Compliances of India Cooling Action Plan (ICAP) -Energy Efficiency Policies for Space Cooling

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Climate Change

Indian Context:

1. Climate Change has emerged as one of the primary developmental challenge.
2. India's per-capita emission in 2016 was 1.7 tCO2, well below the global per capita average of 4.3 tCO2.

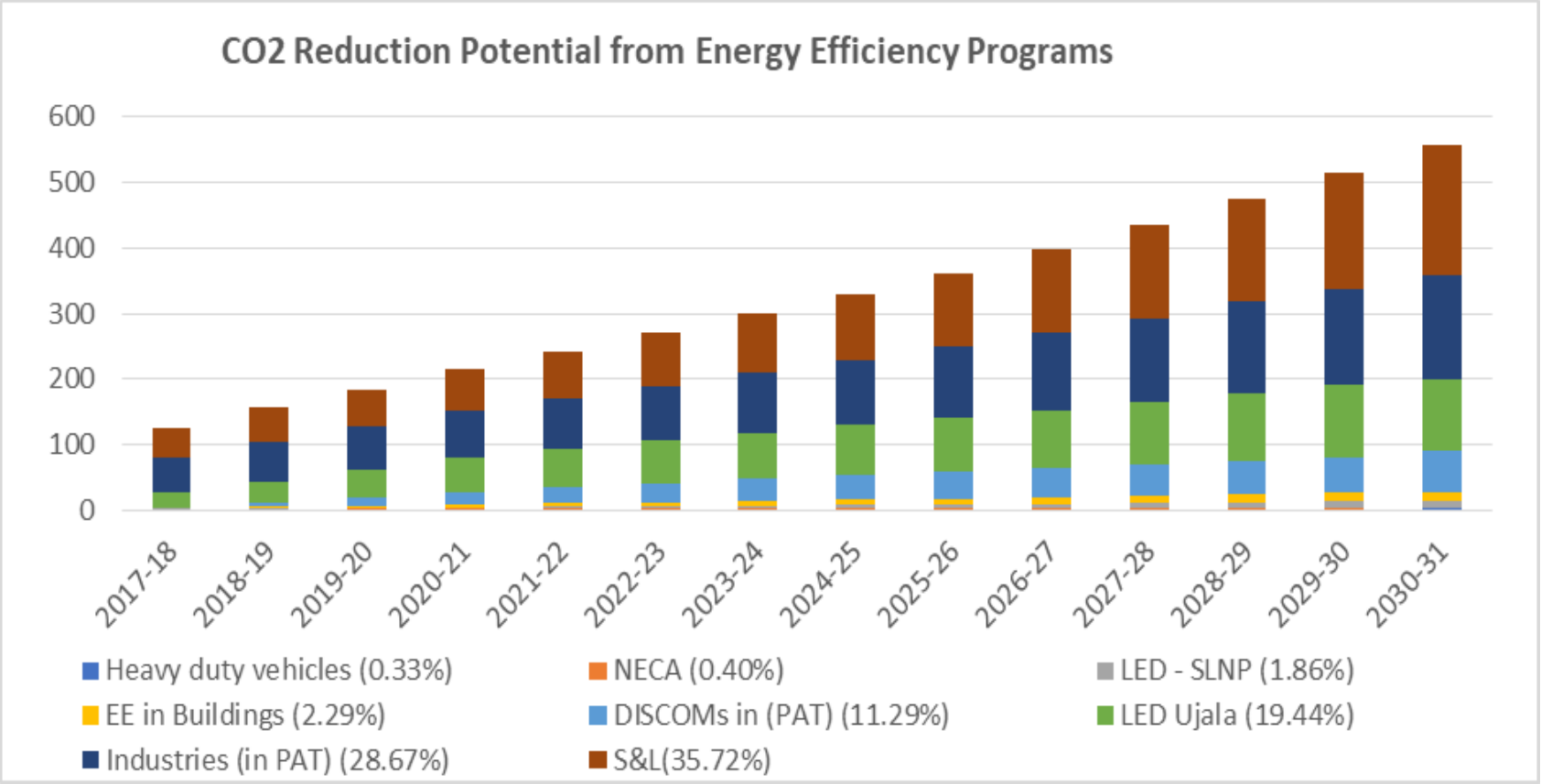
India's Nationally Determined Contributions

- India in its Nationally Determined Contribution has stated that it will propagate a sustainable way of living by adopting climate friendly technologies and a cleaner growth path.

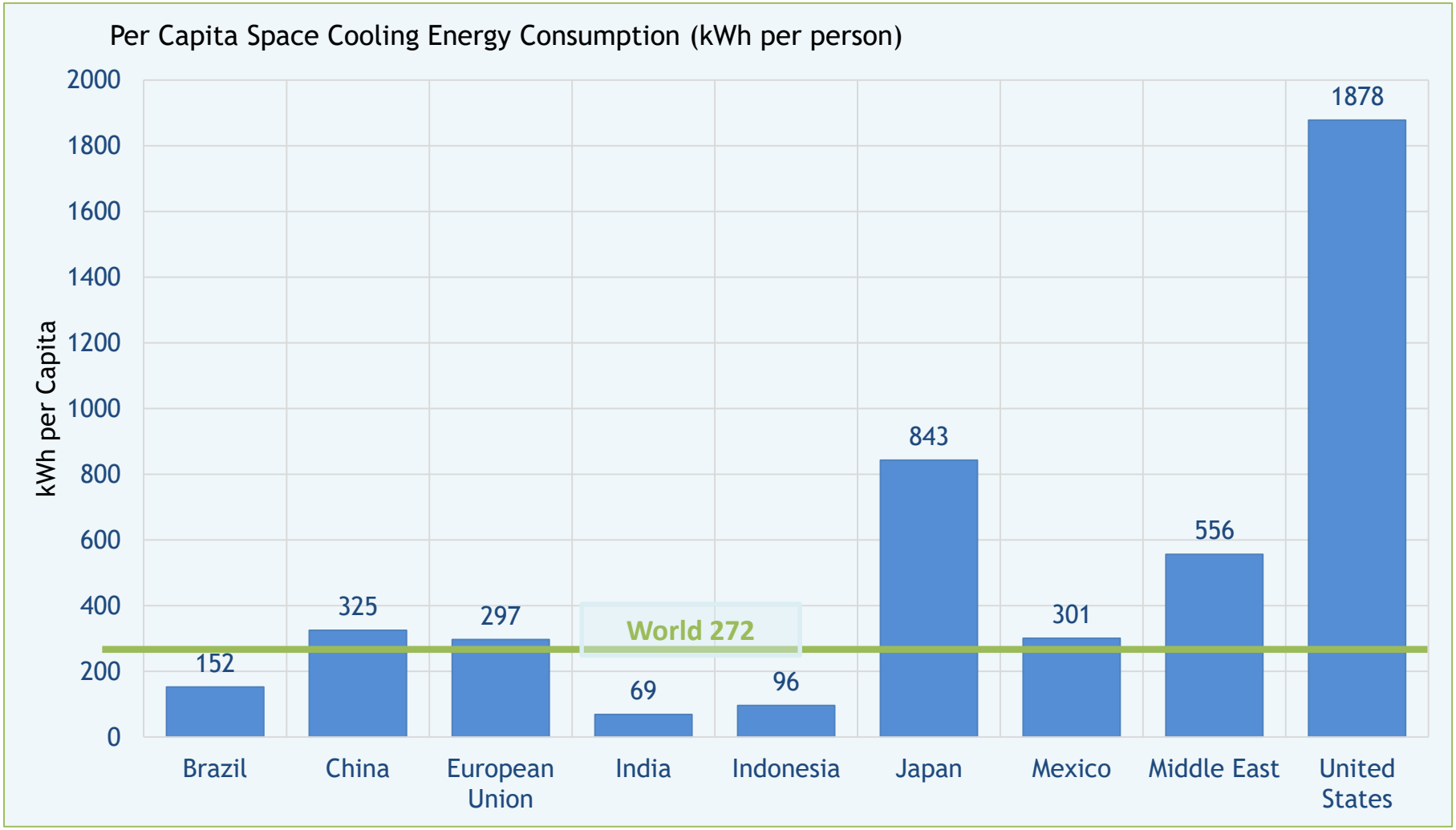
  - ✓ Reduce the emissions intensity of its GDP by 33 to 35 percent by 2030 from 2005 level.
  - ✓ Achieve about 40 percent cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030

Reduction Potential from Programs of BEE

- It is estimated that activities of BEE related to energy efficiency & conservation is going to result in savings of 557 million tonnes of CO2 per annum in 2030



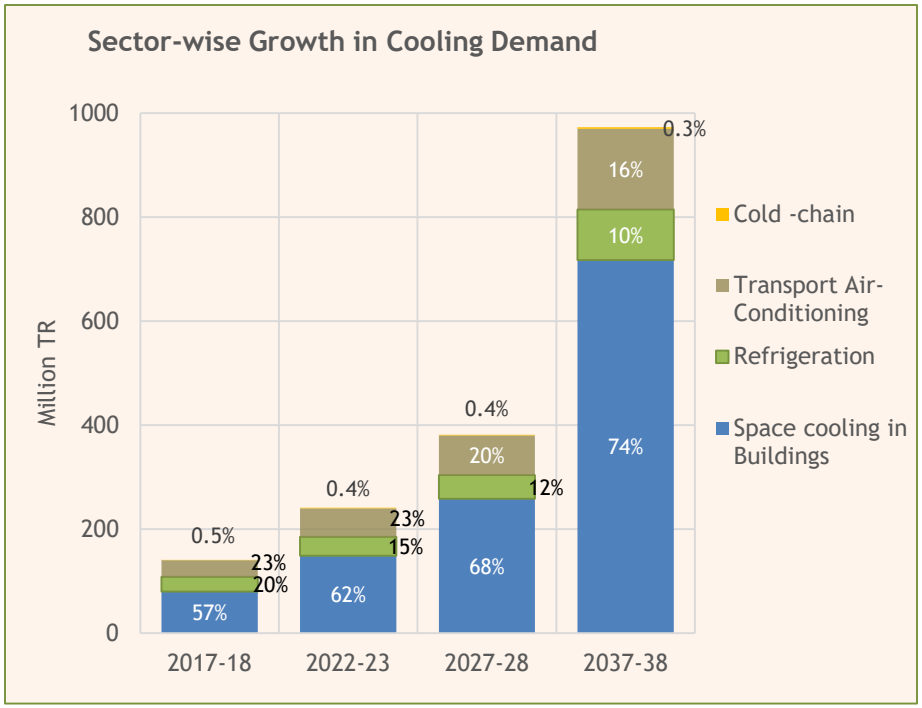
IEA Projections of Cooling Demand

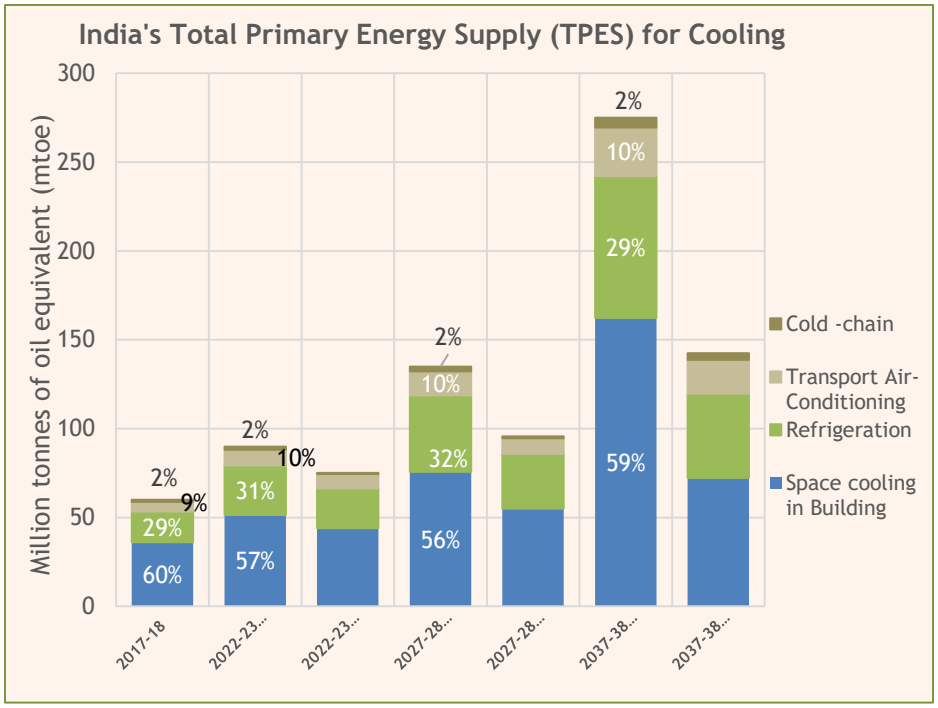


India Cooling Action Plan (ICAP)

- India Cooling Action Plan launched in March 2018 by MoEFCC .
- First country in the world to develop a comprehensive 20-year (2017-18 to 2037-38) vision document to address the cooling requirement across sectors
- Takes a holistic view of policy interventions and their interdependencies
- Cross sectoral and covers residential and commercial buildings, cold-chain, refrigeration, transport and industries
- Triple-sector approach to work with Government, private sector and non-profit & research organizations

India's Cooling Demand



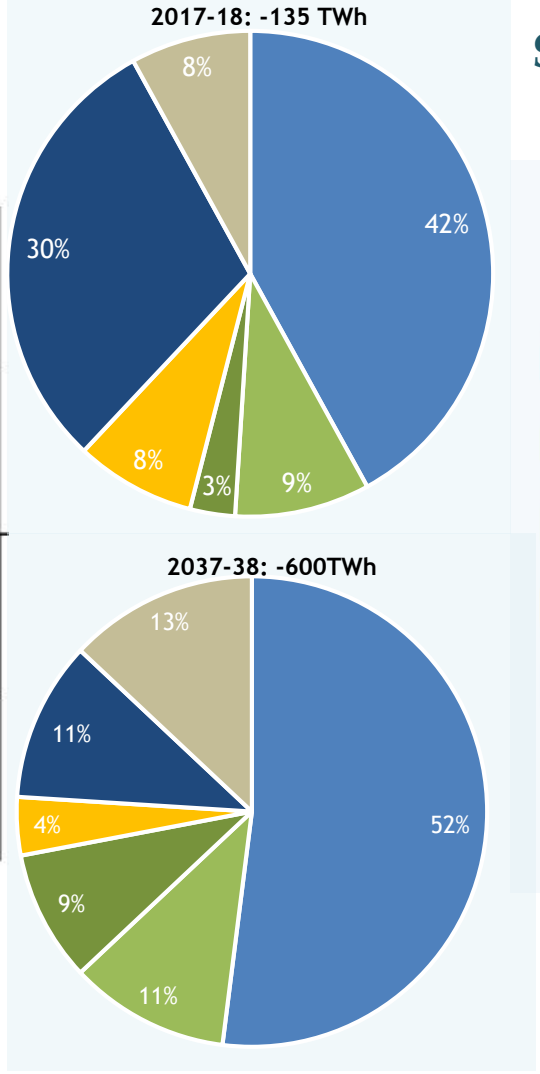


- The aggregated nationwide Cooling Demand in TR is projected to grow around 8 times by 2037-38 as compared to the 2017-18 baseline.
- The TPES requirement for cooling is expected to grow nearly 4.5 times in 2037-38 Reference Scenario, over the 2017-18 baseline .
- Cooling demand almost entirely contributes to the peak energy demand requirements of the country.

Sources of Cooling Demand

COOLING SECTORS

- **SPACE COOLING IN BUILDINGS**
  RAC, Chiller, VRF, DX, Fan, Air Cooler
- **MOBILE AIR-CONDITIONING**
  Passenger LDV & HDV
- **REFRIGERATION**
  Domestic & Commercial Refrigerators
- **COLD-CHAIN**
  Pack-house, Cold Storage, Ripening Chamber, Reefer Vehicle
- **PROCESS COOLING IN INDUSTRIES**



SPACE COOLING DEMAND

- Room Air Conditioner
- Chiller System
- VRF System
- Packaged DX
- Fan
- Air cooler

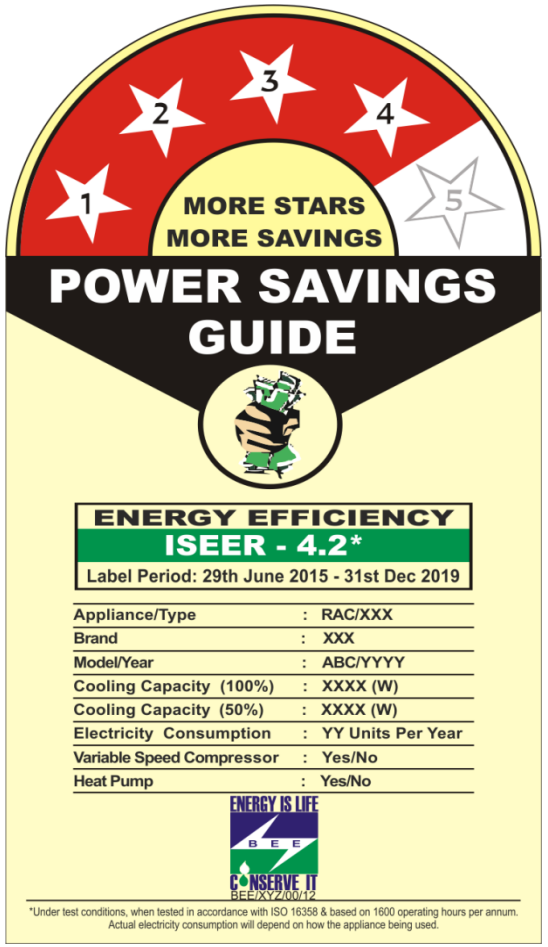
India's Standard & Labeling Program for Appliances/Equipment

Scheme:

- The Bureau of Energy Efficiency, Ministry of Power launched Standard & Labeling (S&L) program for appliances/equipment under section 14 of the Energy Conservation Act, 2001.

Objective:

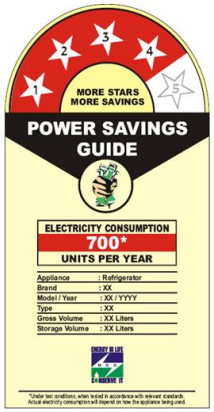
- To reduce the end use energy consumption of appliances/equipment without diminishing the service levels.
- Creating awareness amongst the consumers, to make informed decision considering the cost effectiveness & energy performance while purchasing appliances .
- Monitor and Verify energy savings that incur annually through sale of EE appliances.
- As a spinoff of the scheme ensures products quality.



Star Labeling Program in India

2001-2002

Energy Conservation Act and establishment of Bureau of Energy Efficiency



2006

Voluntary Labeling program launched for refrigerators and ACs

2009

Mandatory Labeling for four products



2011

Endorsement Label Launched

2019

24 appliances under labeling, of which 10 under mandatory phase



Source: Bureau of Energy Efficiency

Key Achievements of S&L Program



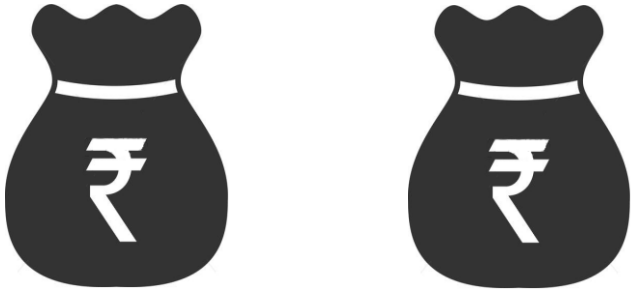
Electricity saved till 2018-19

296 Billion Unit



Co2 emission reduction of

242 million tonne



Equivalent cost saving of

USD $21.1 Billion

Source: Bureau of Energy Efficiency

Status of Labelling program

S.no	Appliances/ Products	Year Standards First developed	Nature of Labeling program
1	**Frost Free Refrigerator (FFR)**	**2006**	**Made Mandatory in 2009**
2	**Tubular Florescent Lamp (TFL)**	**2006**	**Made Mandatory in 2009**
3	**Room Air Conditioners-RAC (Split, window)**	**2007**	**Made Mandatory in 2009**
4	**Direct Cool Refrigerator (DCR)**	**2007**	**Made Mandatory in 2016**
5	Pump Sets	2008	Voluntary
6	**Distribution Transformer**	**2009**	**Made Mandatory in 2009**
7	**Color Television (CTV)**	**2009**	**Made Mandatory in 2016**
8	**Electric Geysers**	**2009**	**Made Mandatory in 2016**
9	Ceiling Fans (CF)	2009	Voluntary(to become Mandatory in 2020)
10	Induction Motors	2010	Voluntary
11	**RAC (Cassette, Floor Standing)**	**2011**	**Made Mandatory in 2015**
12	Washing Machine	2011	Voluntary
13	Computer (Notebook/Laptops)	2011	Voluntary
14	Solid State Inverter	2013	Voluntary
15	Ballast (Electronic/Magnetic)	2013	Voluntary
16	Office Equipment's	2014	Voluntary
17	Domestic Gas Stoves	2014	Voluntary
18	Diesel Generator Sets	2014	Voluntary
19	**Room Air Conditioners –RAC (variable speed)**	**2015**	**Made Mandatory in 2018**
20	Diesel Engine Mono-set Pumps	2015	Voluntary
21	**LED Lamps**	**2016**	**Made Mandatory in 2018**
22	Chillers	2018	Voluntary
23	Microwave Oven	2019	Voluntary
24	Solar Water Heater	2019	Voluntary

Source: Bureau of Energy Efficiency

Policies on Cooling Products

Room AC



Refrigerator
(Frost Free and Direct cool)



Ceiling Fan



Chillers

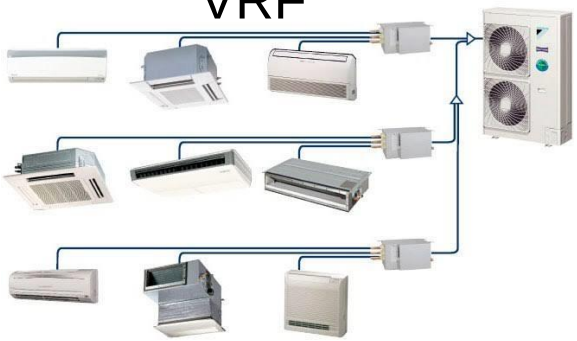


Policies under Development

Deep Freezer



VRF



Light Commercial AC



Labeling Program on Room ACs

2006
Launched voluntary policy **Room AC (fixed speed)**


भारत का राजपत्र
The Gazette of India

2011
Launched voluntary policy of **Cassette and Floor mounted AC (fixed speed)**

2015
Launched voluntary policy of **Inverter RAC**

2021
Upgradation of **1 star** in Energy Performance level



2009
Mandatory of **Fixed speed -Room AC** policy



2012 - 2014
Biennial upgradation of **1 star** in Energy performance level

2018
Common rating plan based on ISEER for fixed speed & Inverter AC **(mandatory Inverter AC policy)**

Efficiency Improvement for RACs

Revision in Star Rating Plan for Split type RAC (fixed and inverter)

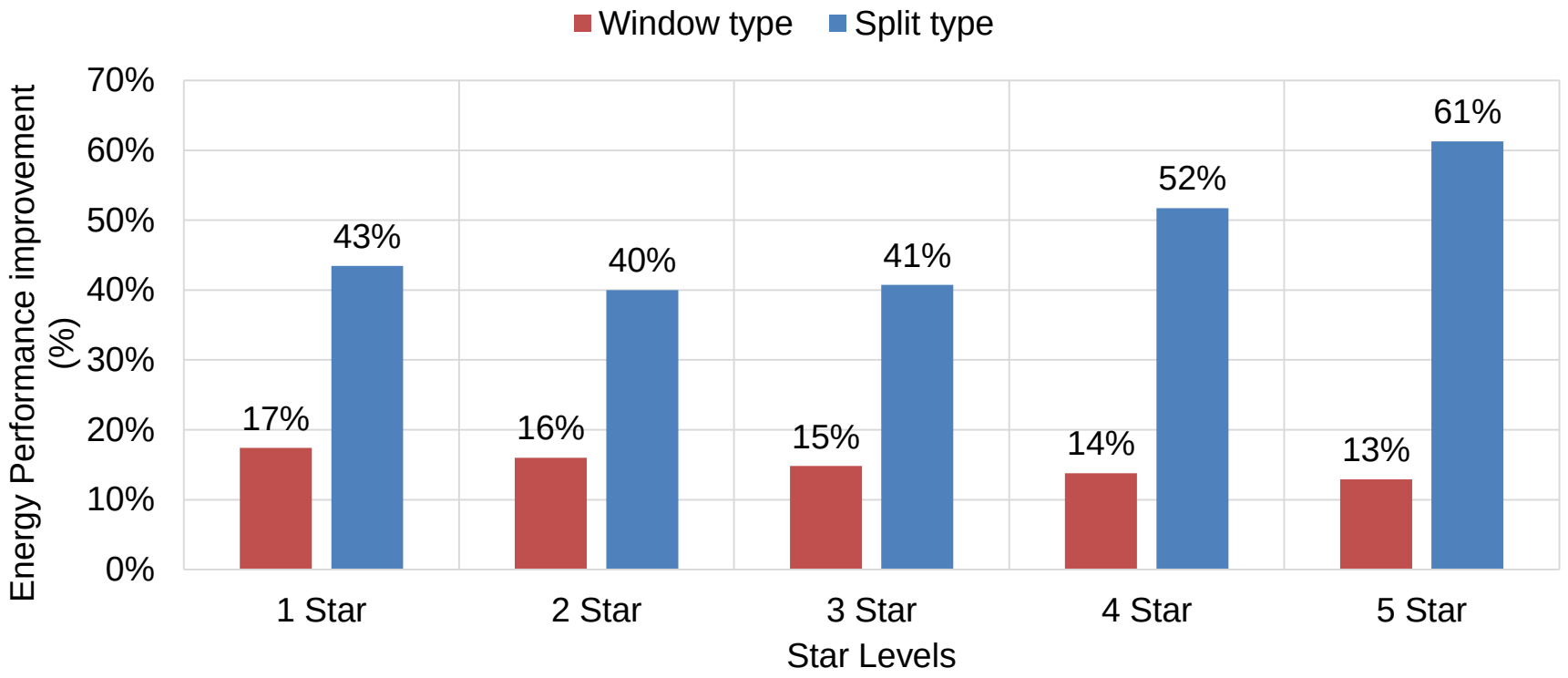
Star level	Jan 2009- Dec 2011	Jan 2012- Dec 2013	Jan 2014-Dec 2017	Jan 2018- Dec 2020	Jan 2021-Dec 2023
1 star	2.3	2.5	2.7	3.1	3.3
2 star	2.5	2.7	2.9	3.3	3.5
3 star	2.7	2.9	3.1	3.5	3.8
4 star	2.9	3.1	3.3	4.0	4.4
5 star	3.1	3.3	3.5	4.5	5.0

Revision in Star Rating Plan for Unitary type RAC (fixed and inverter)

Star level	Jan 2009- Dec 2013	Jan 2014- Dec2020	Jan 2021-Dec 2023
1 star	2.3	2.5	2.7
2 star	2.5	2.7	2.9
3 star	2.7	2.9	3.1
4 star	2.9	3.1	3.3
5 star	3.1	3.3	3.5

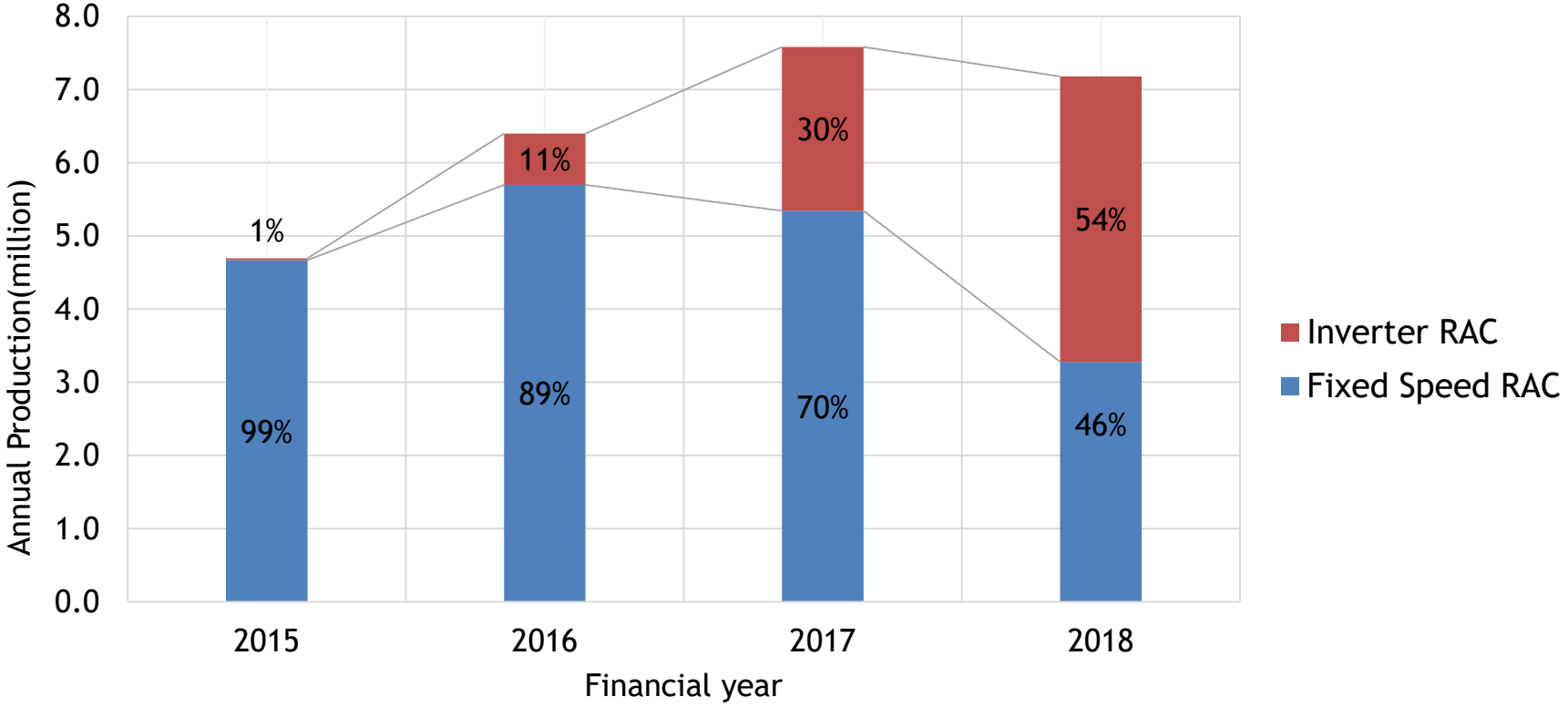
- Periodically, BEE revised the star rating plans RACs to make the energy performance thresholds stringent

Efficiency Improvement for RACs



- Since 2007, efficiency of Split AC of 1 Star has been improved by 43% and 5 Star by 61%
- **Policy Impact-** 38 MT of carbon emissions have been avoided cumulatively by 2016-17

Market Transformation of Fixed and Variable Speed Labeled RAC



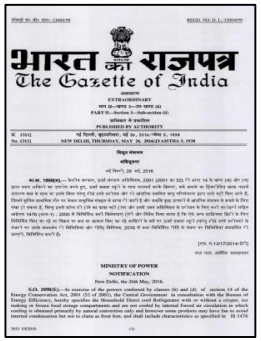
- RAC market reached 7.2 million units by 2018-19, and share of variable speed RACs increased to 54% in 2018

Evolution of Refrigerator Labeling Program

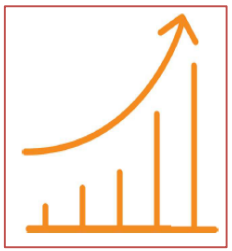
2006
Launched voluntary policy for Frost free Refrigerator (FFR)



2009
Mandatory Frost Free Refrigerator policy



2012-2020
Upgradation of FFR-Energy Performance level by 5 stars



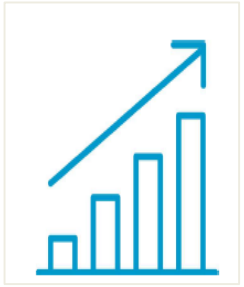
2022
Common rating plan for frost free and direct cool Refrigerator



2007
Launched voluntary policy for Direct cool Refrigerator (DCR)

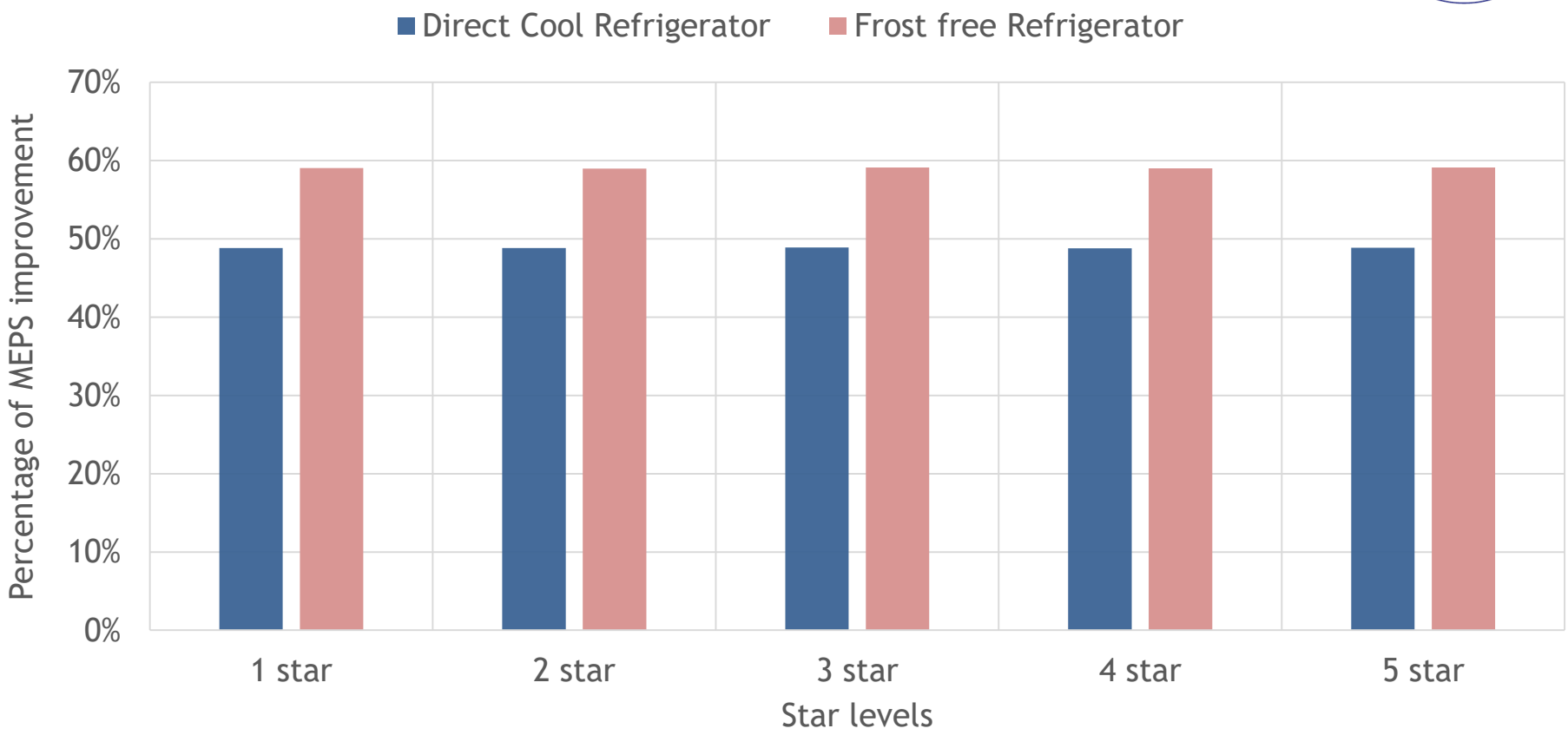


2016
Mandatory Direct Cool Refrigerator Policy



2007-2020
Upgradation of DCR-Energy Performance level by 4 stars

Refrigerator labeling program- Policy improvement

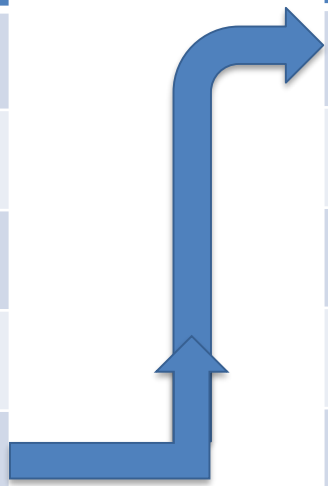


- For frost free refrigerator, MEPS improved by 59%, till 2016 and for direct cool refrigerator by 49%, till 2017
- Comparable improvement were observed in all stars levels

Source: BEE

Labeling Program for Ceiling Fans

Service Value	2009-2019
≥ 3.2 to < 3.4	Star 1
≥ 3.4 to < 3.6	Star 2
≥ 3.6 to < 3.8	Star 3
≥ 3.8 to < 4.0	Star 4
≥ 4.0	Star 5

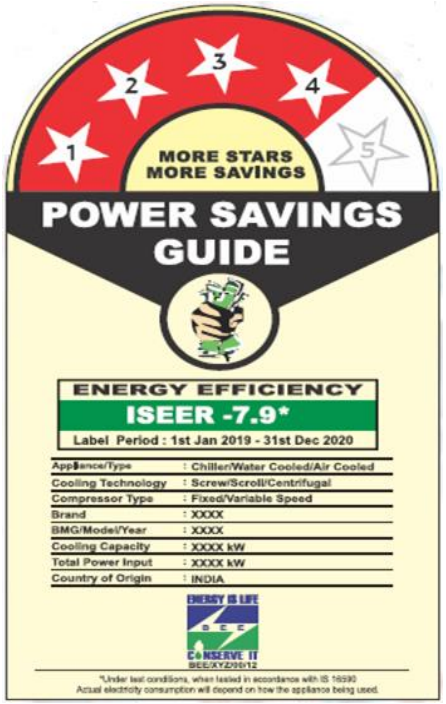


2019-2022	Service Value
Star 1	≥ 4.0 to < 4.5
Star 2	≥ 4.5 to < 5.0
Star 3	≥ 5.0 to < 5.5
Star 4	≥ 5.5 to < 6.0
Star 5	≥ 6.0

- Labeling program revised in 2019 and will transition to mandatory phase in 2020

Labeling Program for Chillers

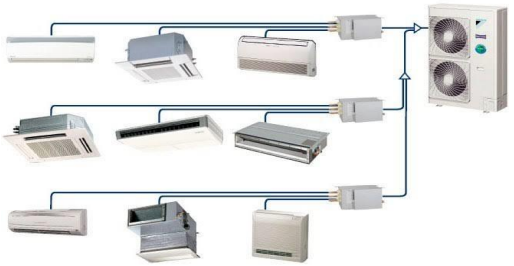
- Extensively used for space conditioning of buildings and industrial process cooling applications
- Contribute approx. 40 per cent of total energy consumption in commercial buildings
- Indian chiller market was at 1 Million Tonne per year in 2017, projected to grow at a CAGR of 3.6%
- Labeling program launched on voluntary basis in **2018** and valid up to December 2020
- 20 Chiller models are registered under the program



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Product policy under Development -ICAP

S.no	Product	Program Scope	Sample Products
1.	Deep Freezer	Covers upto 1000 litres	
2.	Light Commercial Air Conditioner	Covers above 10.5 to 18 kW	
3.	VRF		

THANK YOU

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