



# **Opportunities and Challenges for Industry Resulting From Changing European, United States, Canadian and Japanese Legislation**

## **Regulating HFCs**

**欧盟，美国，加拿大以及日本HFC管理法规对企业带来的商机和挑战**

# 环境保护署 (EIA) 简介

## Introduction to EIA



- 成立于1984年，在伦敦和美国华盛顿特区分别设有办公室
- Established in 1984, offices in London & Washington, D.C
- 独立的宣传组织，致力于保护环境，防止对自然环境资源的破坏和滥用资源的行为
- Committed to bringing about change that protects the natural world from environmental crime and abuse.
- 宣传活动范围：非法野生动物（老虎，大象，鲸鱼）贸易，木材贸易和化工贸易
- Campaigns: Illegal trade in wildlife (tigers, elephants, whales); stopping deforestation; Phasing down HFCs
- 自1997年开始调查消耗臭氧层物质（ODS）的非法贸易
- Investigating illegal trade in ozone depleting substances (ODS) since 1997
- 15年以来，积极参与国际臭氧和气候谈判
- Closely involved in international ozone and climate negotiations for 15 years



## EIA's work to reduce HFC emissions from the RAC sector 环境调查署 (EIA)有关减少房间空调器HFC排放的报告

Chilling Facts: Annual report encouraging transition away from HFCs across global supermarket retailers. Access to field data direct from retailers

冷却真相：每年发布各大超市如何减少HFC使用的报告，以鼓励超市转型。所有的原始数据都由超市直接提供。

Putting the Freeze on HFCs: Case study information on HFC-free alternatives available in RAC sector

冻结氢氟烃：关于不含HFC的技术在房间空调器领域的应用案例。

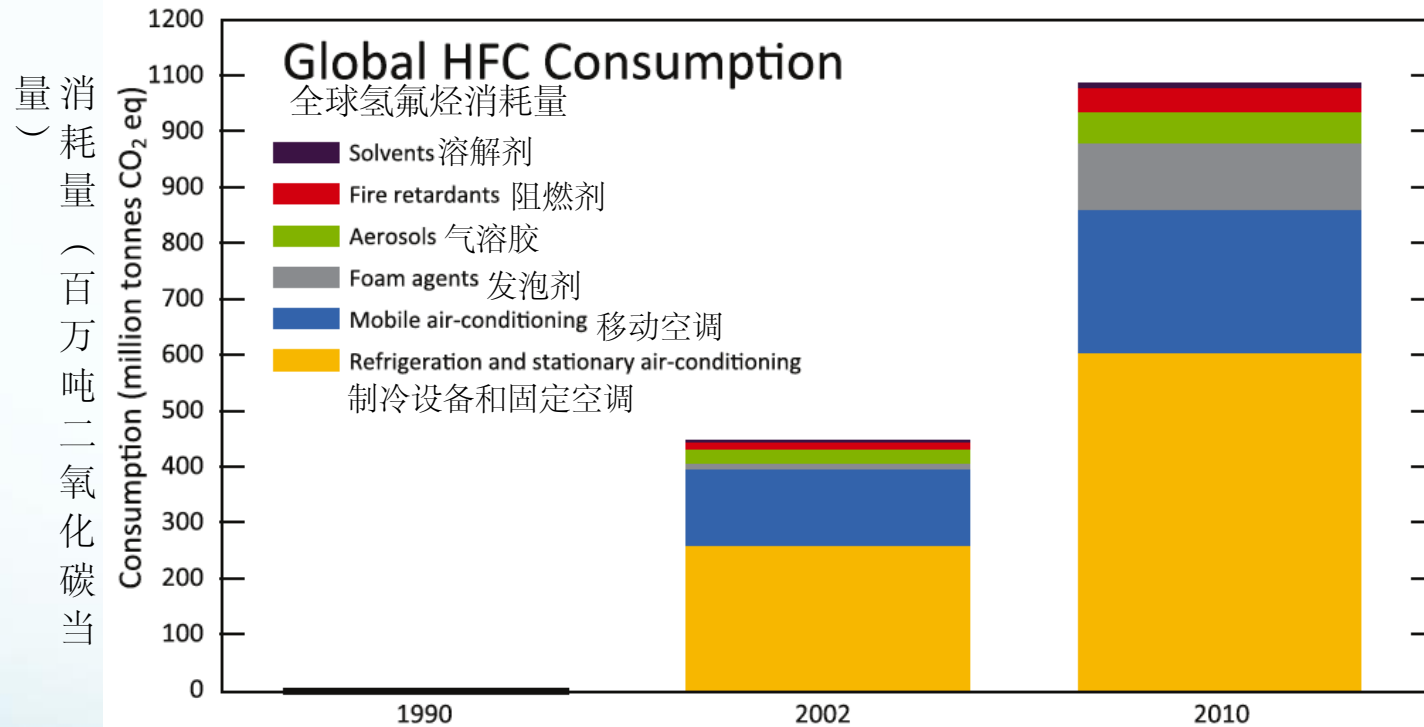
[www.cooltechnologies.org](http://www.cooltechnologies.org) Joint EIA-Greenpeace database on HFC-free technologies与绿色和平合作的宣传不含HFC技术的网站。





# 氢氟烃的排放量在短短20年以来，在所有温室气体排放量中的百分比已经大于1%

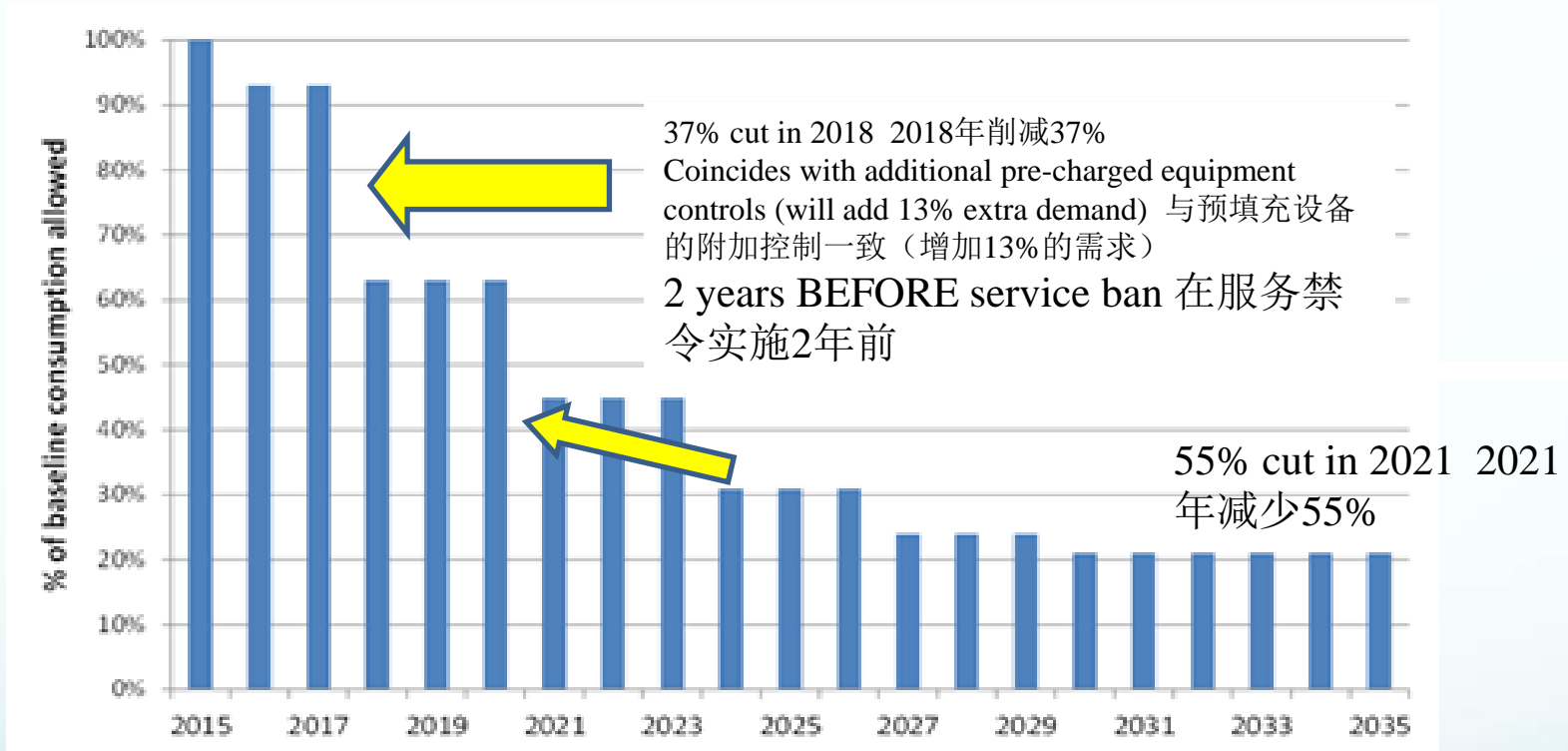
## HFC Emissions Have Grown to More than 1% of All Greenhouse Gases in Just 20 Years



- 全球氢氟烃的排放量每年以15%的速度增长
- *Global HFC emissions increasing at ~15% annually*
- 2050年：氢氟烃的排放量可能会达到5.5到8.8(亿吨二氧化碳当量)
- 2050: HFC emissions could reach 5.5–8.8 (GtCO<sub>2</sub>-eq.)

## EU F-gas regulation, impacts for industry

### 欧盟F气体法案对企业的影响



- Very large supply cuts come before key bans and service ban on use of HFCs GWP>2500 (2020) 在重要禁令和服务类禁令使用前先实施对GWP大于2500的大规模削减

## EU F-gas regulation, impacts for industry

### 欧盟F气体法案对企业的影响

- EU phase-down is based on technically feasible and cost-effective transitions to HFC-free alternatives, i.e., **fast action** 欧盟的削减计划是基于对不含HFC的替代可行技术和成本的综合考量而制定的。如：快速行动方案
- Transition is likely to be slower than anticipated, this will squeeze quotas, driving price of HFCs up 这样的转型可能会比预期的要慢，会涉及削减配额，使HFC价格上涨
- Ongoing demand will reduce average GWP of HFCs allowed on EU markets 不断的需求会迫使HFC的GWP最高容许值在欧盟下降
- Average GWP of HFCs available on EU markets under differing transition to alternatives scenarios HFC的平均GWP值在欧盟市场削减的可能情况
- Based on a slower transition scenario 缓慢转型的情况

By 2025 EU Phase-down has no room for refrigerants with GWP >312, reducing to GWP >189 by 2030

2025年，在欧盟削减计划下，GWP高于312的产品将不再有空间，

需要在2030年降低至189

	2015	2020	2025	2030
Average GWP under Anticipated transition	1957	1072	468	28
Average GWP under 50% slower transition	1305	715	312	18

# US unSNAP Regulation, Impacts for Industry

## 美国SNP法案对企业的影响

Period for comment closed, proposed changes deemed acceptable, EPA analysis on going, final regulation expected early Fall and to be close to the Rule put out for comment. 意见征求阶段已经结束，修改已经部分被接受。EPA在继续分析最终版本，预计可以在秋天出台，也会公布最终的出台政策意见。

禁止销售的制冷剂及时间	对应产品
气溶胶（2016年1月）	<ul style="list-style-type: none"> <li>HFC-134a不能使用，除了一些技术和医用领域的气溶胶，包括MDIs</li> <li>HFC-125, -227ea不能使用，除了MDIs</li> </ul>
机动车载空调（2021年后生产的）	<ul style="list-style-type: none"> <li>HFC-134a 不能使用</li> </ul>
发泡剂（2017年1月）	<ul style="list-style-type: none"> <li>HFC-134a 和其混合物不能使用</li> <li>HFC-245fa和HFC-365mfc,HFC混合物在所有发泡剂中都不能使用，除了喷雾发泡剂产品</li> </ul>
新生产的（或是由旧的ODS翻新的）超市使用的冷藏系统：远程压缩系统（2016年1月）	<ul style="list-style-type: none"> <li>HFC不能使用，包括HFC-227ea, R-404A, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, R-434A, R-507A</li> </ul>
新生产的独立式商用食品冷藏设备和贩卖机（2016年1月）	<ul style="list-style-type: none"> <li>HFC不能使用，包括HFC-134a, R-404A, R-407A, R-407C, R-507A, 其他混合物</li> </ul>
由旧的ODS翻新的独立式商用冷藏设备和贩卖机（2016年1月）	<ul style="list-style-type: none"> <li>HFC不能使用，包括R-404A和R-507A</li> </ul>

## Canada Takes Actions to Phase-down the Use of HFCs 加拿大采取行动削减HFC使用量

- NOI - Canada to mimic U.S. unSNAP NOI—加拿大效仿美国unSNAP法案
- After comments Environment Canada looking at HFC Phase-down with sector bans. 在征集意见之后，加拿大将开始寻求HFC削减的行业禁令
- Comments due April 17<sup>th</sup>. 意见征集截止时间是4月17日
- Rule expected 2016. 法规预计2016年出台

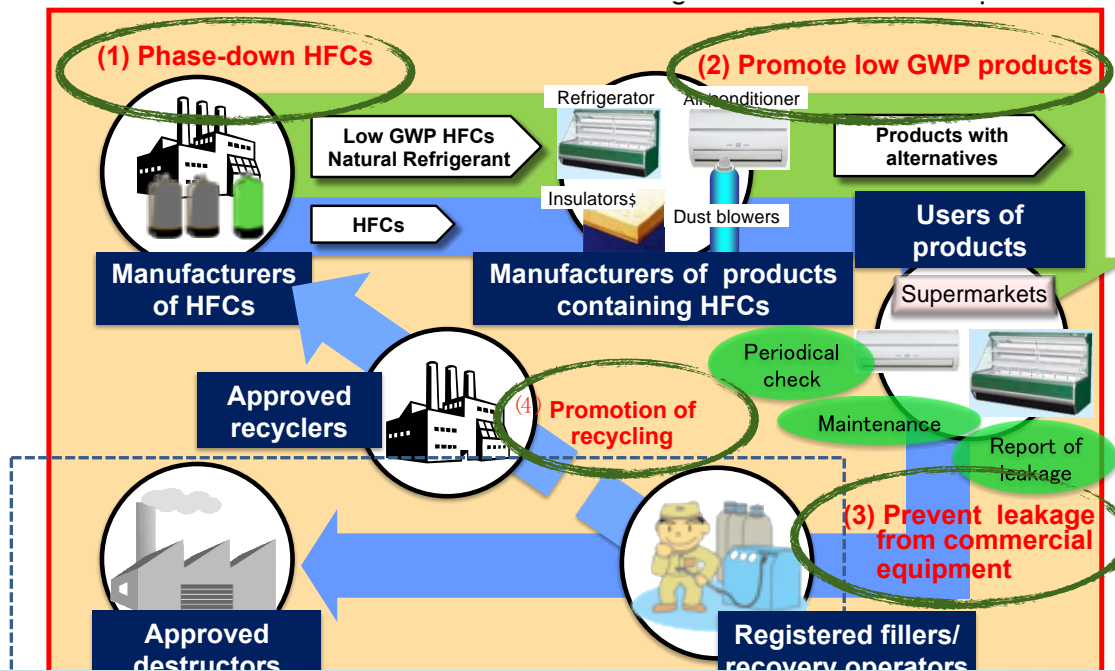




# Japan Takes Actions to Phase-down the Use of HFCs

## 日本采取行动削减HFC

Framework law agreed in June 2013 foresees 4 types of measures 在2013年6月通过的法律结构图预测了4种计算方法



# Japan's Phase-out and Bans 日本的削减计划的禁令

日本根据每个分组制定的推广低GWP值制冷剂的计算方案

Japan's measures to promote low-GWP refrigerants  
- likely targets per product group



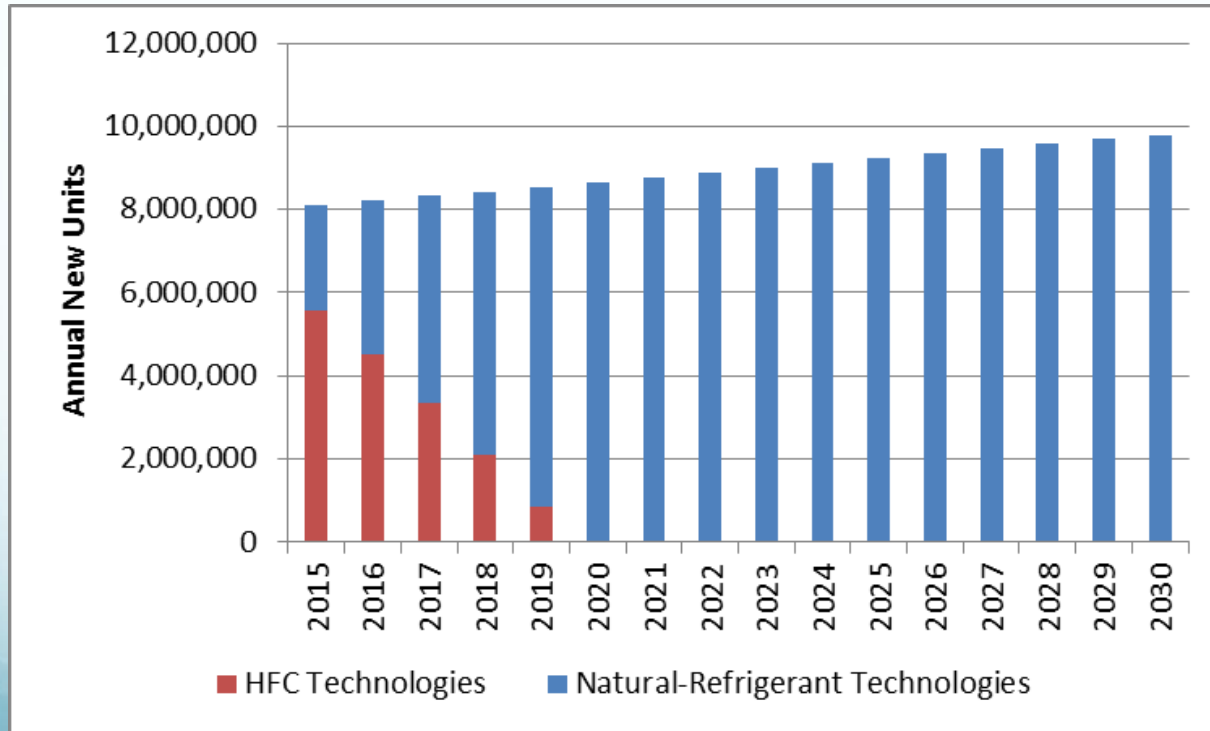
Product group	GWP target	Target year
Residential AC	750	2018
Light commercial AC (e.g. office use)	750	2020
Condensing units > 1.5 kW - stationary refrigeration	1500	2025
Cold store (< 50,000m <sup>3</sup> ) central refrigeration systems	100	2019
Mobile AC (passenger cars)	150	2023

# Opportunities for Industry EU Air-conditioning sector



## 欧盟空调产业对企业的机遇

**Assumed Market Penetration in New Single Split AC Systems (3kg or less) in order to meet EU HFC phase-down** Data taken from Preparatory study for a review of Regulation (EC)No 842/2006 on certain fluorinated greenhouse gases. 为达到欧盟HFC减排标准，预计新的单体式空调系统（3千克及几下）的市场穿透力



By 2020 100% of all new single split air-conditioning systems installed should be relying on natural refrigerant technologies

到2020年为止，100%安装的单体式空调系统都需要依赖天然制冷技术

# Opportunities for Industry

## US Air-conditioning sector



- **What is SNAP? US Environmental Protection Agency (EPA) program to evaluate and regulate substitutes for ozone-depleting chemicals**
- **SNAP rule IS FINALIZED due to be published in coming weeks**

制冷剂	全球变暖潜值	应用范围					
		家用冰箱	零售独立式冰箱	贩卖机	低温冰箱	热泵	家用独立式空调
乙烷	6				X	X	
异丁烷	8		X	X			
丙烷	3	X		X			X
R-441A (碳氢混合)	<5		X	X			X
HFC-32	675						X

## Opportunities for Industry US Air-conditioning sector



### 美国关于房间空调器市场的政策

Approvals will apply to residential and light commercial air conditioning for self-contained room air conditioners, including: 这些政策适用于家用和轻型商用独立式空调。具体包括:

- Packaged terminal air conditioners (包装终端空调)
- Packaged terminal heat pumps (包装终端热泵)
- Window A/C units (窗式空调)
- Portable A/C units designed for use in a single room (单一房间使用的便携式空调)

Wall Mounted A/C 壁挂式空调 Btu/Hr (英热/小时)	Maximum R-290 charge size (grams) R-290最大充注量 (克)
5,000	230
10,000	460
21,000	730
34,000	1,000

Window A/C Btu/Hr 窗式空调 (英热/小时)	Maximum R-290 charge size (grams) R-290最大充注量 (克)
5,000	130
10,000	260
21,000	400
34,000	570



# Challenges for Industry

## Air-conditioning sector



### Standards! 行业标准! 空调市场面临的挑战

- Proposed tightening of UL Standards on A/C  
建议加强空调UL标准
- EPA has responded saying that they will abide by earlier 8<sup>th</sup> version of UL Standard, larger charge sizes WILL be allowed  
环保署回应将遵守早期第八版本的UL标准，允许更大充注量
- European Commission: In January 2017, the European Commission will publish a report containing information on national codes, standards or legislation in Member States that affect replacement technologies for HFCs.  
欧盟委员会：至2017年1月，欧委会将公布一份报告，报告含成员国的国家编码、标准、法规等影响氢氟烃替代技术的信息。
- Producers and importers of HFC-free equipment must engage in Standards making processes to ensure that all voices are heard and future markets are opened up for alternatives  
无氢氟烃设备的制造商与进口商需在生产过程中执行该标准，确保了解所有建议，未来市场向替代品开放。

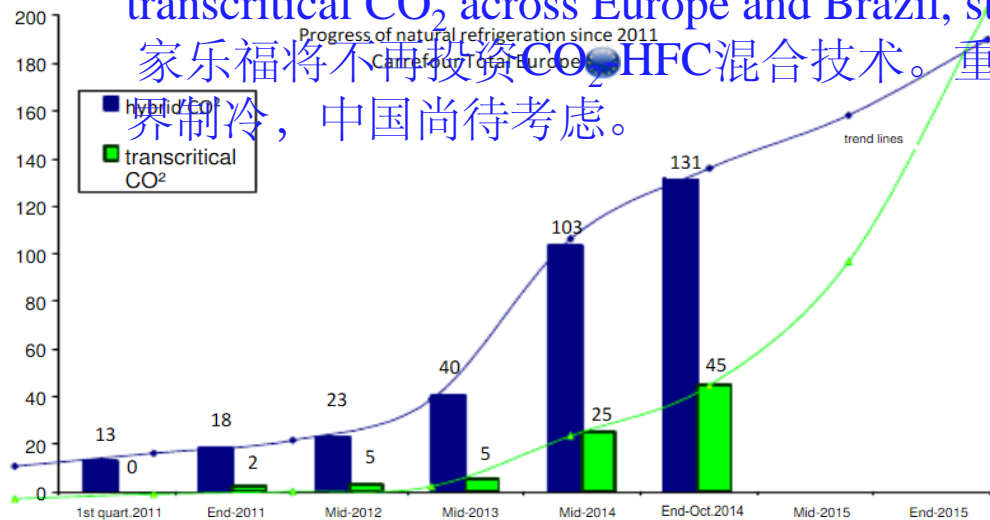
# Opportunities for Industry

## CO<sub>2</sub> Transcritical Refrigeration in Hot Climates

Carrefour: 家乐福 市场机遇——高温天的二氧化碳跨临界制冷

- Pioneering CO<sub>2</sub> transcritical in Spain, Southern Europe.  
南欧、西班牙率先使用二氧化碳跨临界制冷。
- Use of parallel compressors has lead to 13% annual energy savings (comparing like for like) in Valencia, average summer time temperature ~28 °C (82.4 °F)  
巴伦西亚使用并联压缩机，每年节省13%的能量（相较而言），该地夏季平均气温为28 °C（82.4 °F）。
- Second test store with additional use of ejector, additional energy savings expected.  
第二家试点超市将使用附加抽气泵，节省更多能量。
- Carrefour is no longer investing in CO<sub>2</sub>-HFC hybrid. Focus is on roll out of transcritical CO<sub>2</sub> across Europe and Brazil, still considering China

家乐福将不再投资CO<sub>2</sub>-HFC混合技术。重心将移至欧洲与巴西的二氧化碳跨临界制冷，中国尚待考虑。



**-Energy efficient technology for warm climates is ready**

高温天的节能技术已成熟

**-Supermarkets want to invest in Asia**

各大超市愿意投资亚洲

**Challenge: decrease costs, start**

**Chinese production**

挑战：成本降低，开拓中国制造。

# Opportunities for Industry

## Commercial refrigeration



Japan 日本

市场机遇——商业制冷

- Number of stores using CO<sub>2</sub> expected to increase from 190 in March 2014 to 763 in March 2015  
使用二氧化碳技术的商铺预计将从2014年3月的190家增加至2015年3月的763家。
- By 2015 over 25 Brands will be using CO<sub>2</sub> technology  
2015年，超过25家品牌将使用二氧化碳技术。

Lawsons: 罗森

- Over 570 CO<sub>2</sub> transcritical stores, committed to using CO<sub>2</sub> in all new stores, including sub-tropical  
逾570家商铺使用二氧化碳跨临界制冷，所有新店铺将使用该技术，包括亚热带地区。
- Transcritical CO<sub>2</sub> system in the sub-tropical climate of Okinawa, Japan's southernmost island is showing energy efficiency improvements of up to 21 percent compared to a conventional HFC-404A system.  
冲绳是日本最南端岛屿，属亚热带气候，二氧化碳跨临界系统在该地与传统HFC-404A系统相比，节能提高了近21%。

# 商业制冷碳氢系统

## Commercial Refrigeration Hydrocarbon Systems



- Types of systems: 系统类型

**Integrals:** Refrigeration system which is self-contained. Also referred to as ‘plug and play’ or standalone cabinets. 整体：自带制冷系统，也被成为“即插即用”或者独立式系统。

**Water-cooled:** Hydrocarbons used in conjunction with water cooling to

minimise the refrigerant charge. 水冷却：碳氢与水冷却想配合，最小化制冷剂填充材料

- Benefits of hydrocarbon systems: 碳氢系统的优势
- Factory assembled, easier to install and cheaper to maintain 工厂组装，安装更便捷，维持价格更低廉
- Energy efficient; savings of 10-40% documented
- 高效节能，节约10-40%的材料





# Opportunities for Industry- Commercial Refrigeration Hydrocarbon Systems 商业制冷碳氢系统的行业机遇

**The Co-operative (UK)** Using hydrocarbon integrals. Now accounts for almost 23 per cent of total refrigeration used  
合作社（英国）使用整体烃，已经应用到23%的制冷剂中。

**Musgrave Group (UK and Ireland)** Trailing hydrocarbon integrals, initial energy savings of 40% over previous HFC-based systems. 马斯格雷夫集团（英国及爱尔兰）使用整体碳氢，与以往的HFC系统相比，初始节能40%。

**Waitrose (UK)** Using water-cooled hydrocarbons in 111 stores. (R-1270 in units and R-290 in water chiller). Recently optimised system is delivering energy benefits of apx 30% 维特罗斯（英国）的111家门店使用水冷却烃。（空调使用R1270,水冷却机组使用R290）

**Lidl (Europe)** Planning Europe wide roll out of propane systems (700gram charge size). Energy savings of 10-15% expected. 利得尔（欧洲）计划在欧洲范围内推出丙烷系统（填充大小为700克）。预期节能10-15%。





# Key opportunities and challenges

## 核心机遇与挑战



### Opportunities: 机遇

- Begin exporting HC based A/C to Europe and U.S. markets 开启对欧洲和美国市场的空调烃出口。
- Develop Chinese production of CO<sub>2</sub> transcritical refrigeration 发展生产中国二氧化碳跨临界制冷剂。
- Further development of natural refrigerant technologies in new sectors to take advantage of anticipated increased demand resulting from EU, U.S., Japanese and Canadian legislation
- 进一步发展新领域自然冷冻技术，利用欧盟、美国、日本和加拿大立法带来的预期需求增长

### Challenges:

Be ready for sharp HFC supply cuts on EU, Japanese and Canadian markets and Selective bans in the U.S. market

应对欧盟、日本和加拿大市场的大规模HFC削减和美国市场的服务禁令

- Engage in international standards procedures
- 参与国际标准程序

谢谢!  
Thank You!

请提问  
Any Questions?

[www.eia-global.org](http://www.eia-global.org)





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