

# 建筑领域热泵空调节能标准进展和作用

## Importance of energy standards in supporting affordable growth of the high efficiency heat pump market in China

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# 一、中国热泵产品能效标准制修订进展

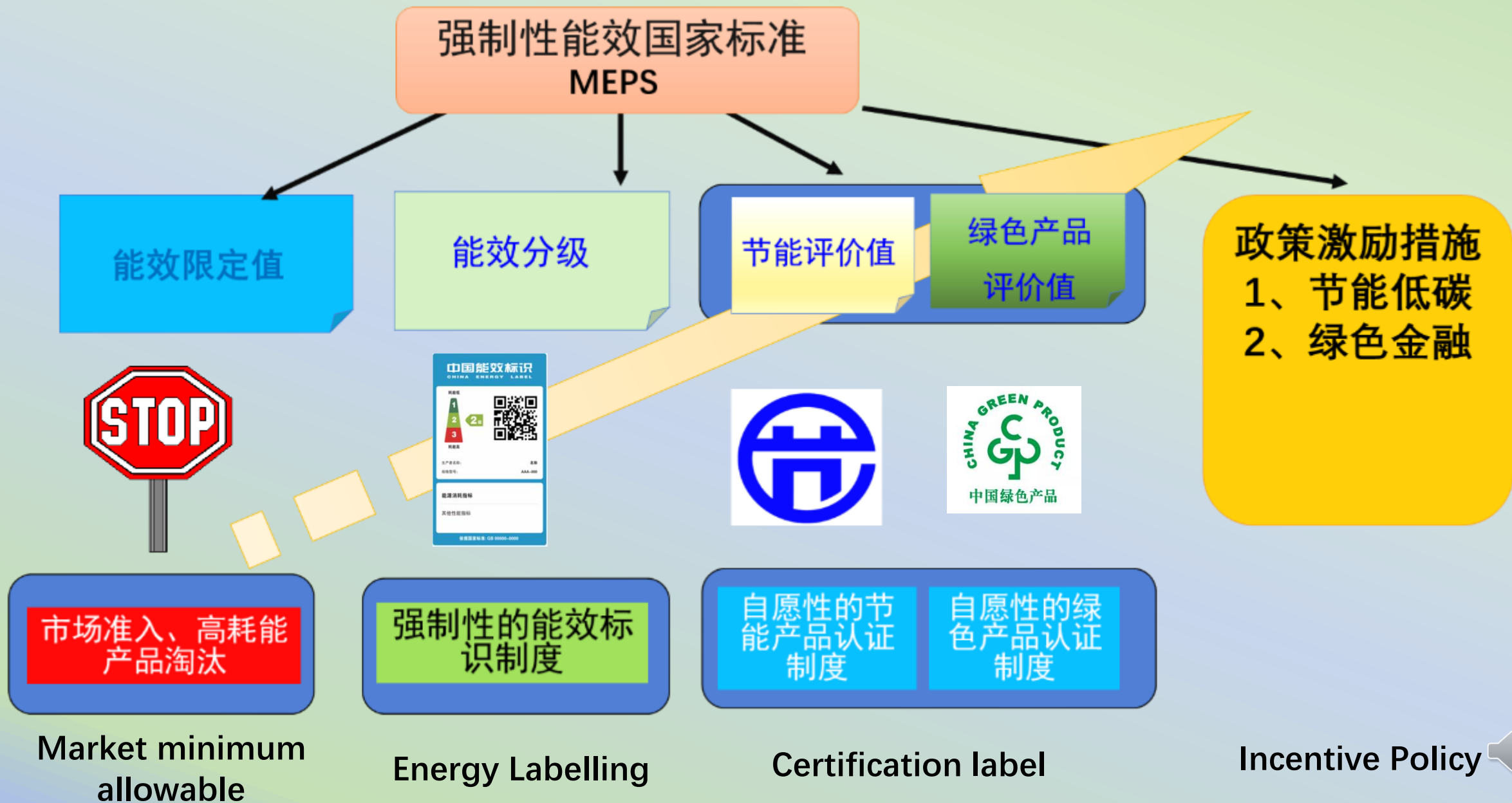
## Progress on the energy efficiency standards for heat pump in China

家用 household appliance		
产品 product	能效标准号 Stand No.	版本数 Ver.
房间空气调节器 RAC	GB 21455-2019	6
热泵热水机（器） heat-pump water heater	GB 29541-2013	1
饮水机 Water dispenser	GB 30978-2014	1
空气调节器用全封闭型电动机-压缩机 Compressor	GB 35971-2018	1
低环境温度空气源热泵（冷水）机组 Low ambient temperature air source heat pump (cold water) unit	GB 37480-2019	1

商用空调 Commercial air conditioners		
产品 product	能效标准号 Stand No.	版本数 Ver.
单元式空气调节机 unitary AC	GB 19576-2019	2
多联式空调(热泵)机组 Mullite-connected AC (heat-pump)	GB 21454-2020	2
风管送风式空调机组 Air-duct air conditioning unit	GB 37479-2019	1
冷水机组 water chiller	GB 19577-2015	2（修订中）
溴化锂吸收式冷水机组 Lithium bromide absorption chiller	GB 29540-2013	1（修订中）
水（地）源热泵机组 Water (ground) source heat pump unit	GB 30721-2014	1（修订中）



# 能效标准标识实施框架 Implement approach in China



## 二、节能标准制修订原则与要求

Development & Revision principles for Standard of refrigeration and air conditioning in China

### 《国家标准化发展纲要》 Outline of National Standardization Development

### 《强制性国家标准管理办法》 Measures for the Administration of Mandatory national standard

- 标准化水平大幅提高  
greatly improve the level of standardization
- 标准化开放程度显著提高  
internationalization
- 高质量发展  
high-quality development
- 国际化：提升标准化对外开放水平，分享我国标准化经验  
Internationalization: promote standardization open level, share our standardization experience

### 方案目标 Object:

- **大幅提高制冷能效和绿色水平** Significantly improve the energy efficiency
- **增加能效标准数量** Increase the number of energy efficiency standards
- **国际领先** Leading international
- **兼顾节能与制冷剂替代** Consider energy saving and refrigerant replacement



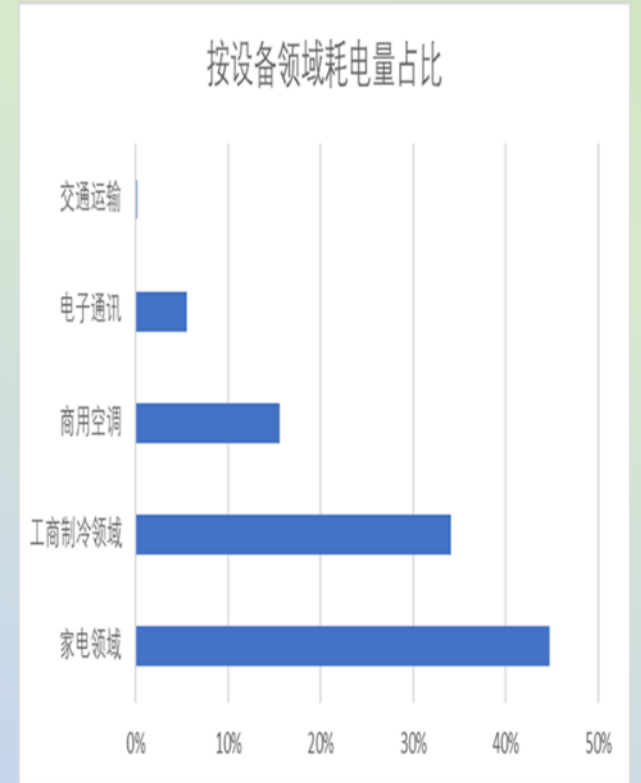
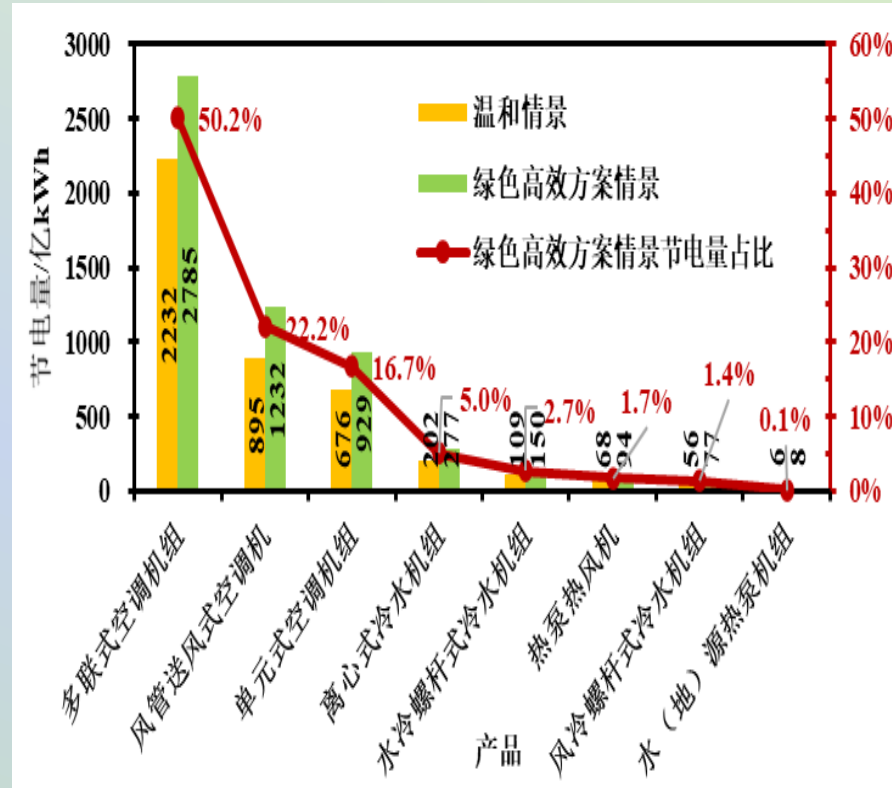
# 三、标准应对方案与路径 Standard response plan and path

## • 路径The path

- 1、提高产品能效Improve product energy efficiency
- 2、电气化转型Transition to electrification
- 3、新能源化集成Integration of new energy
- 4、系统节能优化设计和管理。Optimized design and management of system energy saving

## • 任务与目标： Mission and Objectives:

- 双碳目标Double carbon targets
- 应对全球气候变化Tackling global climate change



数据：《中国制冷空调产品节能减排潜力研究》（EFC）



# 政策措施及阶段性节能目标 Phased Energy Saving Target

		2021	2022	2025	2030
制冷产品总体能效水平提升 <b>Improve EE for overall</b>					25%
制冷产品/设备市场能效水平提升 <b>products</b>	家用空调 RAC		30%		15%
	多联机 Multi-connected AC		40%		15%
	制冷陈列柜 Display cabins		20%		15%
	热泵热水机 heat-pump water heater		20%		15%
大型公共建筑空调系统能效提升 <b>Large public buildings</b>					30%
绿色高效制冷产品市场占有率 <b>Market share of Green products</b>			20%		40%
北方地区清洁能源取暖率 <b>Clean energy heating share in Norther</b>		70%			
公共机构和党政机关 <b>Public Institution</b>	新增热泵供热（制冷）面积 <b>New heat pump heating (cooling) area</b>		200万平米		
	既有建筑用能系统和设施设备节能改造 <b>energy saving transformation for existing buildings</b>		70%		
建筑节能和绿色建筑发展指标 <b>Building energy efficiency and green building development indicators</b>	城镇新建居住建筑能效水平提升 <b>EE of new urban residential buildings</b>				30%
	城镇新建公共建筑能效水平提升 <b>EE of new urban public buildings</b>				20%
	既有建筑节能改造面积（亿平方米） <b>Energy efficiency improvement of existing buildings</b>				3.5
	建筑超低能耗、近零能耗建筑面积（亿平方米） <b>Building area with ultra-low energy consumption and near zero energy consumption</b>				0.5
城乡建设领域碳达峰实施方案 <b>Implementation plan for carbon peaking in urban and rural development</b>	建筑可再生能源替代率 <b>Renewable energy replacement rate for buildings</b>			8%	
	建筑用电占建筑能耗比例 <b>Building electricity accounts for the proportion of building energy consumption</b>				65%
	新建公共建筑全面电气化 <b>Full electrification of new public buildings</b>				20%



# 1、提升产品能效

Improve EE of product

## 1) 房间空调器能效标准修订: Revision of energy efficiency standards for RAC

### ➤ 定频和变频能效标准合并

Fixed-speed and variable-speed MEPSs are merged

➤ **GB 21455**

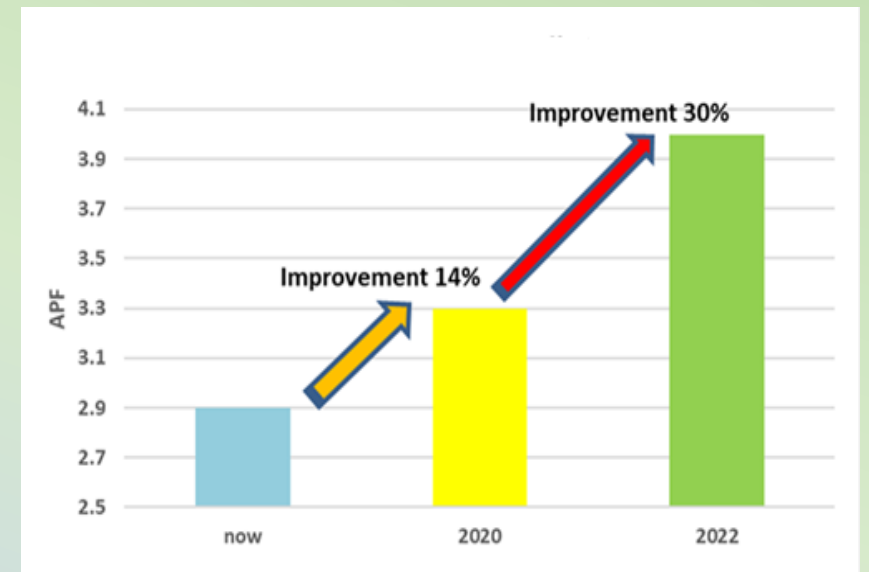
➤ GB12021.3

### ➤ 增加产品: 低环境温度空气源热泵热风机

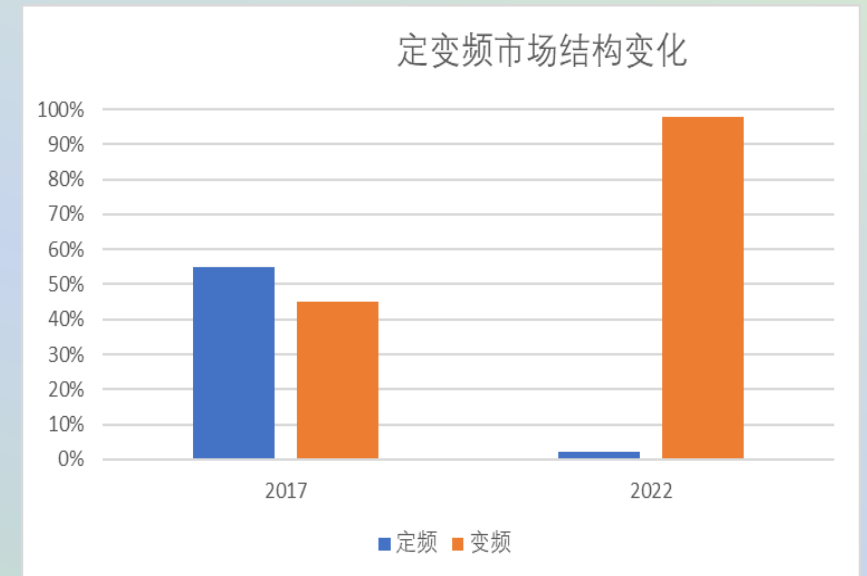
Added products: Low ambient temperature air source heat pump RAC

### ➤ 实施效果 Implementation effect

- 能效指标: 提升30% Energy efficiency index: 30% improved
- 市场技术升级: 变频占比提升98% technology upgrade: market share of variable-speed product increase to 98%



房间空调器能效标准提升幅度 EE improvement of RAC



房间空调器市场结构变化changes of RAC market structure

## 2) 《多联式空调（热泵）机组能效限定值及能效等级》GB21454-2008

MEPS for multi-connected air-condition (heat pump) units

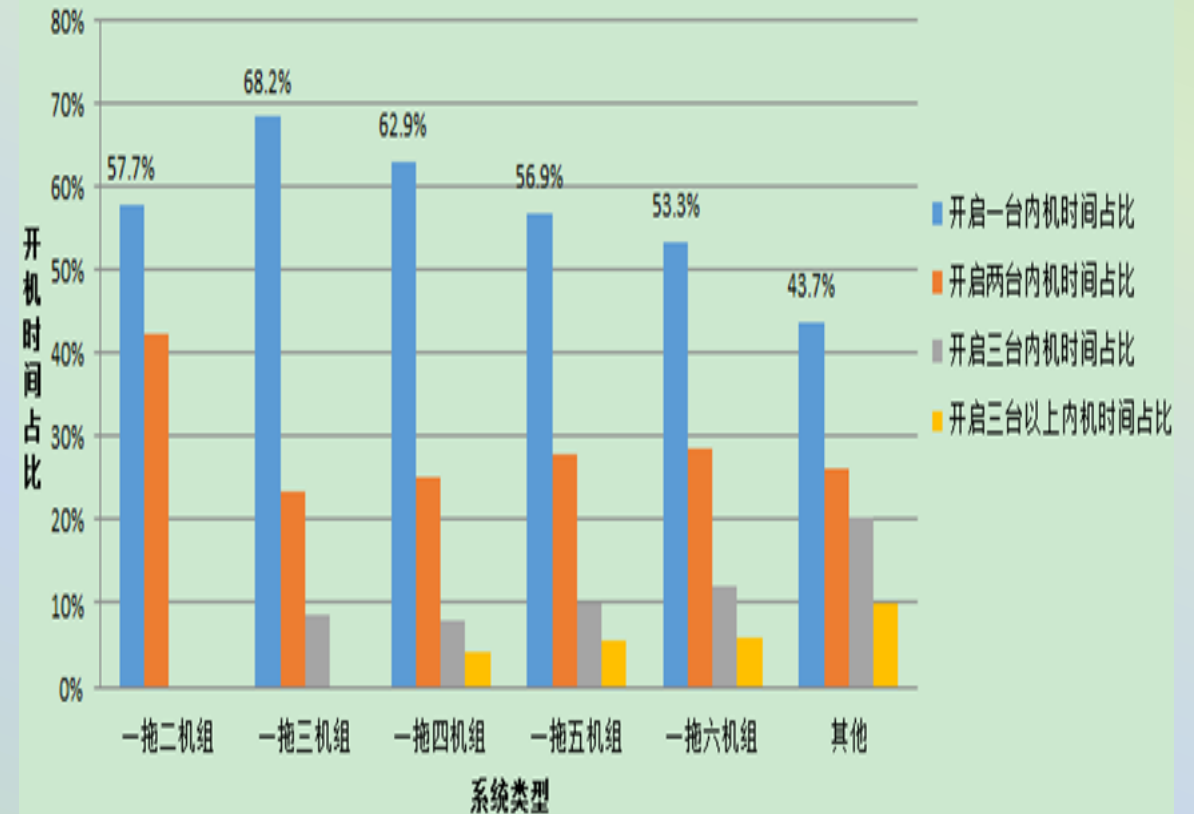
### ➤ 节能提升 improve energy efficiency

- 能效指标：提升40% index: increase by 40%

### ➤ 增加 added

- 14000以下产品，增加低负荷指标考核For product below 14000W, add low load requirement of test, and add low temperature test points
- 低环境温度空气源多联式热泵（空调）机组，并增加低温考核点 low ambient temperature multi-connected heat pump (air conditioning) units

不同类型系统开启内机数量占比（全国）





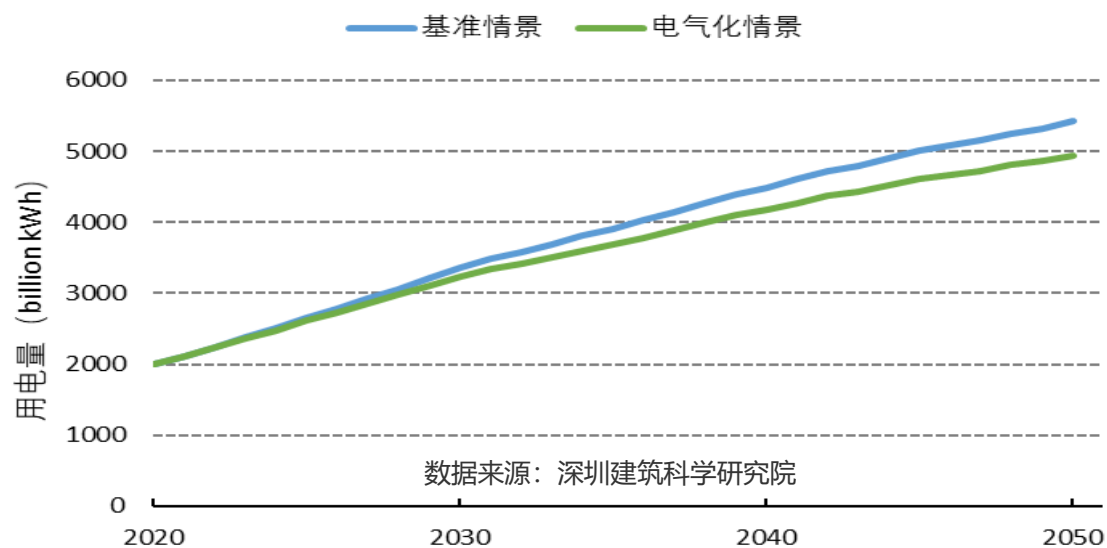
### 3) 正在修订: 冷水 (热泵) 机组能效标准 Being revised: MEPS for water (heat pump) units

- 目标:
  - 能效指标提升20~30%: Increase EE by 20-30%
- 产品范围增加 Increase product
  - 蒸汽压缩循环冷水(热泵)机组 GB 19577-2015 Steam compression circulation water chiller (heat pump) GB 29540-2013 GB 30721-2014 volumetric cold water (heat pump) unit
  - 溴化锂吸收式冷水机组 GB 29540-2013 Lithium bromide absorption chiller
  - 水(地)源热泵机组 GB 30721-2014 water (ground) source heat pump water chiller
  - 高出水温度冷水机组 high water temperature chiller
  - 带全热回收的容积式冷水(热泵)机组 Positive displacement water chilling (heat pump) packages with total heat recovery

## 2、应对建筑电气化转型 transition to electrification of buildings

- 促进政策 incentive measures:

- 《城乡建设领域碳达峰实施方案》 Carbon Peaking Implementation Plan for Urban and Rural Construction
- 2025年，城镇建筑可再生能源替代率达到8%。 By 2025, renewable energy in urban buildings 8%,
- 2030年，建筑用电占建筑能耗比例超过65%。 by 2030, building electricity more than 65% of building energy consumption
- 新建公共建筑全面电气化，到 2030 年电气化比例达到20% New public buildings fully electrified, with 20% electrified by 2030
- “煤改电”措施 "Coal to electricity"
- “气改电”措施 "gas to electricity"



- 建筑供暖

- GB 37480-2019低环境温度空气源热泵(冷水)机组能效限定值及能效等级 MEPS for low ambient temperature heat pump (water) units
- 中低温热泵机组 Medium low temperature heat pump unit
- 替代：燃气、燃煤设备 Replacement: gas or coal equipment

- 生活热水

- GB 29541-2013热泵热水机（器）能效限定值及能效等级 MEPS for heat pump water heaters
- 替代 Replacement:
  - 家用燃气快速热水器和燃气采暖热水炉：GB 20665 MEPS for domestic gas instantaneous water heater and gas fired heating and hot water combi-boilers
  - 储水式电热水器:GB21519—2008 MEPS for electrical storage water heaters

*Thanks*

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