

# Cooling Challenges & Opportunities

Bureau of Energy Efficiency

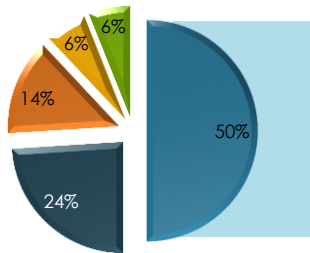
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Energy Economist

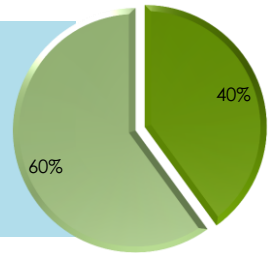
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# Cooling Market

Segment Share of Air Conditioning (2011-12)



Room Air Conditioner Market (2011-12)

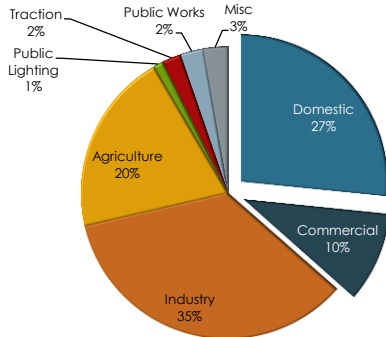


- Room Air Conditioner
- Central Plant (Chiller)
- Duct/Package
- VRF
- Precision
- Commercial
- Residential

2

# Cooling Profile - India

**Electricity Consumption - 750 BU (2013)**  
**14)**



**Air Conditioner Contribution:**

- Household: 20-30%
- Commercial: 40-50%

**70-80 GW connected load is only due to Cooling and consumes about 40-50 BU annually**

3

# Urban Households Possessing Appliances per 1000 households

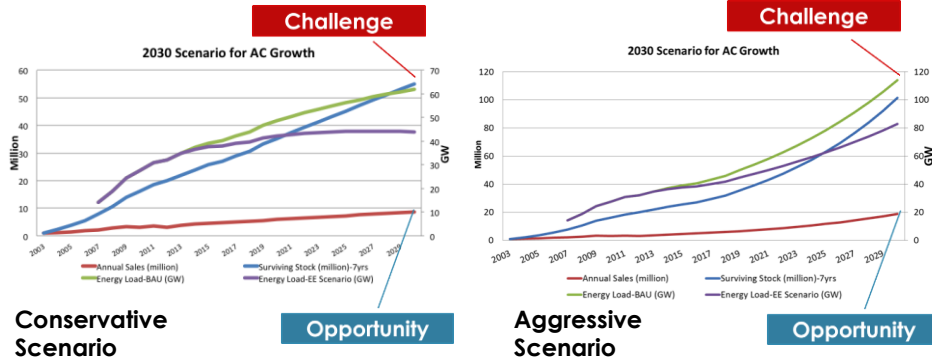
MPCE decile class	MPCE (Rs. per person per month)	Television	Electric Fan	Air Conditioner, Cooler	Refrigerator
0-733	599.27	429	664	42	24
733-926	830.96	597	822	73	70
926-1101	1011.84	691	831	96	114
1101-1293	1196.08	768	902	143	218
1293-1502	1397.99	830	922	178	328
1502-1773	1633.42	827	938	190	359
1773-2097	1930.96	823	946	208	450
2097-2603	2329.87	818	943	236	537
2603-3665	3050.69	839	966	295	664
3665-More	5863.25	778	970	433	658
<b>All</b>	<b>1856.01</b>	<b>758</b>	<b>906</b>	<b>214</b>	<b>390</b>

Source: NSSO 66th round (2009-10)

**Approx. 6% in Urban Household**

4

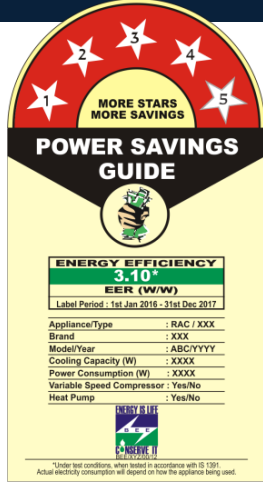
# 2030 Scenario



# Opportunities & Challenges

- Opportunity
  - Higher Penetration
  - Sales growth
  - More cooling requirement due to climate change & rise in incomes
  - Efficient Air Conditioners
- Challenges
  - Significant peak load contribution due to cooling requirements
  - High Electricity consumption
  - High cost of Efficient Air Conditioners
  - Inefficient air conditioners installed
  - Maintenance & Power Supply issues

# Room Air Conditioner



### Mandatory Appliance

**Standard:** IS 1391:1992

Section 14(b): S.O.180(E) dated 12.01.2009

Section 14 (a): S.O. 181 (E) dated 12.01.2009

Regulation: No.2 /11 (5)/03-BEE dated 06.07.2009

**Star Labeling Parameter**  
Energy Efficiency Ratio

### Split AC



### Window AC



Higher is Better

# ISEER

- ▣ ISEER – Indian Seasonal Energy Efficiency Ratio
- ▣ Testing standard – IS 1391 Part II
- ▣ Calculation procedure – ISO 16358
- ▣ Weather profile for 54 cities across India were analysed to arrive bin temperature and hours

Temperature in °C	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	Total
Average Annual Hours	527	590	639	660	603	543	451	377	309	240	196	165	130	101	79	59	44	31	20	10	5774
Fraction	9.1	10.2	11.1	11.4	10.4	9.4	7.8	6.5	5.4	4.2	3.4	2.9	2.3	1.7	1.4	1.0	0.8	0.5	0.3	0.2	100
Bin Hours	146	163	177	183	167	150	125	104	86	67	54	46	36	28	22	16	12	9	6	3	1600

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# Room Air Conditioner (Split AC)

## Star Label Up-gradation for Split AC

	2006-2011	2012-2013	2014-2015	2016-2017	2018-2019
Star 1					Star 1
Star 2					Star 2
Star 3					Star 3
Star 4		3.30	3.49	4.00	4.49
Star 5		3.50	-	4.50	-

**From January 2018**

- All Room AC based on ISEER Methodology
- Mandatory labeling for Inverter AC
- Merger of fixed speed and inverter AC label

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# Change in Label



# Inverter Type Air Conditioner

- How to compare Inverter Split with Normal fixed speed split AC

**Bureau of Energy Efficiency**  
Ministry of Power, Government of India

Search and Compare for Room Air Conditioner

Brand (49)	Type	Model (394)	Energy Efficiency Ratio (EER)(W/W)	Nominal Marketing Capacity (in Ton)	Star Rating
Select All	Select All	Select All	Select All	Select All	Select All
AIK	CASSETTE AIR CONDITI	4501276	2.21	0.7	1
AVI	FLOOR STANDING TOW	WASC18GNBWM	2.72	0.75	2
BLUE STAR	CELLING/FLOOR AIR CC	WASC12GGBWM	2.23	0.8	3
CARRIER	CORNER AIR CONDITIO	WWN18CRA-D	2.74	0.8T	4
CHIGO	SPLIT AIR CONDITIONE	WSM18CRS-C1	2.75	0.9	5
CROMA	WINDOW AIR CONDITIO	WSM12CRS-C1	2.76	1	5

You Searched for:

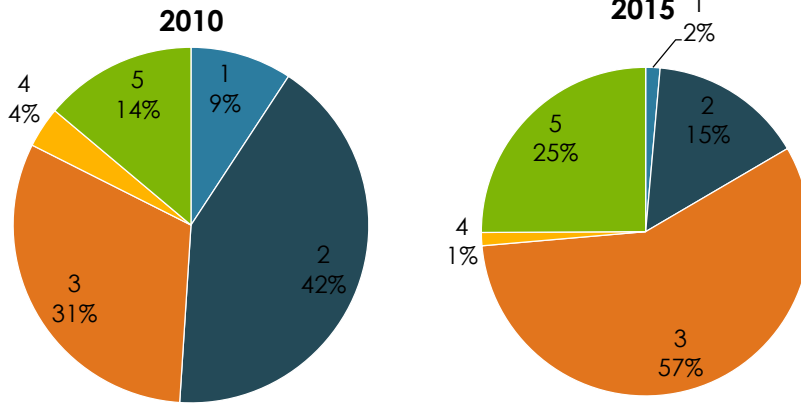
Brand: ALL    Model: ALL  
 Nominal Marketing Capacity (in Ton): ALL    Energy Efficiency Ratio (EER)(W/W): ALL  
 Type: ALL    Star Rating: 5

S.No	Brand Name	Type	Model Number	EER(W/W) & Equivalent ISEER	Nom. Marke. Cap. (Ton)	Cooling Capacity (W)	Power Cons. (W)	Seasonal Energy Consumption (CSEC) (KWh)	Valid Till Date	Star Rating
1	WHITE WESTINGHOUSE	Split air conditioner	WASC18GNBWM	3.51	1.5	5270	1501	1161.93	31-12-2017	5
2	WHITE WESTINGHOUSE	Split air conditioner	WASC12GGBWM	3.51	1	3550	1011	782.62	31-12-2017	5

11

# Star Labeling Impact

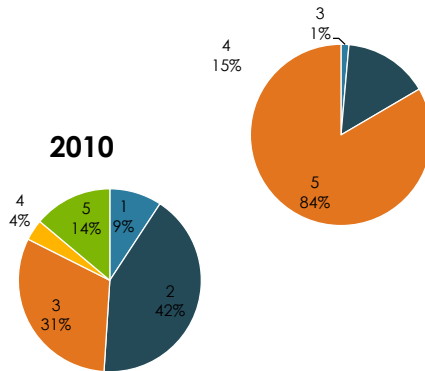
Air Conditioners Market



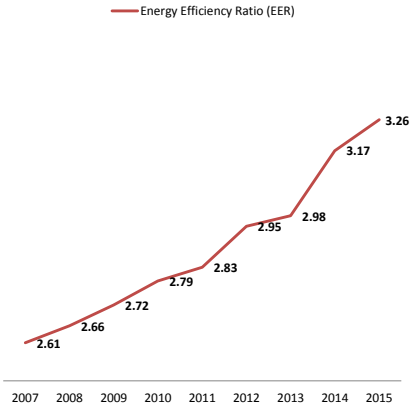
12

## Market Transformation

### 2015 at 2010 Levels



### Energy Efficiency Ratio (EER)



13

## Way Forward

- ▣ Short/Medium Term
  - ▣ Differential taxation for 5 Star appliances
  - ▣ Incentive Program for Super Efficient Air Conditioners
  - ▣ **Bulk Procurement of Super Efficient Air Conditioners to reduce higher 1<sup>st</sup> Cost**
  - ▣ Recognition through awards for best available ACs
  - ▣ **Star Labeling for Chillers and VRFs**
  - ▣ Installation Practices
  - ▣ Strategic Retailer/Consumer Awareness
- ▣ Long Term
  - ▣ Disruptive technology for Cooling

14

Thank you for your kind attention