



选用臭氧气候友好的 替代技术，推动HPMP实施

Adopting Ozone2Climate Alternative Technologies, to Promote the Implementation of HPMP

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1 行业现状

Industry Situation

- ❖ 中国是全球制冷空调设备的生产大国。根据CRAA统计，中国制冷空调行业2017年工业总产值超过6500亿元，较2016年有超过二位数的增长。

China is a major refrigeration and air conditioning equipment manufacturing country in the world. According to CRAA statistics, gross industrial output value of China's refrigeration and air-conditioning industry in 2017 exceeded 650 billion RMB, more than a two-digit increase from 2016.

- ❖ 随着经济的持续增长，中国市场对各类制冷空调产品的需求量还在逐年提升，对产品品质的要求也越来越高。

With continuous economic growth, Chinese market demand for various types of refrigeration and air-conditioning products increases year by year, and product quality requirement is increasing as well.

- ❖ 环保、节能和高品质是行业和市场未来发展的主流方向。

Environment-friendly, energy saving and high quality are the main trends of the industry and market.

1 行业现状

Industry Situation



- ❖ 目前中国制冷空调行业是中国HCFCs的主要消费行业之一；随着制造规模的快速增长，行业内制冷剂的消费需求也在快速增加。

China's refrigeration and air-conditioning industry is currently one of the major HCFCs user in China; demand for refrigerants in the industry increases along with its rapid development.

- ❖ 随着HCFCs淘汰进程的加速带动HFCs消费的增加，我们必须对此加以关注并寻求解决途径。

With the acceleration of HCFCs phase-out progress, HFCs consumption increases as well, we must pay attention to this and seek solutions.

2 行业HCFCs淘汰行业计划的实施进展

Implementation Progress of HPMP in ICR Sector



第一阶段实施进展

Implementation progress in Stage I

- ❖ 工商制冷空调领域第一阶段HPMP实施进展顺利，总共签署了36条产品生产线的转换改造合同，所有项目实施完成后将淘汰超过8000吨的HCFCs。

The HPMP Stage-I implementation in the ICR sector has gone well. A total of 36 production line conversion contracts have been signed. After the completion of all projects, more than 8,000 tons of HCFCs will be eliminated.



第一阶段实施进展

Implementation progress in Stage I

- ❖ 在第一阶段HPMP的实施中，政府、协会和制造商携手合作，积极推进更低GWP的高效替代技术的选择使用，大量低GWP替代技术的采用使得R134a和R410A等具有高GWP值的替代制冷剂的应用在第一阶段的HPMP实施中仅占不到30%的份额。第一阶段HPMP的实施成果远超预期。

In the HPMP stage-I implementation, governments, industry associations and manufacturers work hand in hand to actively promote the use of low-GWP alternative technologies. The adoption of a large number of low GWP alternative technologies has enabled high GWP alternatives, such as R134a and R410A, only makes up less than 30% of the HPMP stage-I implementation. The implementation of the HPMP stage-I is far from expected.

替代技术研发项目

Alternative Technology R&D Projects



- ❖ 在第一阶段HPMP实施过程中，CRAA配合FECO在行业中启动了6个低GWP替代技术研发项目，为第二阶段以及今后更长时期内的技术选择提供了重要的技术支撑。

During the HPMP stage-I implementation, CRAA cooperated with FECO to launch six low-GWP alternative technology R&D projects in the industry, providing important technical support for stage II and further period of technology selection.



替代技术研发项目

Alternative Technology R&D Projects



| 序号No. | 项目名称Projects | 承担单位Participants |
|-------|---|---|
| 1 | R290大功率商用热泵机组开发项目 R290 high-power commercial heat pump unit development project | 浙江盾安人工环境股份有限公司、上海交通大学 Zhejiang Dunan Co., Ltd and Shanghai Jiaotong University |
| 2 | 商用CO₂热泵热水机关键技术的研究 Research on Key Technology of Commercial CO₂ Heat Pump Water Heater | 浙江中广电器股份有限公司、南京奥特佳新能源科技有限公司、浙江三花股份有限公司 Zhejiang Zhongguang Co., Ltd, Nanjing Aotejia Ltd. and Zhejiang Sanhua Co., Ltd. |
| 3 | HFO冷水机组的开发与应用潜力分析 Analysis of Development and Potential Application of HFO Chiller | 浙江盾安人工环境股份有限公司、合肥通用机械研究院 Zhejiang Dunan Co., Ltd. and Hefei General Machinery Research Institute Co., Ltd |
| 4 | CO₂制冷在超市冷链中应用的成套技术开发 Development of Complete Set Technology for Application of CO₂ Refrigeration in Supermarket Cold Chain | 昆明东启科技股份有限公司 Kunming Dongqi Co., Ltd |
| 5 | 低GWP制冷剂在列车空调中的应用研究 Application of Low GWP Refrigerant in Train Air Conditioning | 华南理工大学、广州中车轨道交通空调设备有限公司 South China University of Technology and Guangzhou Zhongche Co., Ltd. |
| 6 | R290空气源冷水热泵机组实验研究项目 R290 Air Source Cold Water Heat Pump Unit Experimental Research Project | 南京天加空调设备有限公司 Nanjing TICA Co., Ltd |

第二阶段已开展的工作

Ongoing Projects in Stage II

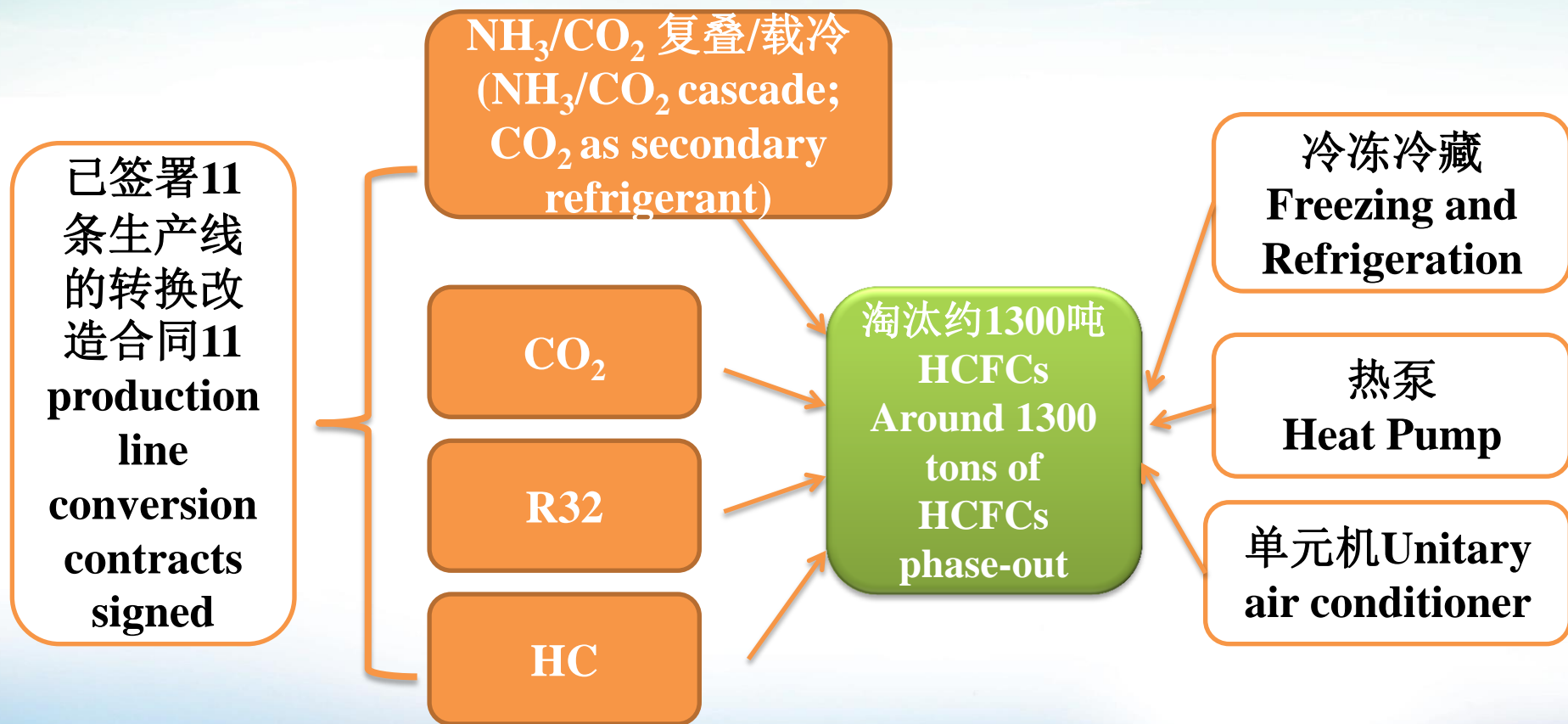


- ❖ 中国工商制冷行业第二阶段HPMP于2016年12月在《蒙特利尔议定书》多边基金执委会77次会议获得批准，目前第二阶段HPMP的实施正在有序推进。

The HPMP stage-II in China's industrial and commercial refrigeration industry was approved at the 77th meeting of the Multilateral Fund Executive Committee of the Montreal Protocol in December 2016. Currently, the implementation of the HPMP stage-II is progressing in an orderly manner.

第二阶段已开展的工作

Ongoing Projects in Stage II



3 行业第二阶段替代技术的选择

Alternative Technology Selection in Stage II



- ❖ 考虑到基加利修正案的规定，中国工商制冷行业第二阶段行业计划中将不再资助采用R410A和R134a等高GWP值制冷剂作为替代技术的项目。 **Considering the provisions of the Kigali Amendment, the HPMP stage-II will no longer fund projects using high-GWP refrigerants such as R410A and R134a as alternative technologies.**
- ❖ 计划采用CO₂、NH₃、HC、HFOs等替代技术的项目将超过第二阶段总淘汰目标的50%。

Projects that plan to adopt alternative technologies such as CO₂, NH₃, HC, and HFOs will exceed 50% of the total phase-out target in stage II.

第二阶段替代技术的选择计划

HPMP Stage-II — Alternative Technology Selection



| 替代制冷剂 Alternative refrigerants | R32 | NH ₃ /CO ₂ 复叠/载冷 NH ₃ /CO ₂ cascade; CO ₂ as secondary refrigerant | NH ₃ | CO ₂ | HC | HFOs | 合计/吨 Total/ton |
|--------------------------------------|-------|---|-----------------|-----------------|-----|------|-------------------|
| 小计/吨 Sub- total/ton | 3,150 | 1,700 | 150 | 270 | 780 | 450 | 6,500 |

成就和荣誉

Achievements and Honors

- ❖ 2017年9月12日，在北京召开的中国保护臭氧日纪念大会上，中国制冷空调工业协会、烟台冰轮、清华同方、南京天加、汉钟精机、青岛海尔及合肥通用机械研究院等单位因为在保护臭氧层事业中做出的积极贡献获得表彰。

At the China Ozone Day Memorial Conference held in Beijing on September 12, 2017, China Refrigeration and Air-conditioning Industry Association, Yantai Ice Wheel, Tsinghua Tongfang, Nanjing Tianjia, Hanzhong Precision Machinery, Qingdao Haier and Hefei General Machinery Research Institute and others were recognized and awarded for their active contributions.



成就和荣誉

Achievements and Honors

- ❖ 2017年11月23日，在加拿大蒙特利尔召开的《关于消耗臭氧层物质的蒙特利尔议定书》缔约方第二十九次会议上，来自中国工商制冷空调行业的冰轮环境技术股份有限公司承担的“冷冻冷藏用NH₃/CO₂复叠制冷系统替代R22示范项目”荣获“保护臭氧层示范项目奖”。

At the Twenty-ninth meeting of the parties to the Montreal Protocol on substances that deplete the Ozone layer, held in Montreal, Canada, on 23 November 2017, Moon Environment Technology Co., Ltd. from China's Industrial and Commercial Industry was awarded "the Ozone layer Protection demonstration Project Award" for its demonstration project of " NH₃/CO₂ cascade refrigeration system for refrigeration cold storage replacing R22 ".



- ❖ 冰轮环境技术股份有限公司的项目实施取得了巨大的成功，在示范项目的推动下，目前 NH_3/CO_2 复叠技术已成为中国冷冻冷藏行业的主流技术，同时示范项目的执行也为项目承担企业和用户带来了良好的经济效益和节能效果。

The project of Moon Environment Technology Co., Ltd has achieved great success. Driven by the demonstration project, NH_3/CO_2 cascade technology has become the mainstream technology in China's refrigeration industry. At the same time, the implementation of the demonstration project has also brought good economic benefits and energy-saving effects for the project undertaking enterprises and users.

4 关注“基加利修正案”能效提升要求

Focus on the Kigali Amendment to improve Energy efficiency requirements

- ❖ 基加利修正案要求执委会制定费用指南时考虑维持或提高被替代的设备的能效，同时注意其他机制解决能效问题的作用。

The Kigali amendment requires the Executive Committee to consider maintaining or improving the energy efficiency of replaced equipment when developing cost guidance, paying attention to the role of other mechanisms in addressing energy efficiency issues.

4 关注“基加利修正案”能效提升要求

Focus on the Kigali Amendment to improve Energy efficiency requirements

- ❖ 我国是一个多煤、贫油、少气的国家。

China is a country with more coal, less oil and less gas.

- ❖ 大量的燃煤发电和燃煤供暖带来了可见的环境污染。

A large amount of coal-fired power generation and coal-fired heating brought visible environmental pollution.

- ❖ 中国政府高度关注环境保护问题，已制订诸多相关的措施并投入大量的人力、财力用于治理环境污染与破坏。

The Chinese government is highly concerned about environmental protection. It has drawn up many related measures and invested a lot of human and financial resources to combat environmental pollution and damage.



4 关注“基加利修正案”能效提升要求

Focus on the Kigali Amendment to improve Energy efficiency requirements

❖ 目前在中国大面积推进的“煤改电”等燃煤替代行动，为高能效的制冷空调和热泵产品的推广应用带来了新的发展机遇。

At present, the coal-fired alternative actions, such as "coal to electricity", are widely promoted in China. It has brought new development opportunities for the promotion and application of energy-efficient refrigeration, air conditioning and heat pump products.

- ❖ 结合基加利修正案，在淘汰ODS的行动中积极推进低GWP替代技术的应用和产品能效水平的提升，取得臭氧层保护和减缓温室效应的双重环境效益，是我们在未来HPMP实施中应当重点关注的方向，采取二者兼顾的技术路线和选择也必将取得好的成效。

In accordance with the Kigali amendment, we will focus on actively promoting the application of low GWP alternative technologies and improving products' energy efficiency during HPMP implementation in the course of ODS phase-out, in order to achieve environmental benefits of ozone layer protection and greenhouse effect mitigation. It will lead to good results.

5 下一步需要开展的行动

Next Steps



中小企业参与是行业计划实施完成的重要组成部分

SMEs are important participants for completion of the industry HPMP implementation

- ❖ **中国工商制冷空调领域生产厂家众多，数量超过千家，绝大部分为中小企业。**

There are thousands of manufacturers in the commercial and industrial refrigeration and air-conditioning industry in China. most of them are SMEs.

- ❖ **中小企业在资金、技术、人力资源等方面存在不同程度的短板，在开展淘汰转换行动时将面临更多的困难和障碍。**

SMEs have shortages in terms of fund, technology, human resources, etc. They will encounter many difficulties and obstacles during the phase-out and conversion actions.

5 下一步需要开展的行动

Next Steps



- ❖ 按照《蒙特利尔议定书》多边基金执委会批准的第二阶段行业计划，工商制冷空调领域至少有20%的HCFC-22削减任务在第二阶段将由中小型企业承担完成。

According to the HPMP stage-II industry plan approved by the Executive Committee of the Multilateral Fund of the Montreal Protocol, at least 20% of HCFC-22 reduction tasks in the commercial refrigeration and air-conditioning sector will be completed by SMEs.

5 下一步需要开展的行动

Next Steps



- ❖ 行业淘汰目标的完成离不开中小企业的参与。进一步提升中小企业参与行业计划实施的积极性，开发更多的项目，制订合适的实施方案，确保行业计划的全面实施完成是我们下一步需要重点关注的工作内容。

The industry's elimination targets won't be achieved without SMEs participation. Our major tasks in next step will fall on further enhancing the SMEs enthusiasm to participate in the industry HPMP implementation, developing more projects, formulating appropriate implementation plans, to ensure its full implementation.

5 下一步需要开展的行动

Next Steps



- ❖ 在推进HCFCs加速淘汰的同时，给予能效问题更多的关注，结合“基加利修正案”做好第二阶段HPMP的实施工作。

While promoting the accelerated elimination of HCFCs, more attention should be paid to energy efficiency, and the implementation of HPMP stage-II should be done well in conjunction with the Kigali Amendment.

5 下一步需要开展的行动

Next Steps



- ❖ 关注技术支持项目的落实，重点做好低GWP的替代技术在不同产品领域的适用性研究，为企业的转换改造项目的执行和市场推广提供有效的技术支撑。

Pay attention to the implementation of technical support projects, focus on the study of the suitability of low GWP alternative technologies in different product areas, and provide effective technical support for the implementation and marketing promotion of transformation projects in enterprises.

结束语

Conclusion



- ❖ 正在进行的HCFCs加速淘汰驱动了HFCs的消费和排放的增长，而《蒙特利尔议定书》修正案的达成又给高GWP的HFCs的市场应用前景画上了休止符。新的修正案必将对行业未来的发展带来全面而深刻的影响。

The ongoing accelerated HCFCs phase-out is driving the growth of HFCs' consumption and emissions, and the amendment to Montreal Protocol has laid a stop on the market application of high GWP HFCs. The new amendment is bound to bring a comprehensive and profound impact on the future development of the industry.

- ❖ 在未来的行业淘汰转换行动中，CRAA将关注基加利修正案以及HPMP所提出的目标和任务，积极推进更低GWP值替代技术的应用及产品能效水平的提升，尽最大努力推动通过全行业的履约转换行动，取得更大的综合环境效益，为保护地球环境做出更多贡献。

In the future phase-out transition of the industry, CRAA will pay close attention to the targets and tasks proposed by Kigali Amendment and HPMP, actively promote the application of lower GWP alternatives and improvement of products' energy efficiency. We'll make our best efforts to achieve greater integrated environmental benefits through promoting the adoption in the entire industry, in order to make more contributions to the protection of the global environment.



Thank you!