



# 中国行业替代发展趋势： 努力和挑战

## Refrigerant Alternative Trends in China: Effort and Challenges

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# 1 中国制冷空调行业概况

## Industry overview



- ❖ 根据CRAA统计，中国制冷空调行业2018年度工业总产值近7000亿元，同比增长超过6.5%；实现出口交货值超过1200亿元，同比增长超过9%。

According to CRAA statistics, the total output value of China refrigeration and air-conditioning industry in 2018 was over 700 billion yuan, up by 6.5% compared with the previous year, while the export delivery value was about 120 billion yuan, growing by 9% .

- ❖ 随着经济的持续发展，中国市场对各类制冷空调产品的应用需求和品质要求逐年提升，市场规模仍在持续扩大。

Along with the continuous development of China economy, the requirements for various types of R&AC products in China have been increasing every year, and the market continues to expand, meanwhile the requirement of product quality is also increasing.

- ❖ 当前中国政府推行越来越严格的环保和节能政策，取得了明显的成效；对制冷空调行业而言是一个新的发展机遇，同时也存在许多挑战。

The Chinese government has been implementing strict environmental protection policies, which has achieved remarkable results and brought new opportunities as well as challenges.



## 2 HCFCs淘汰管理计划（HPMP）的推进落实 HPMP Implementation



- ❖ 在第一阶段HPMP的实施过程中，通过政府、协会和制造商携手合作，大量低GWP替代技术得到了广泛采用，R134a和R410A等高GWP值的HFCs类替代制冷剂在第一阶段工商制冷行业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 worked hand in hand to actively promote the use of low-GWP alternative technologies. High GWP alternatives, such as R134a and R410A, only make up less than 30% of the HPMP stage-I implementation. The implementation of the HPMP stage-I is far from expected.

# 行业第一阶段替代技术的选择

## Alternatives Technology Selection in Stage I



	产品类型Categories	生产线数量 Conversion Production lines	替代技术 Alternatives
工商行业 Industrial and commercial sector	冷水机组/单元机/压缩机 Water chillers/Unitary AC/ICR compressor	16	R32
	压缩冷凝机组/压缩机 Refrigeration & condensing units/ICR Compressor	9	CO <sub>2</sub> /NH <sub>3</sub>
	工商用压缩机 ICR Compressor	1	HFOs
	冷水机组/压缩冷凝机组 Water Chillers/Refrigeration & condensing units	5	R134a
	多联机 Multi-split air conditioners	5	R410A

# 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及未来的发展趋势，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.

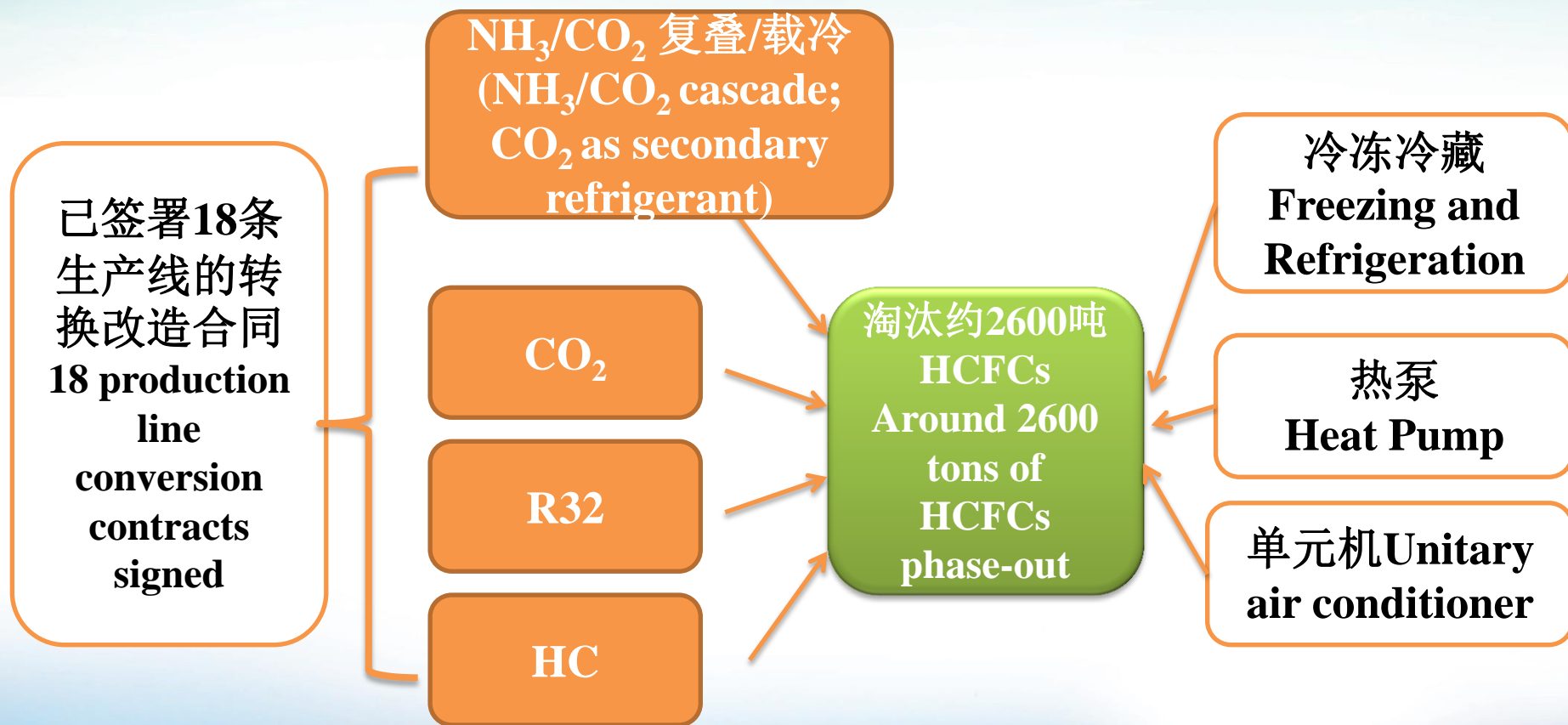
- ❖ 第二阶段行业计划实施过程中，将尽最大的努力采用CO<sub>2</sub>、NH<sub>3</sub>、HC、HFOs等低GWP值的替代技术。

During the implementation of Stage II, we will do our best to adopt lower GWP alternatives like CO<sub>2</sub>\NH<sub>3</sub>\ HC\HFOs.



# 第二阶段HPMP实施工作进展

## Ongoing Projects in Stage II







- ❖ 新的替代制冷剂对制冷空调设备的设计、生产、运输、安装、维修和使用等环节提出了新的要求，尤其是部分替代制冷剂具有可燃性，在产业链的各个环节中需要有更严格的技术规范和要求以保障其安全生产和使用。

New alternatives have brought up new requirements on the design, manufacturing, transportation, installation, servicing and application for the refrigeration and air-conditioning equipment, especially for those adopting flammable refrigerants. More Strict norms and technical requirements are indeed necessary for all sections in order to ensure safety production and use.

- ❖ 迄今为止，行业内已经完成超过20项与替代技术和产品相关标准的制修订。

So far, over 20 standards and norms that related to alternative technology and products have been set and revised.

# 计划对更多的标准进行制修订 More standards to be set and revised



- ❖ 产品安全标准 Safety standards
- ❖ 产品应用标准 Product standards
- ❖ 维修保养规范 Service and maintenance specifications

## Promotional activities of Ozone2Climate technology

### ❖ 宣传Propaganda

- ✓ CRAA与生态环境部对外合作与交流中心、UNDP、UNEP等相关国际执行机构密切合作，广泛宣传环境保护的政策法规

CRAA has been working actively together with IECO, UNDP, UNEP to promote the policies and regulations of environmental protection.

### ❖ 积极开展臭氧气候友好替代技术的示范和推广Demonstration and promotion of Ozone2Climate alternative technologies

- ✓ 环保低碳热泵技术采暖示范项目

Heating demonstration project using environmental friendly heat pump technology

- ✓ CO<sub>2</sub>制冷技术在超市的应用示范项目

CO<sub>2</sub> application demonstration project in supermarket

### ❖ 绿色冬奥会Green Winter Olympics

- ✓ 协会与相关机构合作，成功推动在冬奥会主场馆建设中实现了CO<sub>2</sub>技术方案的选择确认，为绿色奥运建设助力。

Cooperating with relevant institutions, CRAA has successfully promoted the selection of CO<sub>2</sub> solutions in the construction of the main venue of the Winter Olympic Games.



### 3 关注“基加利修正案”能效提升要求

#### Focus on the Kigali Amendment to improve Energy efficiency requirements

- ❖ 基加利修正案的达成对全球的制冷剂替代工作是一个新的里程碑。

The Kigali amendment is a new milestone for global refrigerant substitution.

- ❖ 基加利修正案明确实施HFCs削减时要关注能效提升的协同效应。

The Kigali amendment requires the Executive Committee to consider the synergies of energy efficiency improvements when implementing HFCs reductions.



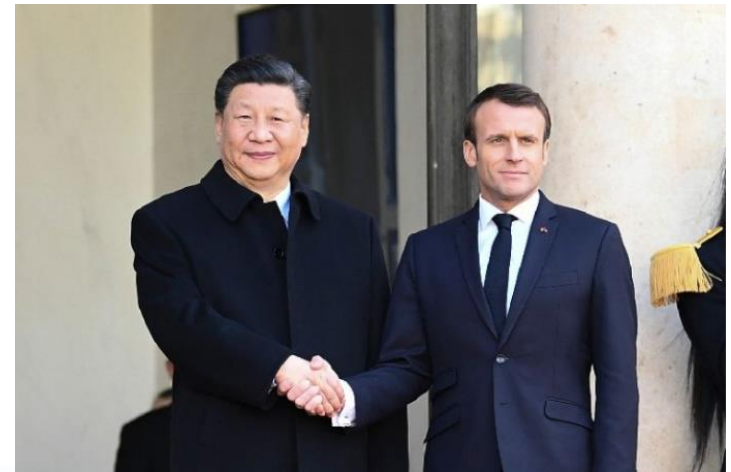
## The Chinese Government attaches great importance

### ❖ 中国和法国发布关于共同维护多边主义、完善全球治理的联合声明：

China and France issued a joint statement on jointly safeguarding multilateralism and improving global governance:

#### 第六条Article 6

- ✓ 1.两国承诺共同推动关于削减氢氟碳化合物的《蒙特利尔议定书》基加利修正案的批准和落实。The two countries are committed to jointly promote the ratification and implementation of the Kigali Amendment to the Montreal Protocol on the reduction of HFCs
- ✓ 2.推动提高制冷行业能效标准。  
Promote the improvement of energy efficiency in the refrigeration industry.



### ❖ 中法联合声明为未来的履约行动和HPMP的实施提供了新的动力。The Sino-French Joint Statement provides a new impetus for future implementation actions and HPMP implementation.

- ❖ 由中国国家发改委牵头，能源基金会中国、中国标准化研究院和中国制冷空调工业协会等相关机构参与，正在推进“绿色高效制冷行动”：

Led by the National Development and Reform Commission of China, involved with EF China, China National Institute of Standardization , CRAA and other related institutions, is promoting “Green Efficient Cooling Action”:

- ✓ 发起“一带一路”绿色制冷倡议

Launch the “Belt and Road” Green Cooling Initiative(BRGCI)

- ✓ 建立国际交流和合作的机制

Establish mechanisms for international exchange and cooperation

- ✓ 制订《绿色高效制冷行动方案》

Formulate the *Green Efficient Cooling Action Plan*

## 4行业面临的压力与挑战 Pressure and challenge

- ❖ 《基加利修正案》提出在进行制冷剂的替代时，需要考虑维持或提高被替代的设备的能效，这无形中提升了实施制冷剂替代转换工作的目标水准，增加了实施的难度，也导致替代转换工作需要更多的费用和技术支持。

The Kigali amendment requires to consider maintaining or improving the energy efficiency of replaced equipment , which increases the target level and difficulty of implementing refrigerant replacement , and leads to more cost and technical support.

- ❖ 行业第二阶段淘汰目标的完成将涉及更多的中小企业参与，这些中小企业在技术来源，资金、装备、市场推广等方面均存在薄弱环节，要完成中小企业的替代转换改造，需要更多的资金和技术支持，这对政府和行业来说都是一个巨大的挑战。

According to the target of HPMP stage- II , more SMEs will be involved. SMEs have shortages in terms of technology, fund, equipment, market, etc. To complete the replacement transformation , more capital and technical support are needed, which will be a huge challenge for government and industry.



- ❖ 新替代品的成本在一定时期内会明显高于当前的被替代品，尤其是涉及到一些可燃制冷剂，市场接受度是一个巨大考验，同时由于新的压缩机、替代制冷剂、润滑油等关键零部件的供应也不充分，新的替代产品的市场化还面临者很大困难。

The cost of new alternatives will be significantly higher than the current refrigerant in use for a certain period of time, especially when it comes to some flammable refrigerants, market acceptance is a huge test. Meanwhile, the supply of key components such as new compressors, alternative refrigerants and lubricants is not sufficient, the marketization of new alternative products is still very difficult.

- ❖ 许多更新一代替代制冷剂存在着可燃、高压或容积效率低等缺点，要实现市场推广应用，需要更多的技术、法规、标准保障，尤其是在短时期内需要开展大量的宣传和培训工作，这也是一个巨大的挑战。

Many of the newer alternative refrigerants have disadvantages such as flammability, high pressure or low volumetric efficiency. To achieve marketing applications, more technical, regulatory, and standard guarantees are needed, especially to conduct a lot of publicity and training work in a short time, which is also a huge challenge.





# 总结 Conclusion

- ❖ 中国政府和行业各界高度重视环境保护和制冷剂替代工作，为履行《蒙特利尔议定书》做出了大量富有成效的工作，取得了令国际社会信服和认可的成就。

The Chinese government and all sectors of the industry attach great importance to environmental protection and refrigerant replacement, and have done a lot of highly effective work for the implementation of the Montreal Protocol.

- ❖ 中国制冷空调行业第一阶段HCFCs淘汰工作已顺利完成，实现了预定目标，第二阶段淘汰工作已全面展开。

HPMP stage-I has been accomplished successfully. HPMP stage-II has been taken into action in an all-round way.

# 总结 Conclusion

- ❖ 《基加利修正案》的达成，给目前行业开展的HCFCs加速淘汰工作提出了更多的要求，也带来更大的挑战。我们希望在未来的工作中与国际同行携手合作，探寻更加绿色可持续的解决方案，为实现ODS淘汰和减缓全球变暖的共同目标而尽力做出贡献！

The achievement of the Kigali Amendment puts more demands on the accelerated phase-out of HCFCs as well as greater challenges. CRAA hope to work with international counterparts in the future to explore more green and sustainable solutions and contribute to the common goal of ODS elimination and slowing global warming!

# Thank you!