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Reduce capital expenses by optimising power quality

Demand for energy in Malaysia expected to grow, driven by need for cooling and tech trends

DUE to rapid urbanisation, buildings in Malaysia rely significantly on electricity to meet energy needs for homes and businesses. The need for cooling is also expected to increase, leading to more electricity usage in the future. On average, the demand is predicted to grow between 1.8% and 2.9% yearly in all scenarios as revealed by the International Renewable Energy Agency (Irena).

The demand for energy is also set to further escalate, driven by the current growth in generative AI technologies and similar tech trends.

When it comes to sustainability, we are encouraged to see the commitment by our government in lowering emissions while ensuring the growth of a low-carbon economy for the country, especially with the introduction of the National Energy Transition Roadmap (NETR).

In line with these efforts, the building sector need to rise above to play its part too, because electricity will play a much larger energy consumption role in the future than it does today.

In the near future, buildings will not just consume power, but they will also produce, store, and share it.

Due to the intermittent nature of renewables and effects of power conversion, managing power quality will be important.

It requires a comprehensive approach that involves a combination of monitoring, preventive measures, as well as collaboration with expert partners and stakeholders.

By implementing these strategies, businesses can minimise downtime, reduce equipment damage, and ensure a reliable and high-quality power supply.

What is power quality?

Electric power quality is the degree to which the voltage, frequency, and waveform of a power supply system conform to established specifications. Good power quality can be defined as a steady supply voltage that stays within the prescribed range. It is useful to consider power quality as the compatibility between what comes out of an electric outlet and the load that is plugged into it.

Drawing from our experience, it's observed that numerous companies in Malaysia often do not prioritise power quality, mainly because it is not directly factored into the determination and analysis of production output. Companies typically analyse downtime or immediate equipment failure after these events occur. Subsequently, they implement mitigation measures to justify production losses, establishing a correlation between the impact of power quality on production loss and the cost of investing in power quality mitigation measures.

While engineering and maintenance personnel display a heightened awareness of the importance in implementing power quality measures, the management and finance departments generally adopt a cautious "wait and see" approach toward power quality mitigation measures, based on our observations.

The impact of power quality issues cannot be underestimated. They stand as a significant cause of unscheduled downtime, equipment malfunctions, and costly damages.

When power quality falters, be it due to interruptions, voltage dips, or harmonic pollution, the repercussions ripple through the business operations.

This is a matter of increasing concern for businesses and end-users, considering not only the frequency of such incidents but also the substantial financial impact.

Did you know that 30% to 40% of all unscheduled downtime today can be traced back to power quality problems?

About 50% of mission-critical power outages are attributable to power quality issues.

When we look at the cost, we found that companies spend on average RM70 billion annually on power quality issues and experience revenue loss of about RM600,000 when a facility is affected.

To break this down further, the downtime costs to mission-critical facilities range between RM65,000 up to a staggering RM26 million an hour!

That's about 3% to 6% of the manufacturing sales money spent on correcting power quality problems.

How to manage power quality?

Effective power quality management demands a comprehensive approach encompassing three vital elements: monitoring, taking preventive measures, and collaborating with expert partners and stakeholders.

Monitoring marks the initial phase in designing and implementing power quality mitigation measures.

It not only establishes a record of power quality issues but also compiles data on power usage for effective energy management.

Taking preventive measures requires companies to study the patterns of how the electricity is behaving and the unique characteristics of the electricity.

Consider preventive measures ensuring immunity to voltage sags to safeguard against issues affecting major electronic loads and crucial production lines due to voltage drops.

This is an ongoing process involving consistent monitoring, adopting enhancements, and improving power quality.

Expert partners and stakeholders can provide valuable insights and support in optimising power quality solutions.

This collaborative approach ensures a comprehensive strategy and the integration of expert knowledge to address potential challenges effectively.

By implementing these steps, companies can minimise downtime, reduce equipment damage, and ensure a reliable and high-quality power supply.

Increased productivity and ROI

Investing in power quality solutions not only ensures high-quality power, leading to increased productivity but also provides a quick return on investment (ROI).

Companies can reduce their capital expenses up to 30% when they optimise their electrical system, avoid oversizing, and limit redundant capacity.

They can also reduce energy losses by up to 30% when they optimise their power consumption and reduce total process energy consumption by reducing CO2 emissions.

Good power factor can also lower power bills and reduce power losses in transformers and conductors.

Firm can reduce utility billing penalties and lower operating expenses up to 10%.

One example comes from Schneider Electric's customer in the Gulf region.

We work with Kuwait's Ministry of Electricity and Water that faced with fast-rising demand, a distribution network running at capacity, plus transformer and switchgear difficulties.

As a solution, they used advanced power quality meters to remotely monitor each capacitor bank.

Although rated for 50°C ambient temperature, outdoor capacitor banks are cooled to ensure uninterrupted performance even during the most severe temperatures.

As a result, they received an additional 15% to 20% kVA network capacity – and reduced transformer losses by approximately 20% to 25%.

Today, their electricity tariffs are amongst the lowest in the world.

Meeting sustainability goals

Achieving sustainability goals is contingent upon monitoring energy consumption. This not only serves the direct purpose of aligning with sustainable practices but also indirectly opens avenues for effective power quality monitoring.

The same monitoring devices used for tracking energy consumption can be leveraged to assess and enhance power quality.

The commitment to sustainability goals not only streamlines monitoring processes but also contributes to the implementation of power quality mitigation measures.

This is made possible by readily available data and records, which can be instrumental in preparing reports and proposals for company management.

These insights, in turn, guide the implementation of robust power quality mitigation measures, ensuring that companies operate in an energy-efficient and sustainable manner.

***This** article is contributed by Schneider Electric country president for Malaysia Eugene Quah (pix) and Perunding Shanu managing director Gunasegaran Reddy*