

Market Assessment of Light Commercial Air Conditioners

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Light Commercial ACs

The Room air conditioner market in India is divided into three major categories as depicted below in the figure 1

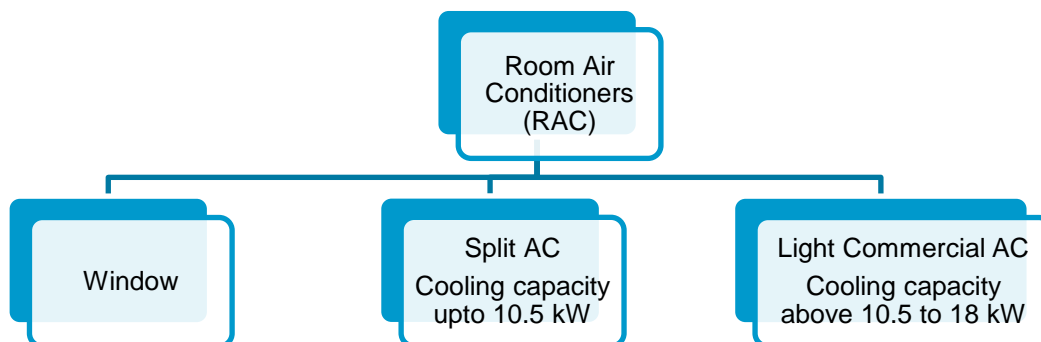


Figure 1: RAC Segmentation

While the products of the first two categories i.e. window and split AC (cooling capacity up to 10.5 kW) are covered by labeling program in place as per Indian Standard IS 1391 part 1 and part 2. The third category split AC (cooling capacity above 10.5 and upto and including 18 kW) consist of 2 types of products known as ceiling mounted (also commercially known as cassettes AC) and floor standing AC. These have recently come under the purview of IS 1391 part 2

The cassette and floor standing ACs are split air conditioners with separate indoor and outdoor units. Cassette ACs are installed at the ceiling of a room whereas floor standing ACs are installed at any location on the floor of the room. The snapshot of the both installations is presented in the figure 2



Figure 2: Snapshot of cassette AC and floor standing AC

Cassette and floor standing air conditioners of cooling capacity (10.5 kW to 18 kW) mostly find their applications in showrooms, motels, banquet halls, restaurants and other small / medium commercial spaces. The AC's above 10.5 kW (~3 TR) until 18 kW (~5 TR) cooling capacity are categorized into single and three phases based on their electrical power input and cooling capacity requirement.

According to the consultation with various manufacturers, 3- 4-ton cooling capacity cassette and floor standing AC products predominantly fall under single-phase segment (some of them may be 3 phase as well) whereas the products ranging from 4 to 5 ton fall mostly in the 3-phase category.

Market scenario - 10.5 kW to 18 KW AC Segment

Market size

The market size of light commercial RAC is estimated to be 1.05 lakh units for year 2019-20. The analysis and estimates reveal that the segment is largely dominated by cassette ACs constituting around 86% of the market share as shown in figure 3.

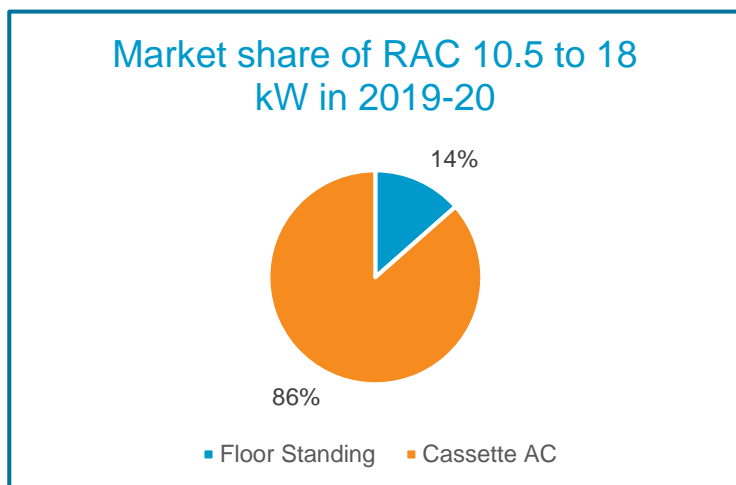


Figure 3 Floor standing Vs Cassette market share

The market for light commercial ACs in India has grown at a CAGR of 19% from FY'13 to FY'19. It is projected to grow at a CAGR of 5-7% in future. The observed growth can be attributed to the following possible reasons-

- Growth of real estate, IT and other services companies in tier 2 and tier 3 cities where these products find major application
- Growth in large residential apartments, villas and small commercial spaces

Performance data and efficiency levels

The summary of efficiency data received from various manufacturers is as follows –

1. Overall 11 manufacturers furnished data for 83 models (53 cassettes+30 floor standing). For the analysis and proposing threshold values, 65 ISEER (43 cassettes+22 Floor standing) values were considered.
2. Efficiency values for 18 inverter models were not considered for the analysis, since ISEER values were not furnished. The manufacturers furnished only power consumption values @ 100 % load, which is inadequate for calculating ISEER and further analysis.
3. ISEER values of 49 models were furnished by independent NABL¹ accredited test lab for air conditioners. These ISEER values were comparatively lower in efficiency compared to ISEER values furnished by manufacturers. Lab efficiency values of most of the models are R-22 based which is not prevalent as this refrigerant has come under the controlled category under Montreal protocol and has a phase out plan in place. This data has been analyzed separately for correlation purposes.

The ISEER data of various manufacturers for - 10.5 kW to 18 KW AC segment has been summarized in the figure 4.

¹ National Accreditation Board for Testing and Calibration Laboratories

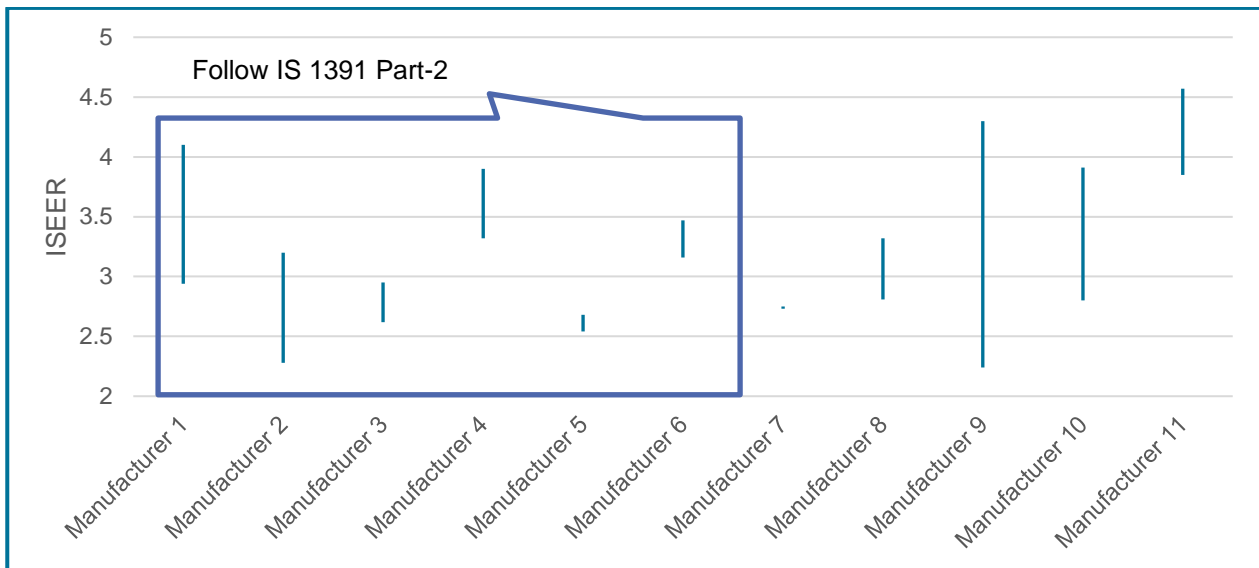


Figure 4: Performance data of manufacturers

Test facilities / Lab infrastructure in India for air conditioners

The major test laboratories having NABL accreditation for air conditioners in India are

1. Central Power Research Institute (CPRI), Bangalore
2. Intertek India Pvt. Ltd., New Delhi
3. Sierra Aircon, Gurgaon

Summary of international standards

This section gives a snapshot of methodology adopted for RAC labeling program in the major countries in table below:

Table 1: S&L summary for Asian countries

Air conditioner S&L program in major countries of import		
China	Japan	Korea
<p>China has 2 standards for air conditioners</p> <ul style="list-style-type: none"> • GB 12021.3 for fixed speed AC's • GB 21455 for variable speed AC's • The efficiency grades are divided into 3 categories based on SEER values for cooling only and APR values for reversible products (With heating) 	<ul style="list-style-type: none"> • The standard followed is JISC 9612 • Japan S&L program compares APF (Annual Performance factor) values with the TOP runner targets for each cooling capacity to assign efficiency grades 	<ul style="list-style-type: none"> • The standard followed is KSC 9306 • The labelling program specifies R (Energy efficiency level index) which is the ratio of Maximum energy consumption of a given model (kWh/month) to the Monthly energy consumption of a given model (kWh/month) to arrive at energy efficiency grades.

The labelling thresholds in China, Japan and South Korea vary as per the cooling capacities (depicted in the table 2)

Table 2: Product categorization by cooling capacity

Product categorization by Cooling capacity (CC) in kW		
China	Japan	South Korea
CC < 4.5	CC < 3.2 3.2 < CC < 4.0	CC < 4.0
4.5 < CC < 7.1	4.0 < CC < 5.0 5.0 < CC < 6.3	4 < CC < 10
7.1 < CC < 14.0	6.3 < CC < 7.1 7.1 < CC < 28	10 < CC < 15

Energy Performance Threshold and Savings Impact

Based on analysis of data provided by manufacturers, the following table was finalized for labeling program:

Table 3: Proposed thresholds for labelling program

S.No.	Star Rating	ISEER	Percentage (%) of models in each category
1	Star 1	2.7-3.09	35%
2	Star 2	3.10-3.39	14%
3	Star 3	3.40-3.69	12%
4	Star 4	3.70-3.99	12%
5	Star 5	≥ 4.00	12%
6	Below 1 star		15%

Savings potential from the proposed thresholds

A cumulative GHG reduction of 2.4 (MtCO₂) and electricity saving of 2.8 TWh is expected by 2030 as shown in Figure 5 below. Saving calculations assume 6% increment in sales figure and 3% improvement in efficiency (for each band) every year.

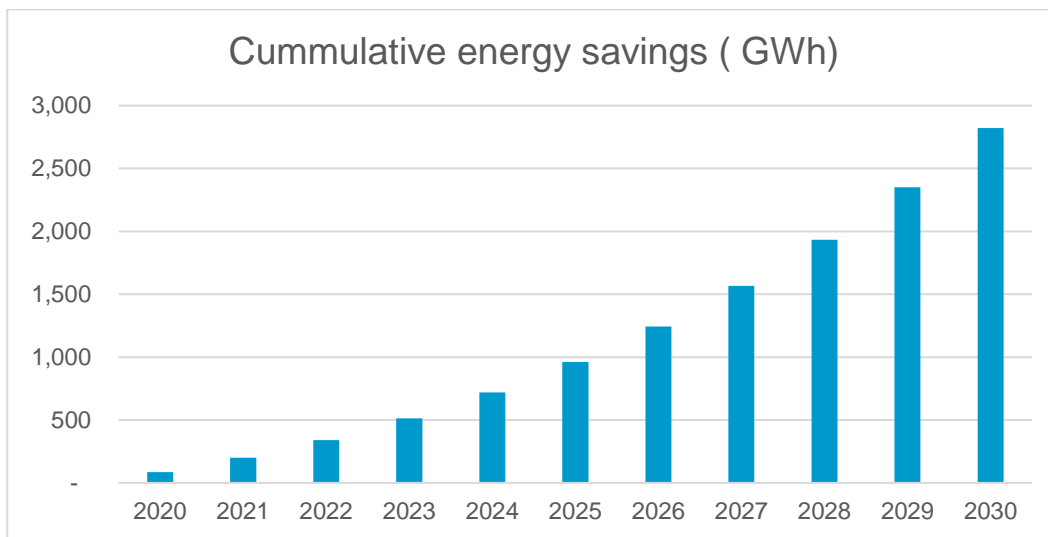


Figure 5: Cumulative energy savings (GWh)

Appendix A. -

A.1. Manufacturer Details

Manufacturer details						
Name of Manufacturer	Manufacturing facility address (in case of multiple facilities enter address in the next row)	Manufacturing facility capacity (of each facility in case of multiple)	Name of concerned representative for Light Commercial	Designation of the representative	Contact Number of the representative	Email_Id of representative

A.2. Market Size

Estimate of market size 3 to 5 TR (cumulative for all manufacturers)					
S.No.	Type	FY 14-15	FY 15-16	FY 16-17	FY 17-18
1	Market size for Cassettes - Single Phase (Quantity in nos.)				
2	Market size for Cassettes - Three Phase (Quantity in nos.)				
3	Market size for Floor Standing- Single Phase (Quantity in nos.)				
4	Market size for Floor Standing- Three Phase (Quantity in nos.)				

A.3. Manufacturer market size

Manufacturer market size (in nos.)						
S.No.	Light Commercial Type	Tonnage (Tr)	FY 14-15	FY 15-16	FY 16-17	FY 17-18
1	Cassette Single Phase	3 to 5 Tr				
	Cassette Three Phase	3 to 5 Tr				
2	Floor Standing Single Phase	3 to 5 Tr				
	Floor Standing Three Phase	3 to 5 Tr				

Manufacturer Import quantity (in nos.)							
S.No.	Light Commercial Type	Tonnage (Tr)	Major countries of Import	FY 14-15	FY 15-16	FY 16-17	FY 17-18
1	Cassette Single Phase	3 to 5 Tr					
	Cassette Three Phase	3 to 5 Tr					
2	Floor Standing Single Phase	3 to 5 Tr					
	Floor Standing Three Phase	3 to 5 Tr					

Manufacturer Export quantity (in nos.)							
S.No.	Freezer type	Tonnage	Major countries of Export	FY 14-15	FY 15-16	FY 16-17	FY 17-18
1	Cassette Single Phase	3 to 5 Tr					
	Cassette Three Phase	3 to 5 Tr					
2	Floor Standing Single Phase	3 to 5 Tr					
	Floor Standing Three Phase	3 to 5 Tr					

