The application of energy saving technology in high rise building at Lanzhou

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Most of designers focus on pursuit of face and the use of functional form, but ignored environmental protection and energy saving, lead to high energy consumption, wasting a lot of resources and properties, and low efficiency. Energy-saving technology can effectively prevent these defects in high-rise buildings, protect the environment, and reduce waste and pollution in build high-rise buildings. It is not only benefiting the city's construction and rational use of resources but also energy as a new technology for high-rise buildings.

KEYWORDS | *energy, building, saving, lighting*

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INTRODUCTION

Due to the architectural design of the unreasonable, design of building components, old buildings failed to receive adequate lighting from sunshine, and this cause unnecessary lighting that cause waste of energy for a mass consumption.

The main objective for this study is to renovate unreasonable architectural design of an old building as to reduce energy waste at LanZhou of China.

Season	Mon	Date	Duration		Lighting Time (minutes)				Power utilization		Cost estimate			
			Start (AM)	End (PM)	AM	PM	Total		Rate per floor (kw/h)	Power utilised (kw)	Unit price (rmb/kw)	Daily cost (rmb)	Monthly cost (rmb)	Seasonly cost (rmb)
							Minutes	Hour						
Winter		2	7.57	6.05	117	115	232	3.87	10.135	39.189	0.833	32.64		

Figure below shows the project methodology flow chart. This methodology describes the rough procedure on how the project was undertaken.

MATERIALS & METHODS

Table 1 energy consumption record

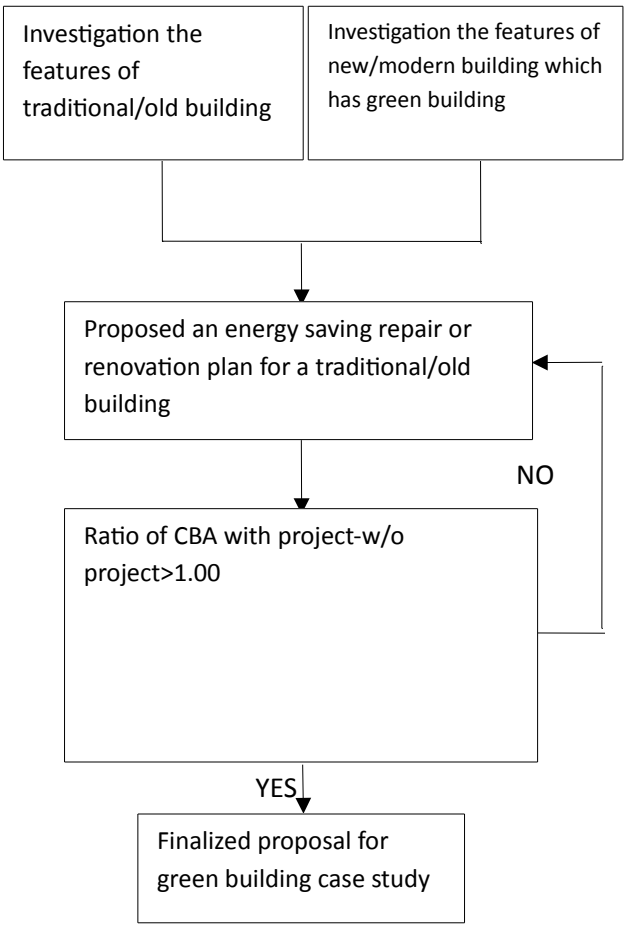


Figure 1 Project Approach

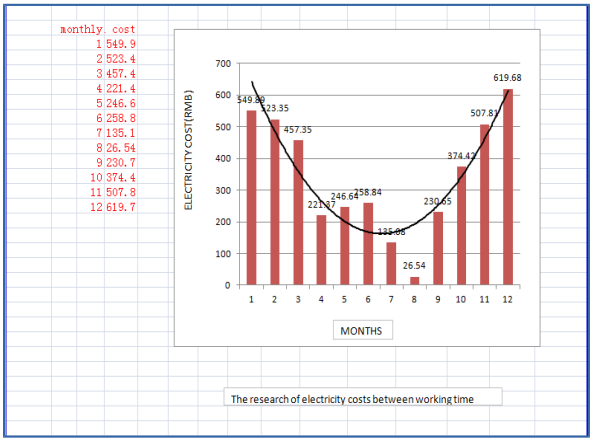
RESULTS & DISCUSSION

This study investigated two different places, different architectural styles as a comparison of energy consumption. The traditional building is located in LanZhou of China that was built in the sixties. Another building is in Kuantan Town of Malaysia as a new building features which still on the process of construction. The new building is used as a reference for proposing traditional building renovation as to reduce energy waste.

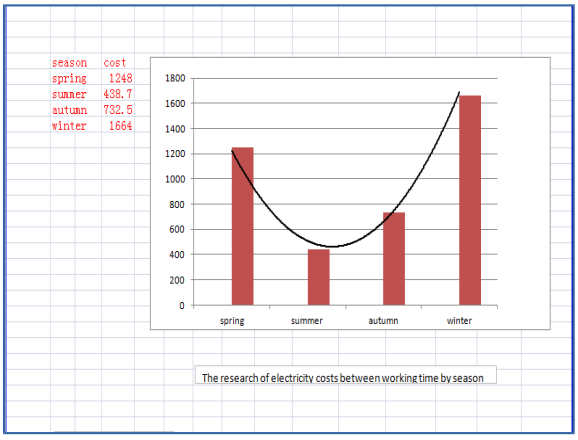
Table 2 Summary of lighting power usage

lights / Items	Numbers of light	Kilowatt of each type light(kw/h)	Total kilowatt of lights for building P (kw/h)
Type1	53	0.100	5.300
Type2	36	0.060	2.160
Type3	13	0.200	2.600
Type4	5	0.015	0.075
Total			10.135

Figures below show the companion electricity costs between working time by month and season in 2012.



(a) Monthly

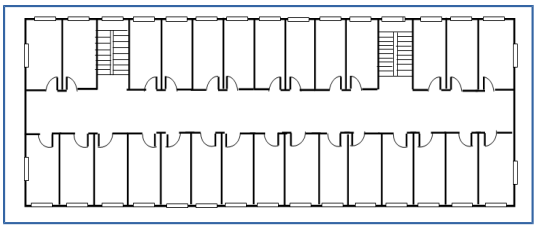


(b) Seasonally

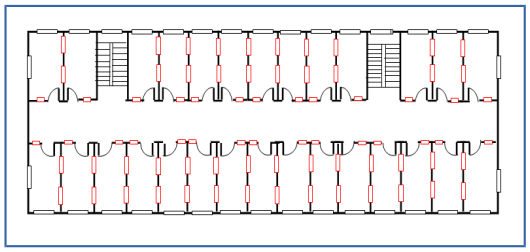
Figure 2 Existing energy consumption for lighting

Renovation of the traditional/old building

The image shows the location and quantity of windows on the traditional building. Figure 3(a) shows the side view a traditional building and figure 3(b) shows the side view of the proposed renovation work (in color). This traditional building window was designed only in the periphery of the building, and the quantity of windows was also limited and this cause in a serious shortage of indoor lighting, especially the corridor channel was very dark even during the day time. The direct way of repairing and renovating is to increase the number of windows as to improve lighting as show in figure 3(b). Materials used were quartz glass window.



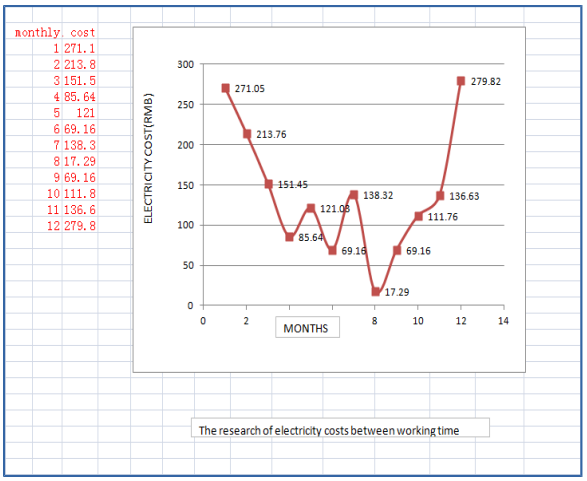
(a) Traditional building



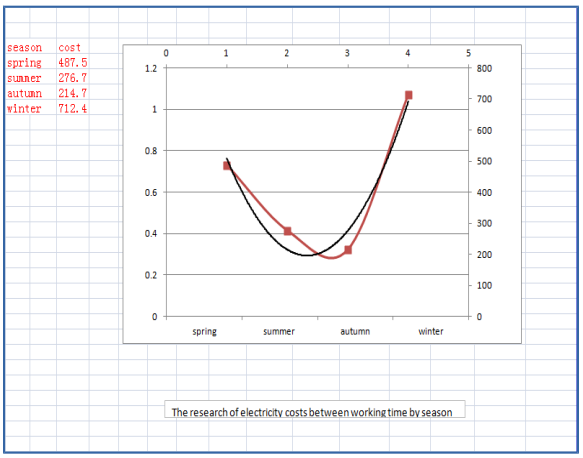
(b) New building (renovated)

Figure 3 Proposed renovation works

The figure below shows electricity costs on monthly and seasonally basis after renovation works.



(a) Monthly

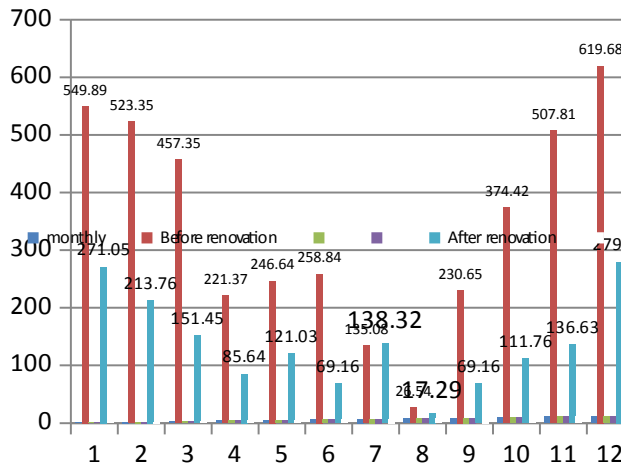


(b) Seasonally

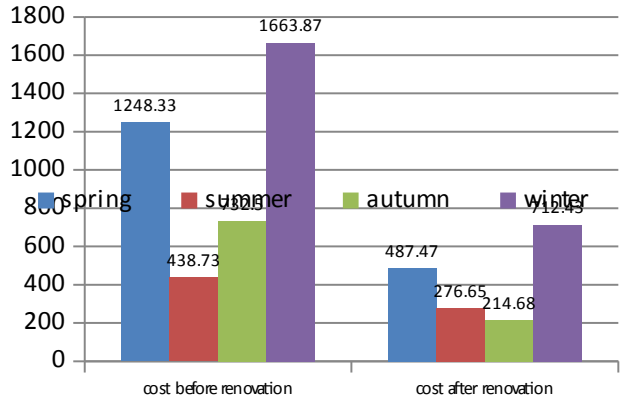
Figure 4 energy consumption for lighting expected

Cost Benefit Analysis

Figures below show comparison charts of the benefits from renovated building. According to estimates from the second year, the cost of energy expenditure will reduce and annually save significant amount of energy costs and can be use to reimbursed the renovation.



(a) Projected saving



(b) Cost before vs after

Figure 5 saving before and after renovation

CONCLUSIONS

Study shows that new energy saving technology is not only have adequate light transmission but also prevent ultraviolet, and more importantly save energy for lighting.

REFERENCES

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