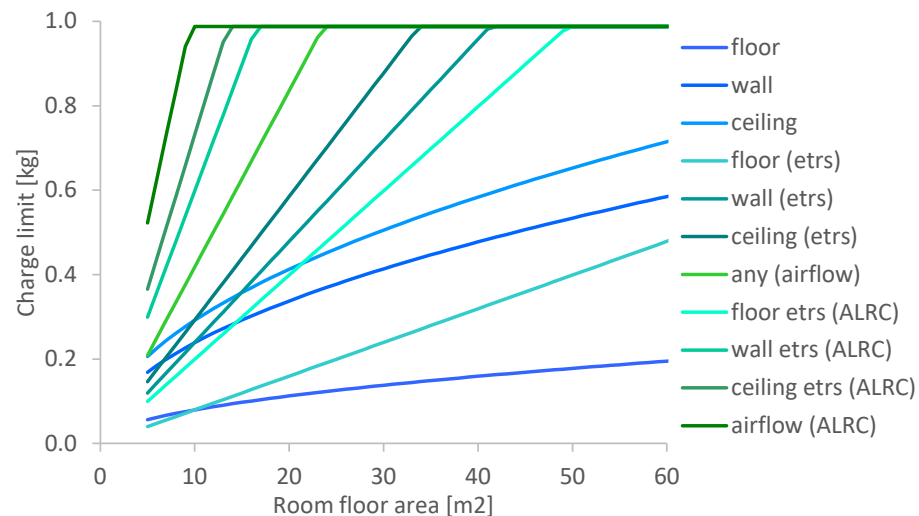
(1 kg = 0.02 kg CO<sub>2</sub>eq)





## Safety standards

- IEC 60335-2-40 (2022)
- Allows a maximum refrigerant charge for split ACs:
  - 1 kg R290
  - 1.2 kg R1270
- On average there are 300-700 g or R290 in one split AC (12-24.000 BTU)
- Very high efficiency
- Extremely high thermal load
- Always result in overall cost reduction





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## GIZ Proklima's Approach is to include R290 ACs in:

- HPMP
- KIP
- Energy efficiency funding windows (e.g. MLF Decision 91/65)
- Climate finance projects
- Carbon finance (Article 6) projects
- NDCs
- National Cooling Action Plans (NCAP)
- MEPS, Ecolabels





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## Include R290 ACs under MLF & climate finance projects

- Some GIZ HPMPs (e.g. Kenya, Namibia, Seychelles, Mauritius, etc.) already included supply chain development and subsidies for R290 AC, product certification, training and monitoring. E.g. in Kenya, we subsidize 500 x R290 ACs x 100 \$ = 50.000 \$)
- GWP limits (e.g. Grenada)
- Tax incentives for ultra-low GWP refrigerants/tax disincentives for HFCs (e.g. Ghana and Seychelles)
- Green public procurement programmes
- Green credit lines



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## Include subsidies for R290 ACs carbon finance projects

**Cooling Program for Southern Africa (South Africa (tbc), Botswana, Namibia, Eswatini), 7 mil. EUR, financed by the German Ministry of Economic Affairs & Climate Action (BMWK)**

- Installation of around 20,000 R290 ACs and financed Internationally Transferrable Mitigation Outcomes (ITMOs) regulated under Art. 6 of the Paris Agreement

**Green Cooling Ghana: approx. 18 mil. EUR financed by KliK Foundation Switzerland (tbc)**

- Installation of 150,000 R290 ACs and financed by Internationally Transferrable Mitigation Outcomes (ITMOs) regulated under Art. 6 of the Paris Agreement



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## Recommendations for the KIPs to be included

- Set clear GWP limits and timelines in HFC legislation
- Create tax incentives for ultra-low GWP refrigerants/tax disincentives for HFCs
- Set up R290 supply chains and subsidy schemes
- Compulsory recovery and collection of old HCFCs and HFCs in HFC legislation
- Equip training centers with R290 ACs and tools, curriculum and conduct trainings
- Adopt international safety standards (e.g. IEC-60335-2-40:2022)
- Introduce ecolabels (see e.g. German Blue Angel for ACs)
- R290 ACs in green public procurement programmes



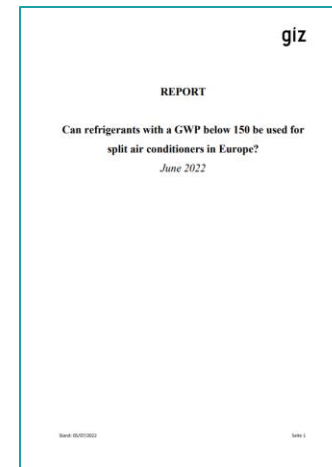
## Further readings



R290 Split Air  
Conditioners Resource  
Guide  
([Download](#))



Introducing Eco-Efficient  
Split Air  
Conditioners with R-290  
in Costa Rica  
([Download](#))



Can refrigerants with a  
GWP below 150 be used  
for split air conditioners  
in Europe?  
([Download](#))



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<https://www.green-cooling-initiative.org>

<https://www.copalliance.org>



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green<sup>❄️</sup>  
cooling initiative

**COPA**  
Cutting refrigerant emissions





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Thank you!

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