

The Intelligent Technology Application of Green Building in Our Country Based on the Green Label and LEED

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Abstract: In this paper, by collecting the related data of the intelligent technology application situation of existing green building projects. It makes comparative analysis of the application situation of intelligent technology which is used on green architecture in our country at present. Compared with other researches, this article does not just a single construction project in the application of intelligent technology is analyzed, but through the Angle of different evaluation criteria of green building to make a classified contrast about the application of intelligent technology in China. This can better show the application situation of the intelligent technology in green building. According to the comparison results, the analysis of the intelligent technology characteristics of China's green building has provide a meaningful reference for the screening of green building intelligent technology.

1 INTRODUCTION

The intelligent technology is a main technical points of green intelligent buildings. In green building technical guidance, through the intelligent technology to support system and product development, so as to improve the performance of the green building. It can effectively meet the user's functionality, comfort and safety of the intelligent system, and the use of intelligent technology can effectively save energy, reduce pollution, to bring economic benefits and environmental benefits for the society (Zheng, 2013). Modern buildings has been more and more used in intelligent technology, as well as to green building. Green building and common building are different. on the one hand, the application of intelligent technology in green building can provide a more efficient way of life for people; on the other hand, it reduces the use of more non-renewable energy for the environment. Therefore, the study of intelligent technology used in the green building has important significance.

The intelligent technology used in the green building is influenced by many factors, different conditions requires different intelligent technology, different national green building evaluation standard

requires different intelligent technology (Wang, 2014). The evaluation marks of our country is Green standard marks and the LEED level of green building, green building is proposed to achieve the different standard will lead to the different choice of intelligent technology of green building, therefore, In order to choose and provide a meaningful reference for decision-making of the green building intelligent technology, the study of the application of intelligent technology in green building under the different evaluation standard in China and to find out the rule which the use of intelligent technology has great significance (Wang, 2012).

2 THE CONTRAST OF DATA WHICH GREEN BUILDING INTELLIGENT TECHNOLOGY APPLICATION BASED ON THE DIFFERENCE EVALUATION CRITERIA

Due to the very many different kinds of evaluation standard, the contrastive analysis is base on China green marks and the LEED green building

evaluation which is common used in our country. China green building marks evaluation is in accordance with China's green building evaluation standard of green building logo, referred to as "green label". According to the green building evaluation standard and department of standards and regulations of the state, China ministry of housing and urban-rural development authority determine whether or not the design, construction or engineering projects completed green evaluation in line with the green building standards. And LEED evaluation standard is the full name of "Leadership in Energy and Environmental Design", means "lead in Energy and

Environmental Design" which put forward by the United States green building council in 2000. To set up a certification of green building rating system to assess whether building performance conforms to sustainability. LEED is considered to be the most perfect, the most influential evaluation criteria among all kinds of building environmental assessment. At present, the green building assessment and building sustainability assessment criteria of LEED has become the standard model to build and sustainability assessment of their green building all over the world.

2.1 Ground Source Heat Pump and Water Source Heat Pump

Table 1: The source heat pump and water source heat pump usage of each evaluation standard.

	One-star Green standard	Two-star Green standard	Three-star Green standard	Platinum level LEED	Gold level LEED	silver grade LEED
Green building case number	99	116	124	17	44	12
The proportion of technology application (%)	6.06%	28.45%	50.00%	47.06%	35.71%	16.67%

2.2 Energy Saving Elevator

Table 2: The energy-saving elevator usage of each evaluation standard.

	One-star Green standard	Two-star Green standard	Three-star Green standard	Platinum level LEED	Gold level LEED	silver grade LEED
The proportion of technology application (%)	20.20%	9.48%	12.10%	17.65%	6.82%	25.00%

2.3 Exhaust Air Heat Recovery

Table 3: The exhaust air heat recovery usage of each evaluation standard.

	One-star Green standard	Two-star Green standard	Three-star Green standard	Platinum level LEED	Gold level LEED	silver grade LEED
The proportion of technology application (%)	9.09%	17.24%	39.52%	29.41%	22.73%	58.33%

2.4 Lighting Intelligent Control

Table 4: The lighting intelligent control usage of each evaluation standard.

	One-star Green standard	Two-star Green standard	Three-star Green standard	Platinum level LEED	Gold level LEED	silver grade LEED
The proportion of technology application (%)	45.45%	30.02%	34.68%	47.06%	34.09%	50.00%

2.5 Transition Season Fresh Air

Table 5: The transition season fresh air usage of each evaluation standard.

	One-star Green standard	Two-star Green standard	Three-star Green standard	Platinum level LEED	Gold level LEED	silver grade LEED
The proportion of technology application (%)	12.12%	0.86%	5.65%	11.76%	4.55%	0.00%

2.6 Solar Hot Water

Table 6: The solar hot water usage of each evaluation standard.

	One-star Green standard	Two-star Green standard	Three-star Green standard	Platinum level LEED	Gold level LEED	silver grade LEED
The proportion of technology application (%)	14.14%	27.59%	41.94%	23.53%	18.18%	8.33%

2.7 Solar Power

Table 7: Solar power usage of each evaluation standard.

	One-star Green standard	Two-star Green standard	Three-star Green standard	Platinum level LEED	Gold level LEED	silver grade LEED
The proportion of technology application (%)	7.07%	18.97%	20.16%	35.29%	9.09%	33.33%

2.8 Part Load Rate Air-Conditioning Energy Efficiency Design

Table 8: The part load rate air-conditioning energy efficiency design of evaluation standard usage.

	One-star Green standard	Two-star Green standard	Three-star Green standard	Platinum level LEED	Gold level LEED	silver grade LEED
The proportion of technology application (%)	3.03%	3.45%	1.61%	0.00%	2.27%	0.00%

2.9 Water System Frequency Converter

Table 9: The water system frequency converter of evaluation standard usage.

	One-star Green standard	Two-star Green standard	Three-star Green standard	Platinum level LEED	Gold level LEED	silver grade LEED
The proportion of technology application (%)	1.01%	3.45%	7.26%	5.88%	11.36%	33.33%

2.10 Cold/Heat Storage Technology

Table 10: The cold/heat storage technology of evaluation standard usage.

	One-star Green standard	Two-star Green standard	Three-star Green standard	Platinum level LEED	Gold level LEED	silver grade LEED
The proportion of technology application (%)	0.00%	2.59%	6.45%	5.88%	11.36%	0.00%

2.11 Green Sprinkler Irrigation and Afforestation of Micro-Irrigation

Table 11: The green sprinkler irrigation and afforestation of micro-irrigation of each evaluation standard usage.

	One-star Green standard	Two-star Green standard	Three-star Green standard	Platinum level LEED	Gold level LEED	silver grade LEED
The proportion of technology application (%)	62.62%	62.07%	62.10%	11.76%	6.82%	16.67%

2.12 Ventilation and Indoor Air Quality Monitoring

Table 12: The ventilation and indoor air quality monitoring of evaluation standard usage.

	One-star Green standard	Two-star Green standard	Three-star Green standard	Platinum level LEED	Gold level LEED	silver grade LEED
The proportion of technology application (%)	13.13%	25.00%	36.29%	35.29%	25.00%	50.00%

2.13 Adjustable Sunshade

Table 13: The adjustable shading usage of each evaluation standard.

	One-star Green standard	Two-star Green standard	Three-star Green standard	Platinum level LEED	Gold level LEED	silver grade LEED
The proportion of technology application (%)	4.04%	25.86%	41.94%	11.76%	6.82%	8.33%

2.14 At the end of Controllable

Table 14: The end controlled usage of each evaluation standard.

	One-star Green standard	Two-star Green standard	Three-star Green standard	Platinum level LEED	Gold level LEED	silver grade LEED
The proportion of technology application (%)	14.14%	6.90%	10.48%	5.88%	2.27%	0.00%

2.15 HVAC and Lighting Automatic Monitoring System

Table 15: HVAC and lighting automatic monitoring system of the evaluation standard usage.

	One-star Green standard	Two-star Green standard	Three-star Green standard	Platinum level LEED	Gold level LEED	silver grade LEED
The proportion of technology application (%)	3.03%	4.31%	12.10%	0.00%	4.55%	0.00%

3 BASED ON DIFFERENCE EVALUATION STANDARD OF GREEN BUILDING INTELLIGENT TECHNOLOGY APPLICATION OF CONTRAST EXPLANATION

In the process of this topic research, found in the process of data collection that built by the green building presently has passed the certification of the various evaluation standards and evaluation standard of China in our country, China is the most popular official evaluation standard in the green building evaluation, moreover we have Shenzhen green building assessment identification in our country. Abroad for green buildings, of course, also have the corresponding evaluation standards, such as the United States of CASBEE LEED, BREEAM in Britain, Japan, Germany DNGB etc. Due to the higher the evaluation of the green building more likely to bring greater profit space for developers, better brand effect, so the green building will be set in the initial stage of design to achieve what level, therefore, through comparing inductive evaluation level can provide design reference for the designer's help to better meet the expected requirements on the application of the green building in smart technology. The contrast to choose the more widely used in our country marks and the LEED green building evaluation, this is only compared the building of having passed certification, moreover LEED levels with platinum, gold, silver and authentication level, but our country is judged to be less LEED certification of green building, so it is easier to appear larger error.

4 BASED ON DIFFERENCE EVALUATION STANDARD OF GREEN BUILDING INTELLIGENT TECHNOLOGY APPLICATION CONTRAST

4.1 China's Green Building Assessment Identification

According to the Green star class in the contrast,

energy-saving elevator, lighting intelligent control, fresh air using transition season, greening of micro-irrigation, sprinkler irrigation, landscaping and several intelligent control technology at the end of the utilization rate is the highest in the three star, and ground source heat pump, water source heat pump, exhaust air heat recovery, solar hot water, solar power, water system frequency converter, cold/heat storage technology, storage of ventilation and indoor air quality monitoring, and adjustable external blinds HVAC and several technical utilization minimum illumination automatic monitoring system, the middle was ranked in other technologies. The use of cold/heat storage technology only is zero.

According to the Green two-star in the contrast, the utility ratio of the highest in the three star smart technology is part of the energy saving design of air conditioning load rate, and energy-saving elevator, fresh air using transition season, greening of micro-irrigation, sprinkler irrigation, landscaping utilization rate lowest end several intelligent control technology, other techniques in the place.

According to the Green standard three-star in the contrast, utility ratio of the highest in the three star is a ground source heat pump, water source heat pump, exhaust air heat recovery, solar hot water, solar power, water system, frequency converter, cold/heat storage technology, storage of ventilation and indoor air quality monitoring, and adjustable external blinds and several intelligent automatic monitoring system of HVAC and lighting technology, and part of the lowest rates of energy efficiency design of air conditioning usage rate, other technical utilization rate in the place.

4.2 The LEED Logo

According to the LEED platinum level in the contrast, ground source heat pump, water source heat pump, fresh air using transition season, solar hot water, solar power, adjustable shade, at the end of several intelligent control technology in the highest utilization rate in three levels, use the minimum load rate is part of the air conditioning energy saving design, water system, frequency converter and several intelligent automatic monitoring system of HVAC and lighting technology utilization rate lowest, automatic monitoring of HVAC and lighting systems and some of the energy saving design of air conditioning load rate of

utilization rate is zero.

LEED gold in terms of the comparison results, air-conditioning energy efficiency design part load rate, cold/heat storage technology and lighting a few intelligent automatic monitoring system technology utilization rate is highest, Although part of the air conditioning load rate but also only 2.27% energy saving design of top utilization rate. And energy-saving elevator, exhaust air heat recovery, solar power, green sprinkler irrigation, afforestation of micro-irrigation, ventilation and indoor air quality monitoring and adjustable external blinds several intelligent techniques in low utilization rate in three levels, the middle was ranked in other technologies.

According to the LEED silver grade in the contrast, the utility ratio of the highest intelligence technology is energy-saving elevator, exhaust air heat recovery, lighting intelligent control, frequency converter water system, greening sprinkler irrigation, afforestation of micro-irrigation, ventilation and indoor air quality monitoring several technologies, and ground source heat pump, water source heat pump, fresh air using transition season, solar hot water, air-conditioning energy efficiency design part load rate, cold/heat storage technology, storage end control and automatic monitoring system of HVAC and lighting a few technology utilization, the lowest among them, the transition season fresh air using techniques such as low utilization rate to zero. Other technical utilization rate in the place.

5 CONCLUSION

According to the above for our country's green building intelligent technology in different evaluation criteria used ,the usage of contrast analysis result shows that different levels of intelligence technology evaluation logo also need identical intelligent technology. In the green building design stage, the reasonable choice for objective evaluation grades of intelligent technology can achieve the anticipated goal and to bring good effect. Of course, evaluation standard and evaluation of projects in different countries also vary. From the point of comparison result,the highest utilization rate of a lot of intelligent technologies in one green mark, but at level is the highest utilization rate in LEED silver or gold, that is to say, the intelligent technology level of utilization rate of the two

standards is not high and low. So, once the green building to achieve the higher level, it should choose the intelligent technology more and more reasonable, so that every standard has intelligent technology points and achieve higher scores. Therefore, when choosing reasonable intelligent technology of green building in design, to make a choice according to the green building project goals as well as the influence of different factors.

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