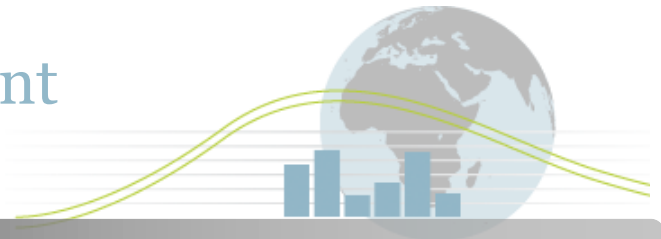


4E

Mapping Document



Country:	China
Technology:	Air Conditioners
Sub Category:	Residential, Unitary (Packaged), Split and Multi-split

Introduction

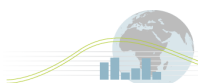
The first stage in the Mapping and Benchmarking process is the definition of the products, i.e. clearly setting the boundaries that define the products for use in data collection and analysis. Doing this ensures that comparison between the participating countries is done against a specific and consistent set of products. The summary definition for this product is:

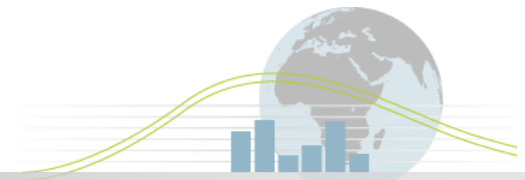
Definition & scope	<p><i>'Air conditioners used in dwellings and designed to maintain the temperature of indoor air at a given temperature level for a given heat load to be extracted.'</i></p> <p>Including only:</p> <ul style="list-style-type: none"> • Products of up to 14 kW cooling capacity (indicative, to exclude products used only in commercial premises) • Electrically driven vapour compression (Absorption units excluded) • Cooling only units, and cooling function of reverse cycle units. (Data for heating cycle / heat pumps to be invited but not analysed). • Air cooled condensers, and water/condensate spray assisted (water cooled units excluded) • Only air to air units (water chillers excluded) 		
Type	Unitary ('packaged', in single mounting, including double duct units)	Split units, (single room unit and single condenser linked by pipe-work)	Multi-split (two or more room units and single condenser linked by pipe-work)
Other variables invited (but not analysed)	<ul style="list-style-type: none"> • Mounting (Window / thru-wall; Other fixed mounting; Mobile) • Variable speed drive / multi-speed compressor (yes / no) • Refrigerant (designated according to ASHRAE refrigerant numbering system) • Standby consumption 		

Important note: Ducted air conditioners (central) are excluded from this analysis as they are not generally used outside of the USA and Canada.

The detailed product definitions can be found at the Annex website:

<http://mappingandbenchmarking.iea-4e.org/matrix>

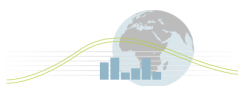


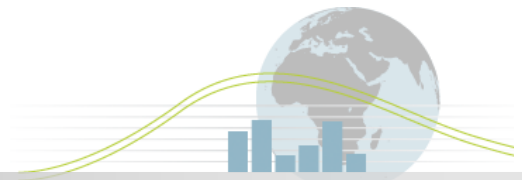


Energy Efficiency Ratio of New Unitary Air Conditioners China

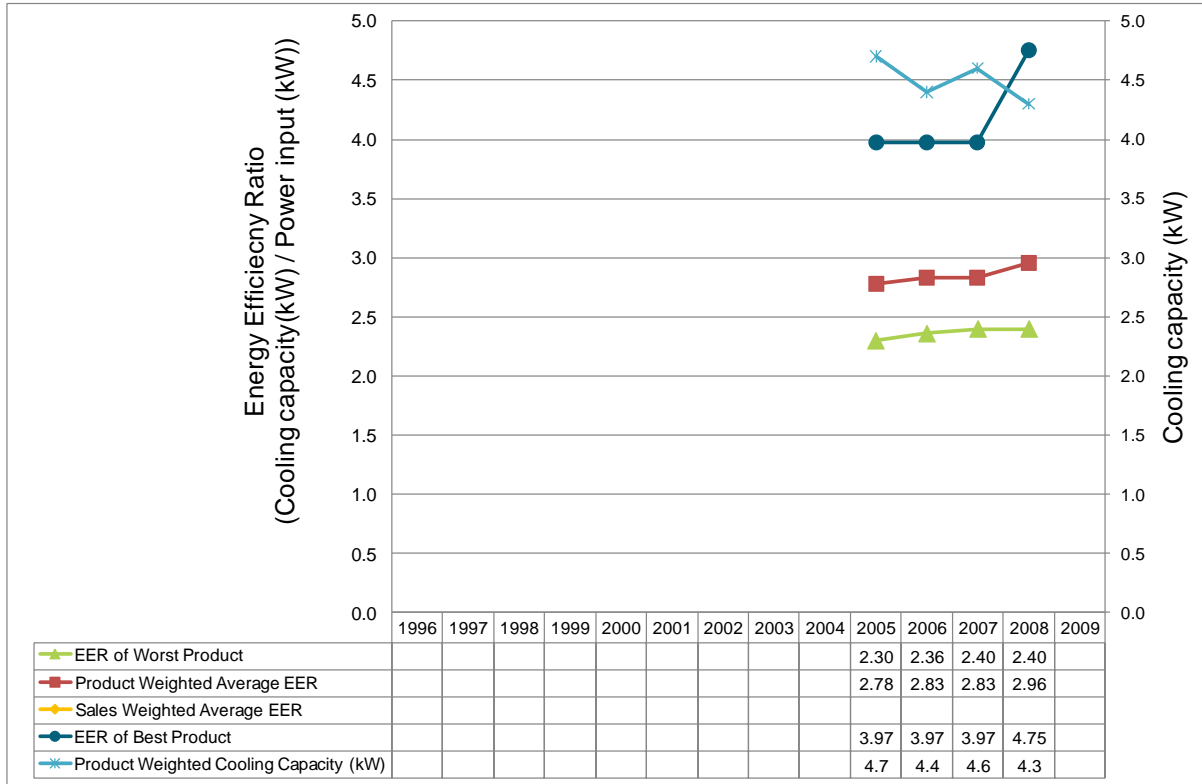
Key notes on Graph (see notes section 1)

- No data available for unitary products of less than 14kW capacity.



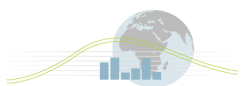


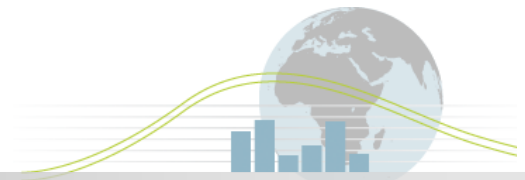
Energy Efficiency Ratio of New Split Air Conditioners China



Key notes on Graph (see notes section 1)

- This data set includes only Split type products under around 14kW cooling capacity. The EER units are kW per kW.
- Data is from Government statistics. It is assumed representative of the whole market, but no evidence is available to confirm this.

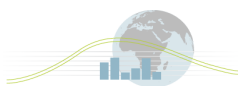


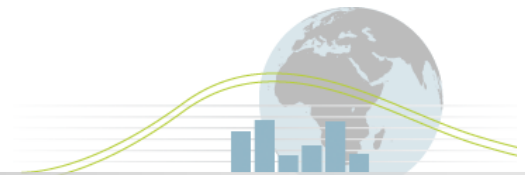


Energy Efficiency Ratio of New Multi-split Air Conditioners China

Key notes on Graph (See notes section 1)

- No data available for multi-split products of less than 14kW capacity.

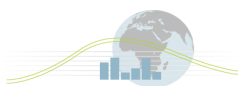


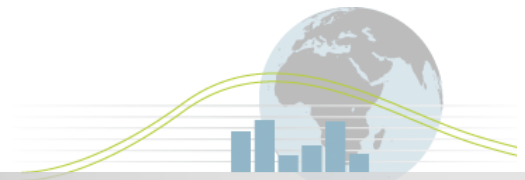


Other Characteristics of New Residential Air Conditioners China

Key notes on Graph (See notes section 2)

- No statistics available for percentage of the market that has inverter drive, except that the percentage is growing and was at least 10% in 2009.

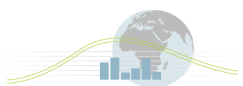




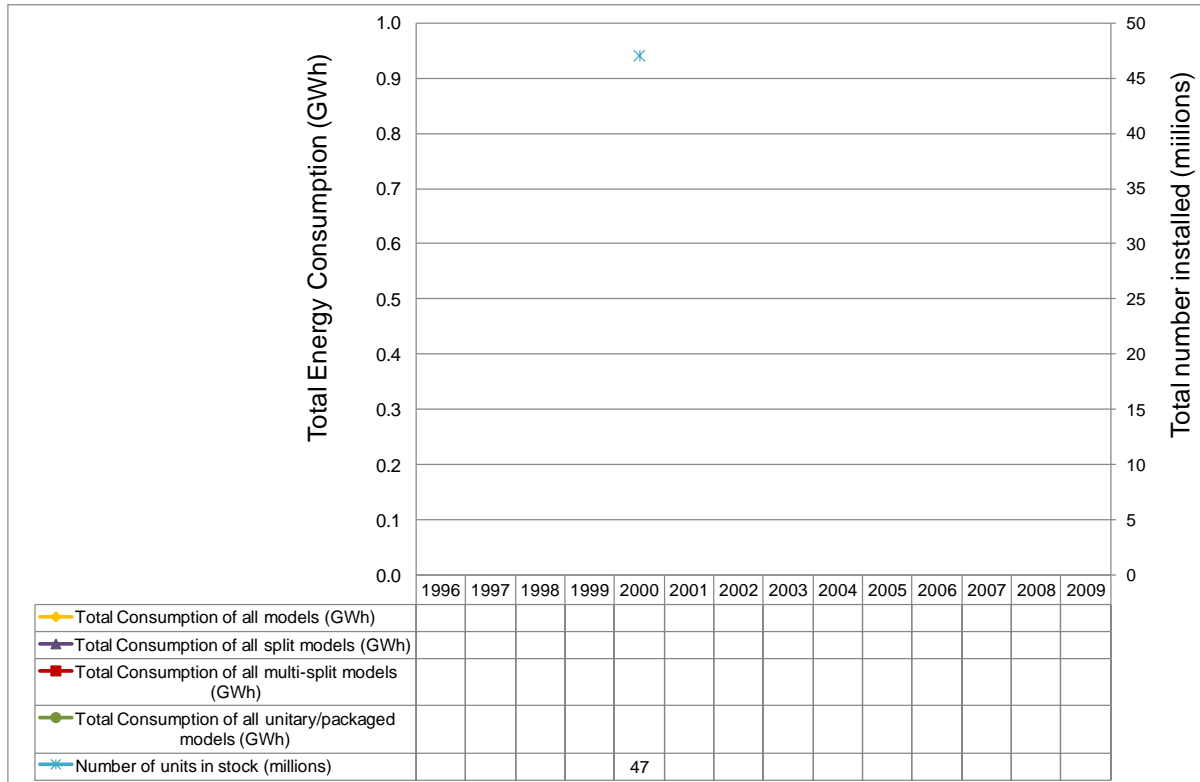
Energy Efficiency Ratio's in the Installed Residential Air Conditioner Stock - China

Key notes on Graph (See notes section 4)

- No data on EER of air conditioner stock in China available.



Energy Consumption in the installed Residential Air Conditioner Stock - China



Key notes on Graph (See notes section 5)

- No data on consumption of installed residential air conditioner stock in China are available.
- Government statistics were used to infer the estimated residential air conditioner stock for towns and cities in China of 3.4 million in 1990 which rose to 47 million by 2000 (see Notes on Data Section 1.2).
- For context, more recent Government statistics indicate that the total stock of all types of air conditioner in residential and commercial premises in China had reached 178 million in 2006 and 198 million in 2007.

Major Policy Interventions (See notes Section 5)

MEPS standards, China Energy Label and China Energy Conservation Certification

MEPS apply to all types of residential air-conditioners except mobile types. There is also a mandatory energy label with five levels. Level 1 is achieved by the best products and Level 5 is the entry level.

The energy label for Room Air Conditioners is due to be updated in June 2010 to have only three levels rather than five (ref regulation GB12021.3-2010). Levels 1 and 2 in the current label will become Levels 2 and 3 in the new standard, with Level 3 as the entry level and Level 1 as a new higher level. Higher level MEPS will be introduced in 2011 for variable speed and multi-split products.

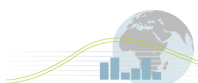
In addition, those products that reach Level 2 or Level 1 meet the requirements of China Energy Conservation Certification and can get certified (an additional voluntary endorsement label).

Compliance is enforced by AQSIQ, under its National Supervision and Inspection (NSI) programme.

Since 2007 there has been a Governmental fiscal subsidy programme to encourage deployment of appliances beyond the cities (translated as “Home appliances going to countryside”). This programme includes air conditioners, but only products meeting certain performance levels can qualify. The required level is raised over time so that this program not only stimulates air conditioner sales, but also improves product energy efficiency.

Cultural Issues (See Notes Section 6)

Unitary and multi-split products in China are usually larger capacity products for commercial use. By the end of 2009 the proportion of Variable Speed AC (VSAC) had reached more than 10%. VSAC is promoted by leading air conditioner manufacturers and consumers are willing to pay a price premium to have it.



Notes on data

Section 1: Notes on Product Energy Efficiency Ratio

1.1 Test methodologies, Performance Standards and Labelling Requirements

Performance test standards in China include GB/T 7725-2004 for 'General' air conditioners; GB/T17758-1999 for unitary; GB/T 22257-2008 for mobile products and GB/T 18837-2002 for multi-split. All of these, and the parallel Chinese documents that explain the MEPS, are based upon ISO, US or EU standards, including those that underpin the ENERGY STAR programme. It is therefore assumed that these results are directly comparable.

1.2 Product Energy Efficiency Ratio Graphic

Source:

The data for split systems for these graphs is from the Chinese Government Bureau of Statistics. Similar data for multi-split and unitary products was deemed out of scope as their average cooling capacity was significantly higher than the 14 kW target size for this analysis.

Key calculations undertaken:

No additional normalisations were required as the test conditions are assumed to be Climate Class T1.

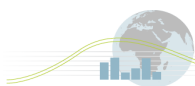
Government statistics can be used to infer an estimated air conditioner stock for towns and cities in China. The statistics for the number of air conditioners used in every 100 families in towns and cities can be multiplied by the number of families in towns and cities to yield: Stock in 1990 of 3.4 million, and in 2000 of 47 million.

Usage assumptions:

No usage assumptions have been made for air conditioners as there is no simple way to calculate an annual consumption from individual or average product performance data. For total consumption, Government modelling data is quoted where available (consumption data not available for China).

Proportion of data set included:

Only summary level data was available for Chinese products. Data on multi-split and unitary products was not included in the analysis as the product capacity was deemed out of scope for most of these products. All summary data for split products was used.



Section 2: Notes on Other Energy Related Metrics

2.1 Test methodologies, Performance Standards and Labelling Requirements

No additional information relevant. Refer to section 1.2

2.2 Other Energy Related Metrics

The other metrics used to characterise the market are:

- The percentage of market that use variable speed drives or multi-speed compressors. These features improve efficiency in real use by more closely matching capacity to cooling demand, although efficiency under standard test conditions may not show savings.
- The percentage of market that use refrigerant R410A. This is a high pressure refrigerant fluid that has become commonly used throughout the world. It has been chosen for these graphs as indicative of the move to HFC refrigerants (away from CFCs / HCFCs).
- The percentage of the market that are reverse cycle products. These can be used for heating as well as cooling (often referred to as heat pumps).

Section 3: Notes on EER of Stock

No further issues to add.

Section 4: Notes on Consumption of Stock

No further issues to add.

Section 5: Notes on Policy Interventions

No further issues to add.

Section 6: Notes on Cultural Issues

No further issues to add.

