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The Present Situation and Suggestions on the Implementation of Energy Management in Construction Contract in Guangzhou

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Abstract: This paper summarizes the relevant policy documents of Guangzhou contract energy management, analyzes the status of energy-saving service companies and the implementation of contract energy projects in Guangzhou in recent years. According to the current situation of the implementation of contract energy management in Guangzhou, suggestions on technology, fund, policy and management have been proposed to speed up the implementation of EMC.

Introduction

The two world energy crises of the 1970s and the growing environmental pressures have contributed to the attention of energy conservation and demand management in many countries around the world. A market-based advanced new energy-saving mechanism——the EMC also will gradually rise in the market economy countries. Its essence is to reduce the energy costs to pay the full cost of energy-saving projects of energy-saving business. This energy-saving investment approach allows customers to use future energy savings for energy system upgrades to reduce current operating costs; or energy-saving services companies to promise energy-saving projects to save energy efficiency, or the overall energy costs for customers to provide energy-saving services. The energy management contract is signed between the enterprise (user) and the energy conservation service company that implements the EMC project, which helps to promote the implementation of the energy conservation project.

Situation of EMC in Guangzhou City

"Financial incentive fund management implementation details for EMC in Guangdong Province " for projects which conform to national EMC financial incentive fund requirement, reward annual actual energy saving 320Yuan / ton standard coal, in which, the central finance incentives 240 Yuan / ton of standard coal, the provincial finance incentives 80 Yuan / ton of standard coal [1].

According to “Guangzhou City Public Agency contract energy management approach”, city development and reform departments provides subsidies to the project which meet the requirements of the public agency EMC projects. In accordance with the duration of the contract generated energy savings with the standard coal, financial subsidies have been offered to public institutions in three tranches. Energy saving of more than 100 tons of standard coal, subsidies are 50,000 Yuan; energy saving more than 100 tons (including 100 tons) of standard coal but not more than 200 tons of standard coal, subsidies are 100,000 Yuan; energy saving more than 200

tons (including 200 tons) Standard coal, subsidies are 150,000 Yuan[2].

EMC projects of public institutions which apply for energy-saving subsidy funds, shall submit application form to the Municipal Development and Reform Commission after project acceptance ,The Municipal Development and Reform Commission should issue Subsidy fund plan based on the third party's assessment of the project energy saving.

Situation of Guangzhou Energy saving Service Company

Development level of Guangzhou Energy saving and environmental protection industry leads the rest of province. Among them, some areas have a technical advantage, such as Energy saving and efficiency overall program design, building energy-saving emission reduction, energy-saving production process optimization, energy efficient use, EMC and other energy-saving services, which bring considerable market benefits, Such as ZhiGuang company has signed the EMC project of more than 1.3 billion Yuan. At the same time, Guangzhou set up the first carbon emissions trading in southern China, which Set a good example in discharge and consumption by the carbon emissions, voluntary emission reductions, carbon sinks, energy-saving emission reduction technology and energy-saving transactions .Environmental services industry competitive advantage in Guangzhou is more obvious than other cities, especially in the urban sewage treatment, domestic waste disposal, environmental remediation and other environmental services.

At present, the National Development and Reform Commission, the Ministry of Finance approved five batches records of EMC companies, the total has reached 3210. Up to now, the Guangdong Provincial Economic and Information Technology Commission announced eight batches and a total of 220companies,of which 84 in Guangzhou.

Although the energy-saving environmental protection industry in Guangzhou has made remarkable achievements, the number of energy-saving service companies ranked the forefront of the country, but the overall level of energy-saving service companies has to be furtherly improved, of which there are still some deficiencies.

First, research and development capacity has to be furtherly improved. Energy-saving environmental protection technology innovation system is not perfect, the combination of production and research is not close enough, and the investment in technology development is insufficient. The core technology has not yet fully grasp, lack of some key equipment, and high dependence on foreign technology, such as wind power generation technology, equipment manufacturing mainly rely on Denmark, the Netherlands, Germany and other wind power companies, new energy automobile industry is hard to break through in the motor, battery, and other core technology, most of the core components has to rely on imports and so on.

Second, the level of enterprise quality is not complete, the overall is not high. The energy-saving and environmental protection enterprises are generally small scale, at this stage of Guangzhou City, more than 90% of energy-saving and environmental protection industry is small and medium enterprises, industrial concentration is low, the leading role has to be furtherly improved.

Third, the market norms to be strengthened. Intellectual property protection of Energy conservation technology and products is insufficient, market supervision is not in place, inter-firm competition among enterprises is outstanding, product quality standards, product testing and certification standards and other work need to be furtherly standardized.

Fourth, investment and financing channels to be improved. At present, the commercial banks have limited the support of the small and medium-sized enterprises in the energy-saving industry,

and the financing difficulties of the small and medium-sized enterprises are still prominent. The fiscal and financial policies of Guangzhou need to be furtherly improved.

Implementation Situation of EMC Project in Guangzhou

In recent years, the existing building energy-saving work has been promoted through a variety of ways in Guangzhou. First, through the pilot demonstration of hot summer and warm winter area to explore the existing building energy-saving transformation approach; Second, promoting the EMC model, the introduction of market mechanisms to facilitate commercial building energy - saving transformation; Third, the building envelope and the energy systems renovation project, requiring strict implementation of building energy efficiency standards, and the simultaneous implementation of energy-saving transformation. "Twelfth Five-Year" period the cumulative implementation of existing building energy-saving demonstration area is about 499 million square meters. In April 17, 2017,the “Guangzhou energy-saving carbon thirteenth five-year plan (2016 - 2020)" is issued, which proposed that, by the end of 2020 to complete the existing building energy-saving transformation of more than 7 million square meters[3].

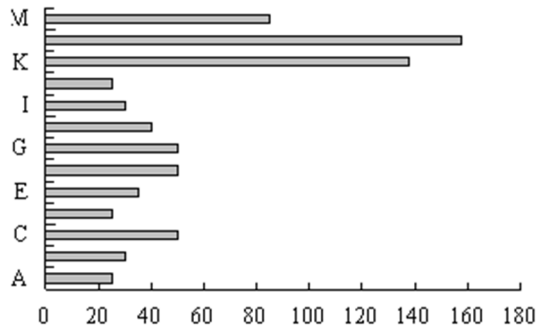
This paper investigates and analyzes 13energy management projects of different types of public buildings which have been implemented in Guangzhou in recent years. The following table shows the information of the project.

Table 1 information of energy management projects in Guangzhou

Project code	Transformation the content	Project investment (ten thousand)	Start and end time (years)	Energy saving rate
A	Energy-saving transformation of central air conditioning system	25	2006-2011	43.15%
B	Energy-saving transformation of central air conditioning system	30	2010-2019	20.00%
C	Energy-saving transformation of central air conditioning system	50	2011-2025	46.95%
D	Energy-saving transformation of central air conditioning system	25	2011-2025	27.53%
E	Energy-saving transformation of central air conditioning system	35	2011-2025	17.08%
F	Energy-saving transformation of central air conditioning system	50	2012-2022	18.82%
G	Energy-saving transformation of central air conditioning system	50	2012-2027	15.70%
H	Energy-saving transformation of central air conditioning system	40	2013-2019	20.00%
I	Energy-saving transformation of central air conditioning system	30	2013-2019	55.00%
J	Energy-saving transformation of central air conditioning system	25	2013-2019	70.00%
K	Energy-saving transformation of central air conditioning system	138	2013-2015	28.62%
L	Energy-saving transformation of central air conditioning system	158	2013-2018	23.50%
M	Energy-saving transformation of central air conditioning system	85	2013-2018	20.50%

As shown in Figure 1, EMC project is mainly central air conditioning system and lighting

system energy-saving transformation, the investment is small, the largest is 1.58 million, while the smallest is only0.25 million. Most of the transformation funds are less than 0.5 million. This shows that the Guangzhou City Public Building EMC is still in the early stages of the market. during which, the vast majority of energy services companies are relatively weak in their financial and technical strength, and are generally inclined to carry out individual or a few energy-saving technological transformation work. For all public buildings, this is the shortest payback period and the highest rate of return measures of all Potential measures. On the other hand, it will also result in a large number of potential energy-saving loopholes in the building, which is not conducive to the follow-up EMC business.



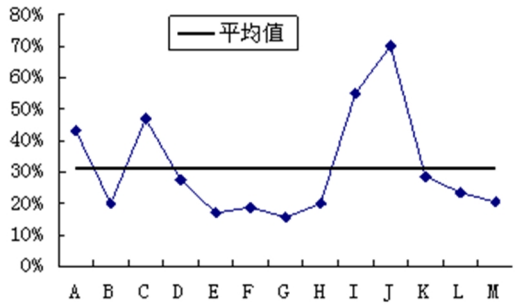


Figure 1 Project investment distribution Figure 2 Project energy efficiency distribution

Figure 2 shows the energy efficiency of 13 projects, compared with the amount of investment, the EMC project energy efficiency is relatively impressive, the lowest energy efficiency is more than 15%, the largest can reach more than 70%.It can be seen from the figure, the average energy efficiency of 13 projects can reach more than 31%, which shows that both public building energy efficiency is low, with greater energy saving potential, the implementation of energy-saving transformation can bring better energy savings. On the other hand, the energy efficiency of 13 projects is also different, the maximum energy efficiency and minimum energy efficiency difference of nearly 5 times, indicating that the same area of public buildings due to building type, system design, equipment selection and operation and management of different energy consumption ,the difference is also greater. After the implementation of energy-saving transformation, the energy savings rate is also different.

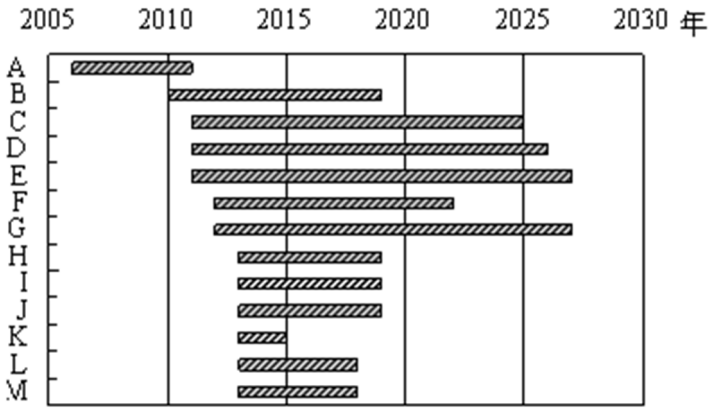


Figure 3 Duration chart of the EMC projects

Figure 3 shows the duration of the implementation of the project on energy management for public buildings, in which, the implementation period is different, the implementation periods between 3 to 15 years. The implementation period, energy efficiency, and investment are not

necessarily related. Objectively speaking, the longer the contract period, the higher the rate of return on energy-saving service, but the construction equipment also has a certain life, especially for LED lighting, which will bring lighting damage, resulting in the contract cannot continue to implement or need to further increase in the contract period to transform investment.

Suggestions on Promoting EMC projects in Guangzhou

For the single-based, and the project which is not strong comprehensive, our recommendations are:

At the technical level, to formulate “the existing public building energy-saving transformation of technical regulations" as soon as possible, according to the characteristics of Guangzhou and public building energy use, clear both public building energy-saving transformation diagnostic methods, transformation criteria, design principles and basic Measures, existing public building air conditioning, heating, ventilation system transformation requirements, design principles and basic technical measures. Which can provide technical guidance for the project to develop reasonable energy saving program.

At the funding level, as the energy-saving service company is the main body of the EMC project investment, it is suggested that the Government to formulate "Public building energy-saving special funds management approach for state organs and office buildings in Guangzhou", and increase the financial support. Grant financial support and incentives to the project before and after the implementation of the transformation, to a certain extent, improve the enthusiasm of energy-saving service companies. On the other hand, to cultivate a number of powerful energy service companies, it is recommended that the government encourage large state-owned companies with technical strength to form their own energy-saving service companies, which not only have strong technical strength, but also can solve the project investment problem.

For some public institutions have great potential for energy-saving, but the enthusiasm of energy-saving reform is not high, the proposals are:

Guangzhou should develop its own financial allocation method, with reference to the experience of Shenzhen, to allow public institutions to keep energy conservation benefit, after the cost of energy service company has been deducted. So as to improve the enthusiasm of public institutions to save energy.

At present, it is most difficult to promote the EMC project is project negotiation, because the public building owner does not know the technical level of energy-saving service company, so that it is difficult to choose the best energy-saving transformation program. What is more, some energy-saving service companies try to the achieve the project through other informal approaches, which lead to serious impact on the effectiveness of energy-saving transformation. In the energy conservation management on public institutions .we can learn from Shenzhen, when the public building’s owner apply for energy-saving indicators ,Administration Office of the people's Government of Guangzhou should organize open tender and choose the optimization plan to implement the project to ensure the energy efficiency improvement.

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