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## 9.0 Overall Cost Analysis / Summary

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MCCCH's original absorption central chilling plant had a yearly operating cost of \$202,297, a first cost of \$409,220, and a 30-year L.C.C. of \$2,168,988.

By redesigning the building's central chilling plant to be driven by electricity rather than natural gas, these costs dropped to a yearly operating cost of \$167,218, a first cost of \$358,240, and a 30-year L.C.C. of \$1,805,054.

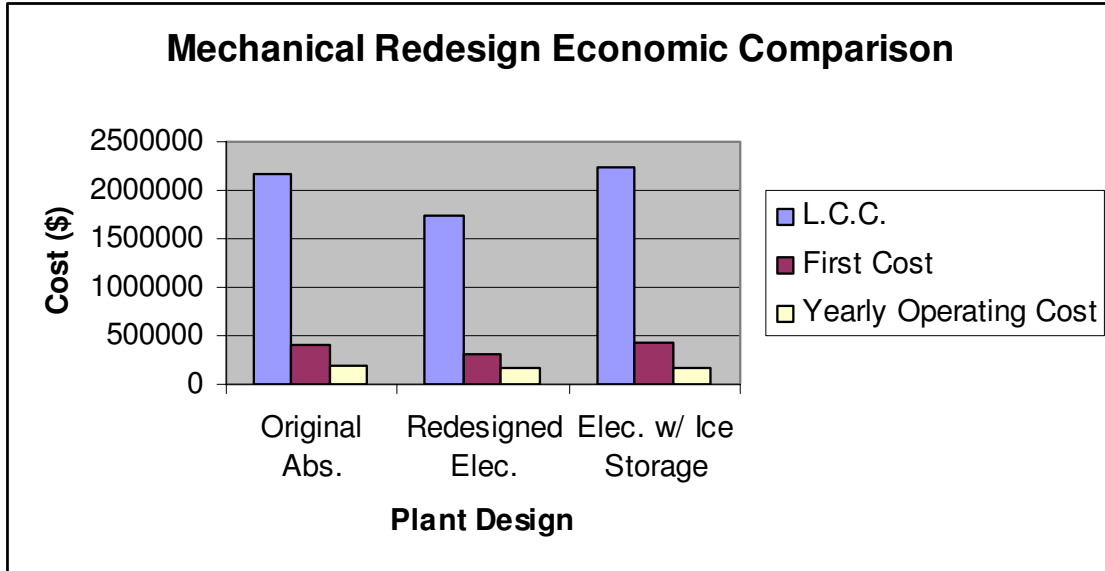
The costs dropped even further when MCCCH's central chilling plant was optimized between chiller manufacturers. The results were a yearly operating cost of \$163,998, a first cost of \$318,240, and a 30-year L.C.C. of \$1,738,472 (w/o the electricity/fuel escalation factor) or \$2,143,047 (w the electricity/fuel escalation factor).

Thus, for this first mechanical redesign, the total savings in yearly operating costs from the original absorption central chilling plant were \$38,299. The difference/savings in first cost was \$90,980 and the L.C.C. savings were \$430,516.

By going a little further and adding a mechanical ice storage plant to the redesign, the yearly operating costs were lowered to \$160,836. The first costs were \$425,922 and the 30-year L.C.C. was \$2,249,006 (w the electricity/fuel escalation factor).

The ice storage redesign saved \$3,162 more per year in operating costs. However, its first cost was \$107,682 higher than the redesigned electric plant. This yielded a payback period of a little over 28 years and a L.C.C. increase of \$105,959.

The table below displays a comparison of the above mechanical redesigns' economic results.



**Table 20: Final Economic Analysis of Mechanical Redesigns**

Additionally, the first costs incurred by changing the building’s electrical system to include an electric (rather than natural gas) central chilling plant were \$10,618. In effect, this would make the first cost of the electric plant redesign equal to \$328,858 but, this still isn’t more than the original plant’s first cost of \$409,220. Therefore, the life-cycle cost of the new electric plant would still be lower than the original absorption plant and would still be the optimum.

Other savings throughout this project were realized by changing the lighting system in the building’s ballroom from incandescent lamps to compact fluorescent lamps. By doing this, an average first cost savings (between the lamp costs and building cooling costs) of \$6,122 was had.

Lastly, even more savings were experienced by altering the building’s construction schedule. A Short Interval Production Schedule (S.I.P.S.) was put together for the MCCCH hotel’s construction and by shortening the length of its construction time, \$193,548 could be saved.