CASE STUDY: ENERGY EFFICIENCY FOR A RETROFIT OF A SMALL INDUSTRIAL PREMISE

About the project

Tonasco is a mechatronics contract manufacturer focusing on single piece and low volume series production of high-tech mechatronic components, modules and complete machine.

In May 2013, Tonasco commissioned IEN Consultants to carry out a Energy Efficiency consultancy for the retrofit of their soon to be new office at Bukit Jelutong, Shah Alam.

The brief was simple. Tonasco was moving their current operations (Office & Production) to a new premise which would be **30% larger (by Gross Floor Area)** but would like to **keep the energy bills the same or lower than the current energy bill**

Key Energy Efficiency Strategies

To meet the client's requirement, IEN proposed the following Energy Efficiency strategies:

1. Electric lighting design would be optimized to ensure that only working zones requiring higher illumination would be brighter lit. Circulation spaces would not need to be as bright.
2. Existing dark tint of the external glazing should be removed to allow better daylight penetration and improved view-out.
3. Air conditioning system would be optimized both in terms of capacity selection as well as overall efficiency. VRF (Variable Refrigerant Flow) systems was recommended and was shown to achieve a payback on the additional capital investment within 5years. This payback period was achieved by ensuring there was little "over-sizing" of AC capacity and equipment with high COP (average COP 3.8) would be selected

The Result

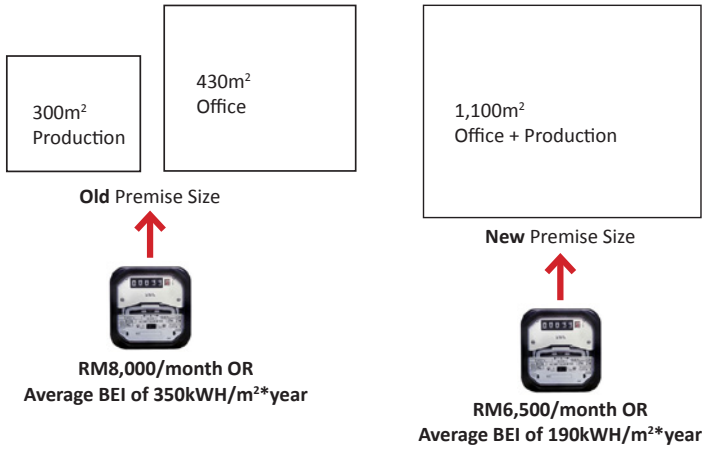
After 5months of operation, the following are the recorded energy consumption and electricity cost (Source: TNB bills)

Month	Energy Consumption [kWH]	Maximum Demand [kVARh]	Consumption Charge (@RM0.377/kWH)	Total Electricy Bill (including RE contribution) [RM]
June 2013	14,832	8,131	5,591.66	5,647.58
July 2013	14,182	8,650	5,346.61	5,400.08
Aug 2013	14,171	8,671	5,342.47	5,395.47
Sept 2013	16,266	9,834	6,132.28	6,193.60
Oct 2013	17,639	11,072	6,649.90	6,716.40

Conclusion

With the few simple but effective energy efficiency strategies implemented, Tonasco was able to reduce their energy consumption and electricity bill by 40% (approximately RM4,000/month or RM48,000 per annum) compared to a Business-As-Usual (BAU) scenario. Even more interestingly, the average BEI (Building Energy Intensity) was **reduced 350kWH/m2*year at the old premise to 190kWH/m2*year at the new building**. **That's a staggering 45% reduction!**

Based on the additional capital outlay (primarily on the upgrading of the AC system), the savings in electricity would result in a payback period on investment of approximately 5years.



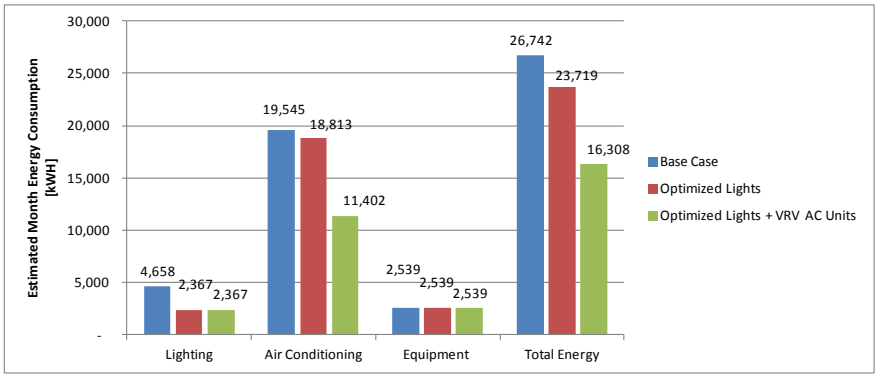


Chart 1 - Breakdown of Energy Consumption (Calibrated IES Simulation)

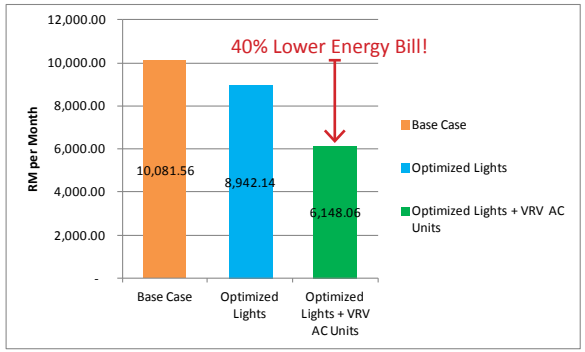


Chart 2 - Reduction in Monthly Electricity Cost (Calibrated IES Simulation)

Client

tonasco
Precision in Every Single Piece

Energy Efficiency & Sustainability Consultant

IEN CONSULTANTS