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# **China Low and Medium-voltage Inverter Industry Report, 2010-2011**

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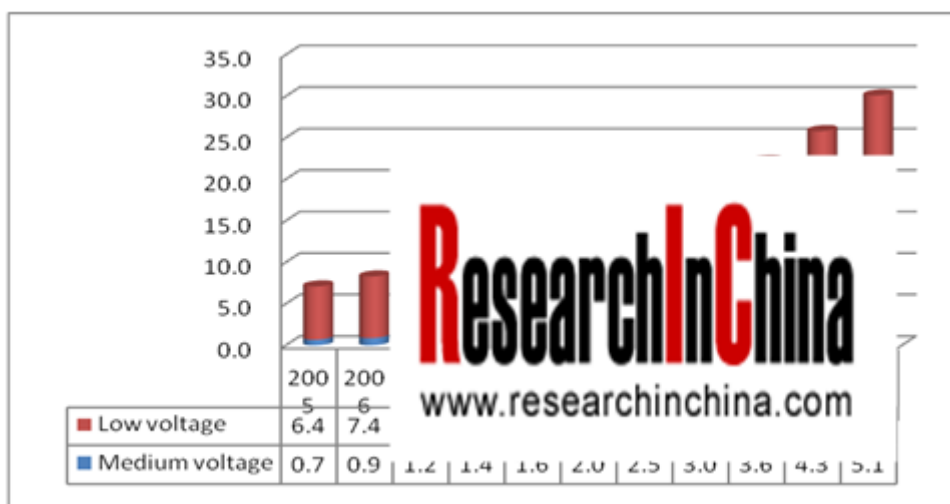
### 3. Chinese Low & Medium-voltage Inverter Market

#### 3.1 Market Size

In recent years, China’s low & medium-voltage inverter industry has progressed steadily at an annual average growth rate over 15%. Nevertheless, subject to the financial crisis, it geared down in 2009 and the market size throughout the year rose by \*\*% year on year to RMB\*\* billion, with RMB\*\* billion and RMB\*\* billion attributable to low-voltage inverter and medium-voltage inverter respectively. With the recovery of the Chinese economy, the low & medium-voltage inverter market was estimated to grow by 16% to RMB\*\* billion in 2010.

In terms of market structure, low voltage inverter dominates the market with over \*\*% market share, whereas due to its narrow range of application, medium voltage inverter only accounts for less than 15% of the total market.

**Market Size of Low & Medium-voltage Inverter by Sales in China, 2005-2015E (RMBbn)**



Source: ResearchInChina

Low & medium-voltage inverter industry is a typical cyclical industry which closely relates to the national economic cycle. Thanks to a series of measures adopted by the state with the aim to encourage spending and readjust the industrial structure, the development of low & medium-voltage inverter industry will keep steady, with annual growth rates of \*\*% and \*\*% for low and medium voltage inverter respectively during the 12th Five-Year Plan period.

## **4. Chinese Low & Medium-voltage Inverter Competition Pattern**

### **4.1 Brand Competition**

#### **4.1.1 Domestic and Foreign Brands**

In China, there are over 140 brands in the low & medium-voltage inverter industry, among which, \*\*% of market share is occupied by foreign brands led by Siemens and ABB. Nevertheless, domestic brands enjoy merely \*\*% of the market share, with leading brands such as Inovance and INVT.

In terms of brand, Chinese low & medium-voltage inverter market is dominated by Japanese, European & American, and Taiwanese brands. Japanese brands represented by YASKAWA, Fuji Electric, Mitsubishi, Hitachi and Sanken Electric entered Chinese market first and used to be monopolies. However, with the constantly stronger brands from Europe & America, Taiwan, and China, the market share held by Japanese brands gradually shrank to approximately 18% currently.

Taiwanese brands entered into Chinese market earlier, and most of their products are similar to their Japanese counterparts. At present, the typical Taiwanese brands include Delta Electronics, Taian, and Powtran. LG is the only Korean brand in the Chinese market at the moment. The market share held by Taiwanese and Korean brands is about \*\*%.

Comparatively, European & American brands entered into Chinese market relatively late. However, with their advantages of advanced control technique, excellent quality and user-friendly interface, European & American brands gained a steady position in the Chinese market. Now, most of the well-known European & American converter brands have entered into Chinese market, with a market share around \*\*%. The representative brands include ABB, AB (Rockwell), Danfoss, EURO, Schneider, SIEMENS and VACON, among which, market shares occupied by ABB and SIEMENS are far more than other brands.

**Brand Pattern of Low & Medium-voltage Inverter in China, 2009**



Source: ResearchInChina

**4.1.2 Domestic Brands**

We divided Chinese brands of low & medium-voltage inverter into 3 groups with regard to enterprise development and word of mouth. See below:

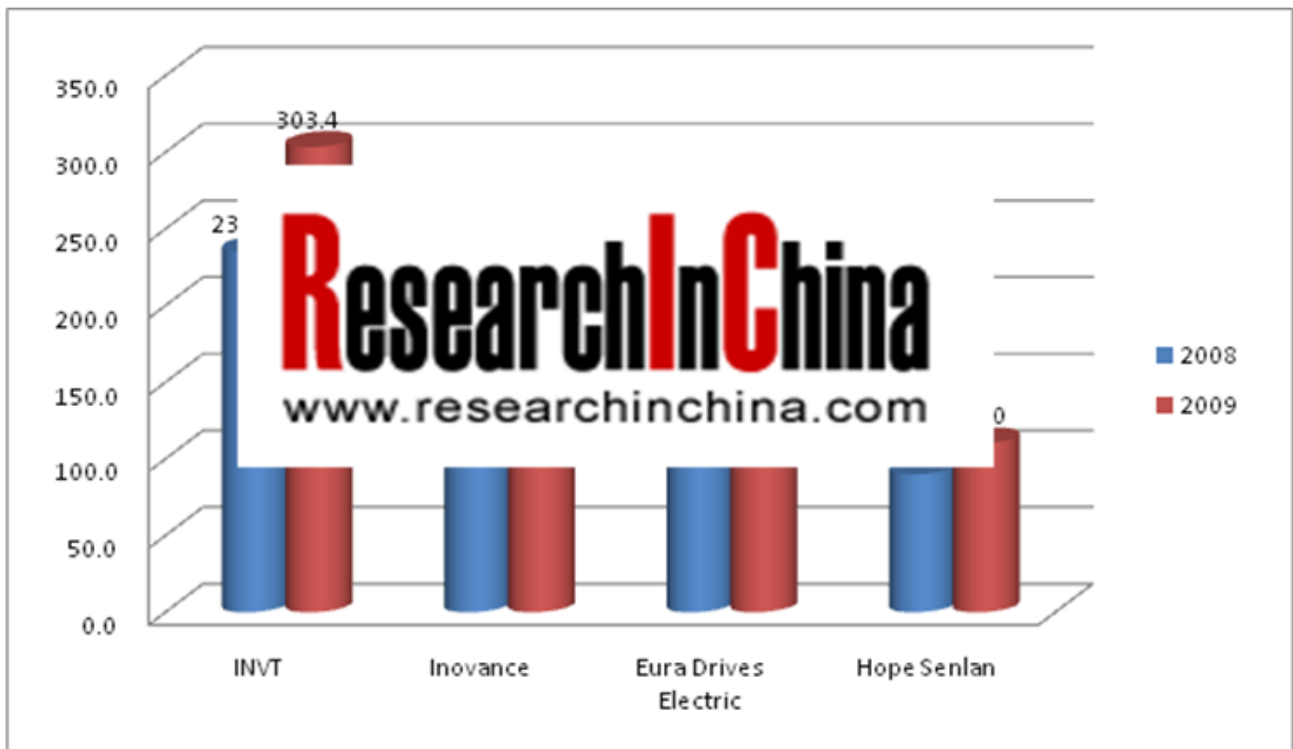
**Classification of Domestic Low & Medium-voltage Inverter Enterprises in China**

Class	Enterprise	Market Share 2009 (by Operating Income)
1	INVT, Eura Drives Electric Co., Ltd., Hope Senlan Science & Technology Corp., Ltd, Inovance	**%
2	Shenzhen Ambition Electronics Co., Ltd., Shandong Xin Fengguang Electronics Technology Co., Ltd., *****	**%
3	Shanghai STEP Electric Corporation, Shenzhen Alpha Inverter Co., Ltd. ****	**%

Source: ResearchInChina

In recent years, INVT is the leading enterprise in Chinese low & medium-voltage inverter market. In 2008, it stepped into high-voltage inverter market and successfully listed in 2010. In the same year, INVT set about R&D and sales of lift, explosion-proof and track traffic-use inverters. Inovance developed advantages in the lift inverter market. In 2010, with its cost-effective features, Inovance extended its services to integrated motor and servo system. Eura Drives Electric started product line expansion to inverter related products in 2010, such as servo system, PLC.

**Low & Medium-voltage Inverter Sales of 4 Enterprises in the First Echelon, 2008-2009 (RMB mln)**



Source: ResearchInChina

Compared to foreign brands, Chinese leading enterprises is under transformational period from providing single inverter products to comprehensive solutions. The market share and profitability of domestic brands are both expected to get improved in the future.

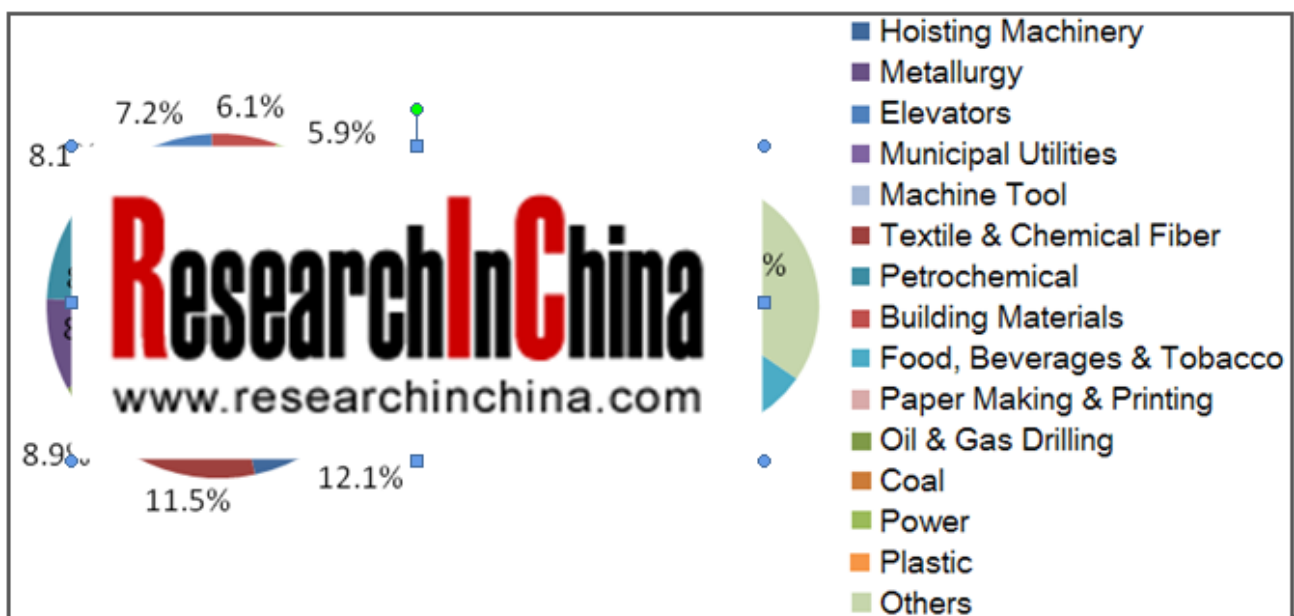
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## 5. Chinese Low & Medium-voltage Inverter Application Industries

### 5.1 Overview

As for market application, low & medium-voltage inverters nearly involve all the fields of national economy, especially the hoisting machinery, textile & chemical fiber, and oil & gas drilling and exploitation industries which contributed RMB\*\* billion, RMB\*\*billion and RMB1 billion respectively (\*\*% totally) to the sales revenue of low & medium-voltage inverters in 2008.

#### *Applications and Proportion of Low & Medium-voltage Inverter in China, 2008 (by Sales Revenue)*



Source: ResearchInChina

Low-voltage inverters are applied to many industries. Medium-voltage inverters are mainly used in coal, oil & gas drilling and metallurgical fields.

In the future, the growth rate of low-voltage inverters for elevators, rail transportation and household appliances will surpass the industry average level, becoming a focus.

## 5.2 Inverters for Hoisting Machinery

Inverters are mainly used in drive control of hoisting machinery. Drive control is implemented by dual-speed motors, inverters, DC speed converters, stator voltage converters / rotor series resistance and so on. Drive modes depend on crane structure. High-end hoisting machinery is generally driven by inverters. The cranes for metallurgical industry mainly use stator voltage converters. Simple cranes adopt dual-speed motor drive.

With the development of inverter technology, the performance of inverters has been improved. Variable frequency control machinery has advantages in features, speed range, accuracy, stability, it is easy to control and it saves energy, so it is applied to hoisting machinery industry widely. In 2005, Chinese market of inverters for hoisting machinery only valued RMB\*\* million; by 2009, the market value increased to RMB\*\* billion, with the compound annual growth rate of \*\*%.

Variable frequency control machinery performs very well in control, speed adjustment and efficiency, and it is easy to maintain. Coupled with the declining inverter prices, variable frequency control will become a preferred speed program for hoisting machinery. The market of inverters for hoisting machinery inverter is expanding. Because the grow rate of inverter prices and crane output slowed down, the market of inverters for hoisting machinery inverter was estimated to grow at \*\*% and value RMB\*\* billion in 2010.

During "Twelfth Five-Year" period, China will enhance the development of special smart equipment, and accelerate the promotion of energy-saving products, which will provide favorable conditions for rapid development of the market of inverters for hoisting machinery. From 2011 to 2015, Chinese market of inverters for hoisting machinery will grow at \*\*%.



**Market Size of Inverters for Hoisting Machinery in China, 2009-2015E (RMB bn)**



Source: ResearchInChina

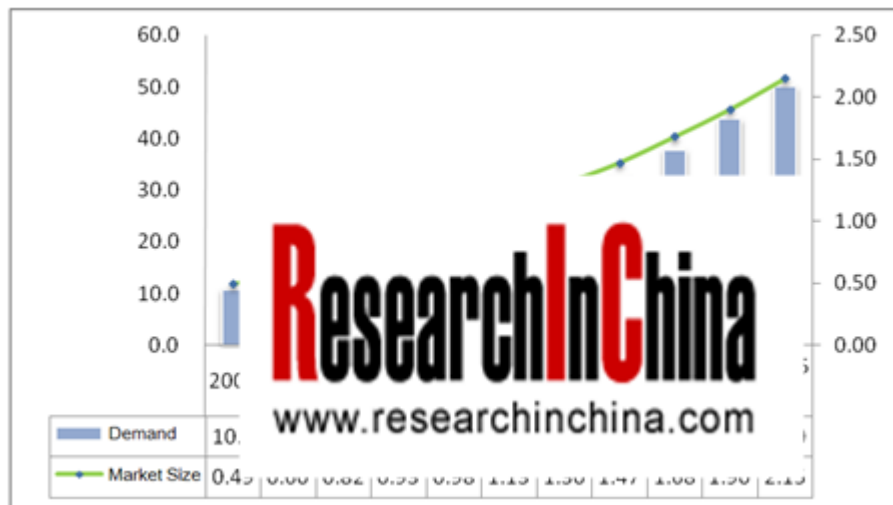
In the market of inverters for hoisting machinery, Siemens, ABB, Yaskawa and other traditional brands take dominating positions; other inverter brands can not fully meet the demand of hoisting machinery, due to the nature of cranes. Crane-use inverter must be featured with fast dynamic response, wide speed control range, reliable operation in the environments of current shock and mechanical vibration.

### 5.3 Inverters for Elevator

As a kind of special equipment, elevators should run stably, safely and efficiently. Inverters are featured with precise speed control and energy saving, so they are widely used in elevators, except hydraulic elevators and some types of escalators.

Inverters are used in upgrading and door machine of elevators. The value and market size of door machine inverter is small with little technical content (in 2008, China elevator special inverter market valued RMB\*\* million, while the door inverter market valued RMB\*\* million), so elevator inverters mainly refer to elevator special inverters.

**Demand and Market Size of Inverters for Elevator in China, 2005-2015E (10,000 sets; RMB bn)**



Source: Prospectus of Shanghai STEP Electric Corporation; ResearchInChina

Compared with DC system, the combination of inverters and synchronous / asynchronous motors is featured with high reliability. Due to easy maintenance and high efficiency, inverters will be applied to elevators for a very long time. In the next 5 years, the elevator special inverter market will grow at the annual rate of \*\*% -\*\*%.

In Chinese elevator inverter market, foreign companies take leading positions, including Yaskawa and Fujitsu of Japan, SIEI of Italy, Emerson CT and so on. In recent years, Chinese enterprises have improved their independent R & D capability, and mastered the closed-loop vector control technology, for example, Shanghai STEP Electric Corporation, Suzhou MCTC and Shenzhen Inovance Technology Co., Ltd. have owned core elevator inverter technology.

**5.4 Inverters for Machine Tool**

The market scale of inverters for machine tool amounted to RMB\*\* million in 2008. In particular, inverters are widely applied in lathe products thanks to the most advanced automation level of lathe made in China.

Presently, most lathe products made in China are low-end products with very low control level. And the utilization of PLC and inverter is not high. Moreover, the application proportion of speed control device approximates around one fourth in the total amount of machine tools.

In recent years, the number of machine tools (referring to cutting machine tools) has soared to \*\* in 2010 from 177,000 in 2000, with the average annual growth rate surpassing \*\*%. It can be estimated that the average annual growth rate of machine tools made in China will be around \*\*% amounting to \*\*million units per year up to 2015.

Provided that 2 sets of inverters are required for one machine tool which is priced at RMB2, 000 and that the utilization of inverter is \*\*%, China's market scale of inverters for machine tool will approximate RMB\*\* million. During 2011-2015, supposing the inverter is priced at RMB1, 800/set and that the utilization reaches \*\*%, the average annual market scale of inverters for machine tool will at least realize RMB\*\* billion.

**Market Size of Inverters for Machine Tool in China, 2009-2015E**

Year	Output of Machine Tool (1,000 units)	Market Scale of Inverter for Machine Tool (RMB bn)
2009	580.3	**
2010	**	**
2011-2015 (yearly)	**	**

Source: ResearchInChina

In terms of brand utilization, YASKAWA, Fuji, Mitsubishi and DELTA are dominating the market. Although some domestic inverters are applied by machine tool manufacturers, the inverters made by foreign enterprises, such as Fuji, Mitsubishi, Siemens and DELTA, still stand in high ground in fields acquiring demanding functions of inverters.

## 5.5 Inverters for Rail Transit

In Recent years, China has seen a rapid development in urban rail transit industry. By the end of 2009, the total operation mileage of urban rail transit covered 1,038.7 km, coming to the world's second place after the US. In early 2010, immediate construction projects in 25 cities involving 87 rail transit lines passed the approval from the Chinese Government, with the total mileage spreading over 2,529.6 km and the investment totaling RMB1 trillion approximately. In the upcoming 20 years, the rail transit construction of China will be undertaken in full swing. By 2015, the operation mileage of China's urban rail transit is expected to realize 3,200 km, and the figure will soar to 6,100 km by 2020.

The huge development of China's urban rail transit construction brings opportunities to currently active automation market. The investment in automation system and product in urban rail transit industry accounts for 15% approximately. The inverter, one of the urban rail transit automation products, has wide application. In particular, energy-saving inverters applied in rail transit industry are doomed to become the mainstream in the market.

In 2009, inverters (including traction inverters) applied in China's urban rail transit industry amounted to \*\* units, with the value totaling RMB\*\* million. The major inverter brands include: ABB, Siemens, Danfoss, Schneider, etc.

In 2010-2015, China is scheduled to build 1,800-km rail transit lines. provided that per kilometer bears 10-15 units of rail transit vehicles, some \*\*-\* units of rail transit vehicles will be increased in the coming 6 years. Coupled with annually renewed and retrofitted ones (measured by 800 vehicles per year), China is estimated to acquire \*\*-\* units of rail transit vehicles per year during 2010-2015. By investment proportion, motor vehicles make up one third of the rail transit vehicles. And each motor vehicle needs one traction inverter. Thus China needs \*\*-\* units of traction inverters per year in the upcoming 6 years. In addition, the demand volume of inverters applied in sectors like air-conditioning and elevator is likely to hit \*\*-\* per year in 6 years, equivalent 3-fold demand volume of traction inverters.

**Market Size of Inverters for Rail Transit in China, 2009-2015E**

Year	Traction Inverter	Other Inverters	Accumulative Total
2009	**	**	**
2010-2015(Yearly)	**	**	**

Source: ResearchInChina

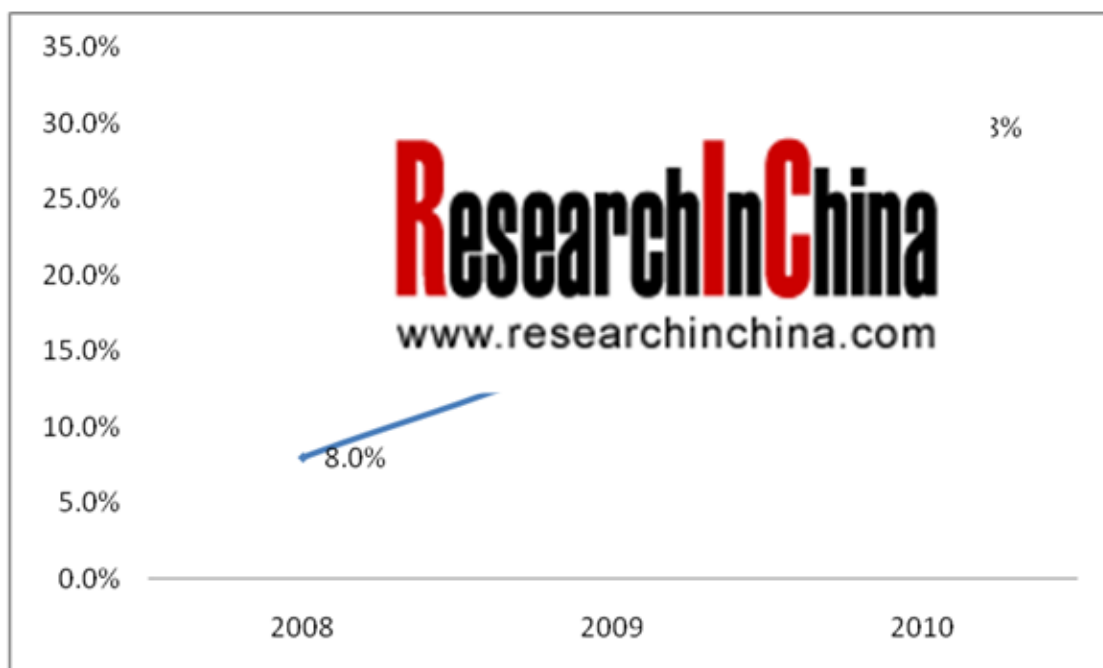
**5.6 Inverters for Home Appliances**

**5.6.1 Inverter Air Conditioner**

1. Market Profile

In recent years, inverter air conditioners have seen skyrocketing development in the air condition market of China. In 2009, the domestic market occupancy of inverter air conditioner in retail market soared to \*\*%, and the proportion rose to \*\*% in 2010. This may contributed largely to the implementation of a series of policies on benefit the people such as home appliances going to the countryside and energy conservation subsidiary. Notably, China lowered down the subsidiary standard targeting energy-saving air conditioner with high efficiency, making way for the development of inverter air conditioner industry.

**Proportion of Inverter Air Conditioner in Chinese Retail Market, 2008-2010**



Source: China Market Monitor; ResearchInChina

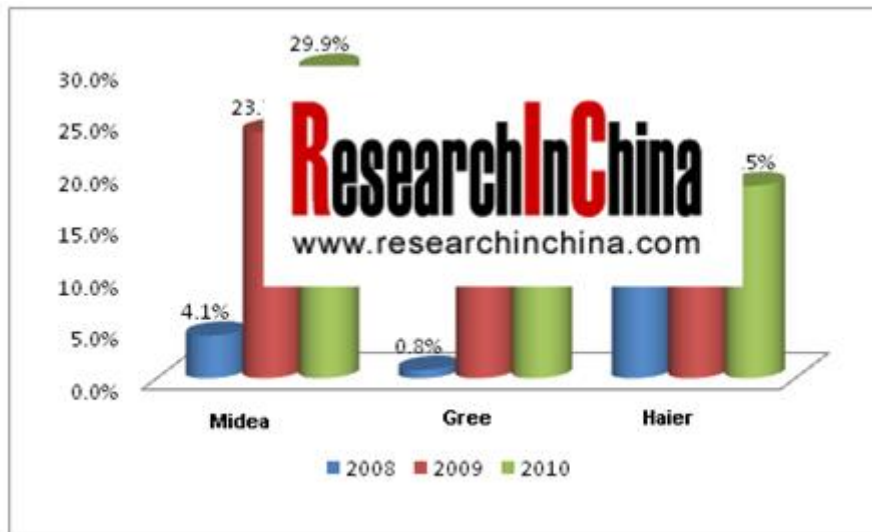
In 2011, domestic air conditioner manufacturers will attach great importance to inverter air conditioner in respond to the energy conservation and emission reduction policy. Thanks to a series of preferential policies and heavy promotion from involved manufacturers, inverter air conditioner will embrace upwardly mobility. And it is expected that the retail volume of inverter air conditioner will contribute \*\*% of the total.

In terms of popularity in the market, the wall-mounted air conditioner market takes precedence over the cabinet air conditioner market. In 2010, the proportion of retail volume of inverter air conditioner in domestic wall-mounted air conditioner market broke \*\*% in 2010, while that in cabinet air conditioner market was no more than \*\*%. Meanwhile, Freon-free inverters are emerging in inverter air conditioner market. In 2010, Haier took initiative to launch A+ Freon-free inverter air conditioner products, as a result, the market occupancy of Freon-free inverter got highly improved, with the proportion accounting for \*\*% in the domestic inverter air conditioner market.

## 2. Key Enterprises

Inverter air conditioners are armed with strong technical edge when it comes to energy conservation. The inverter air conditioner has five energy efficiency grades, and the first grade is the most economical. At present, three leading air conditioner providers including Midea, Gree and Haier are scaling up the inverter air conditioner products, with their market share of inverter air conditioner in 2010 making up \*\*%, \*\*% and \*\*%, respectively.

**Inverter Air Conditioner Market Share of Top 3 Air Conditioner Suppliers in China, 2008-2010**



Source: China Market Monitor; ResearchInChina

In the upcoming years, Midea will continue to strive for the development of household inverter air conditioner and DC inverter air conditioner compressor. As for Gree, it invested the project of Chongqing Refrigeration Industry Park in 2010 and the project will be finished and put into operation in 2011, by when, its annual capacity of compressor, motor and air conditioner is estimated to realize \*\* million, \*\* million and \*\* million units, respectively. As for Haier, it makes great efforts to expand capacity through extending its industry chain based on Freon-free inverter air conditioner, in an attempt to make Freon-free air conditioner become the new force for profit growth.

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