2	300+300	1432.9	41.2%
3	400+200	1480.7	39.3%
4	500+100	1355	44.4%

C. *Life Cycle Analysis*

In this part of the study, life cycle analysis is used to compare different design alternatives and provides recommendation from financial point of view. Maintenance&repair cost is calculated every 5 years. Table 12 shows the life cycle cost of each design alternative. Case 4 has the lowest life cycle cost compared to other three cases.

TABLE XII. LIFE CYCLE COST

Content	Case1	Case2	Case3	Case4
Investment Cost	8848.4	8848.4	9168.4	8728.4
Total life cycle cost	74382.3	69150.1	71139.3	66216.6

[a] Unit: 1,000NTD

Table 13 shows the payback period of each design case. Four cases have average 4.3 years based on the energy cost which can be saved.

TABLE XIII. PAYBACK PERIOD

Year	Case1	Case2	Case3	Case4
1	2226.8	2387.1	2275.8	2574.6
2	4453.8	4774.2	4551.7	5149.3
3	6680.5	7161.2	6827.4	7723.9
4	**8907.3**	**9548.2**	9103.1	**10298.4**
5	11134.0	11935.1	**11378.8**	12872.9
Initial Cost	8848.4	8848.4	9168.4	8728.4
Payback period	4	4	5	4

[a] Unit: 1,000NTD

To conclude the life cycle analysis, case 4 performs the best in terms of life cycle cost analysis. The reason for this is because case 4 contains 500RT chiller which has higher COP. However, it is risky to implement and reply only on one primary chiller in the air supply of hospital. Once the primary chiller is under maintenance or malfunctioned, the whole air supply in hospital will be jeopardized. Case1 and case3 both have the same capacity of chillers, once any one of them is under maintenance or malfunctioned, there are the other chillers which can provide sufficient air to hospital. Therefore, the better option will be using case1.

V. CONCLUSION

This study integrates energy simulation in evaluating hospital buildings. Using eQUEST in simulating complex hospital buildings is reliable with 7% margin of error. Study results also conclude that HVAC energy-saving design proposed by Taiwan's green building regulation can largely lower the electricity consumption of HVAC system, saving nearly 40% of energy consumption. The life cycle year of proposed design is four years. For future study, automatic data input in eQUEST can be developed to increase project evaluation efficiency.

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