Managing Energy Saving Project for Telecom Towers in Asia

ELECTRICAL ENGINEERING TECHNICAL DIVISION

reported by
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Energy costs eat up a sizeable portion of the total costs bearable by telecom operators. Energy efficiency (or rather energy inefficiency) is one of the major culprits. As such, various engineering efficiency related policies have been put into practice since 1973, resulting in a credible reduction in worldwide energy consumption by 56% (IEA, 2007a). This was the main highlight of the talk by Ir. Noor Iziddin Abdullah bin Ghazali, the Regional Head of Electrical System in the edotco Group of companies specialising in integrated telecommunications infrastructure services.

In line with the focus on enhancing energy efficiency, telecom operators have had to ride on the technological evolution of energy-related equipment which can be categorised into energy generation or energy storage. Due consideration has to be given when it comes to deciding which energy source to tap from. These can typically be diesel generator, fuel cell, wind, solar or even hybrid system. This decision is largely influenced by cost, on-site conditions as well as local regulations. Deployment of AC or DC diesel generators, transportation of fuels to the fuel cells, wind speed and partial shading of solar cells are some of the issues which a telco engineer has to deal with pertaining to energy generation at the tower site.

From the perspective of storage technology in the context of telecommunication service

EETD Session Chairman Mr. P.J. Low presenting a token of appreciation to Ir. Noor Iziddin Abdullah bin Ghazali

operators, self-healing silicon batteries, sodium metal hydride batteries, lithium ion batteries, sodium sulfur batteries, T-gel batteries and AGM batteries are some of the additions to the traditional lead acid batteries which telco engineers can choose from. The main criteria which aid in the decision-making process are the depth of discharge, charging time and battery lifecycle. Lithium ion battery is a more attractive option over lead acid battery due to its higher depth of discharge, shorter charging time as well as longer lifecycle. In some countries where theft of lead acid battery is prevalent, the use of lithium ion battery also makes more sense, economically.

The design of the tower site has also evolved over the years. Table 1 depicts such comparison.

Table 1

Traditional Site Design	Modern Site Design
Single technology for Base Transceiver Station	Multiple technology for Base Transceiver Station
Indoor type equipment (cabins)	Outdoor type equipment (cabinets)
Air conditioners for cooling	Emphasis on free cooling/fan cooling/ intelligent ventilation system
Distributed Generators to serve as backup	Increased utilisation of batters as backup
Limited deployment of renewable energy sources	Increased deployment of renewable energy sources
Aesthetic value is not emphasised	Aesthetic value is emphasised with attempts to blend the tower design into ecosystem

Upon realising the available technologies for the operation of telco towers, engineers must then design the energy system. As mentioned, the total cost plays a pivotal role when it comes to designing the optimum system. One approach which engineers can use is the Total Cost of Ownership (TCO) approach which provides a comprehensive method to evaluate different components when designing for a particular site.

Key considerations when using Total Cost of Ownership (TCO) approach are:

- Initial CAPEX Cost of Components
- Installation/Civil works costs associated with components
- Maintenance cycles and costs associated with components
- Manpower costs for operations and maintenance associated with components
- Lifetime/life cycles of components/equipment
- Ambient temperature and humidity have effect on lifetime
- Cost of fuel (diesel/octane/hydrogen/methanol) and grid
- Operational parameters of components (charging rate/fuel consumption)
- Economic factors (inflation rate, duties and taxes)

As one examines these factors further, it can be seen that proper selection of equipment is important as every single piece will affect the direct and indirect cost of the service which buyers have to pay as estimated by the TCO. In turn, this will affect the competitiveness of the telco provider.

All in all, designing an energy system for a telco tower is an arduous task as many factors have to be taken into account with energy efficiency and cost being two of the most challenging ones. The TCO approach may be of great help from the economical side of the project. ■