

Case Study

Radcliff Estates City of Tshwane

Problem set:

Zaptronix was presented with an interesting test case in which to prove its innovative energy management solutions. The Radcliff Estate development within Tshwane, Gauteng consists of 28 luxury houses, with another in its construction phase. Many of the residents have opted for under floor heating, Jacuzzis, multiple geysers etc. Residents from this upmarket security estate required a solution to manage the overloading of their electricity supply. As more houses were added, the maximum supply from the municipality was below the development's collective demand. Radcliff therefore required a system that would minimise and ideally prevent the disruption of supply to the entire complex, caused by the tripping of the main circuit breaker to the estate.

In summary, the estate has a breaker capacity of 3 x 400 (in total 1200A). Each house has been allocated 3 x 60 or 180A breaker capacity with a total house breaker capacity of 5760A. Jan Nel, CEO of Zaptronix commented 'Without a solution in place to balance the supply and demand of electricity, the Estate would experience main circuit breaker overload - especially in winter'. The supply proved problematic to restore since residents had to be requested on a voluntary basis to switch off certain loads before it could be switched back on – thus affecting all the residents.

The solution

When residents started to experience regular blackouts, independent of scheduled Eskom load shedding, it was clear that the development is likely to experience long term problems. The elected body corporate chose to be proactive in its approach. Mr Helmut Keller from the Radcliff Home Owners Association recalls 'The facts on the table were as follows:

- The costs associated with upgrading the infrastructure were prohibitive (additional cabling, CTs, disruptive construction etc.)
- We discovered active metering would be required in order to act proactively as simply switching off geysers or stoves at random was not an effective tool
- Finally, the council did not have spare capacity in the area'

Zaptronix designed, installed and managed a comprehensive load management system for Radcliff. The starting point was to establish a pattern of usage for the collective. For this purpose, the ZAP03 BE data logging Remotely Read Meter was installed. Upon inspection of the data, it was clear that no real opportunity existed to solve the problem by either a Power Factor Correction or via Load Balancing.

The preferred solution targeted electrical water heaters (geysers) for load shedding as they store heat energy. Any supply interruptions for limited periods proved not to be disruptive as the pain was distributed over twelve cells or groups. The system consists of two primary sub-systems, namely the main supply side system or 'controller' and the system in each dwelling or 'load shedding device'. A radio network connects the two sub-systems. The system is implemented in such a way as to ensure that each house will get a fair burden of the load shedding when necessary. The end result was that residents did not notice the impact on a daily basis, yet the cooperative managed to stay below their threshold as maximum demand was curbed. The end result – no more disruptive power outages, without the headache of expensive infrastructure upgrades.

The result

The overall risk of disruptions was substantially reduced, thereby ensuring the uptime and consistent supply of electricity to all residents.

In the likely event that quotas get introduced, Radcliff Estate will be in a better negotiating position - armed with comprehensive reports and mechanisms to distribute power effectively to all of its residents and avoid paying penalties. Zaptronix (as a registered ESCo) will be able to certify the usage patterns and savings Radcliff has achieved. This might lead to additional positive spin-offs where the Estate could be excluded from a ripple relay implementation and even from scheduled load shedding.

As a result of this project, Radcliff has powerful infrastructure and information at their disposal to improve their energy management overall.

Future potential

Should residents ever decide to purchase a central generator – Zaptronix will be able to advise on its ideal size. Due to the systems implemented, the generator required will be smaller and therefore result in direct cost savings (both upfront and ongoing). As a result of the intelligent metering applied, double invoicing will be avoided as the system will be able to distinguish between utility versus generator power.

In summary, the initial investment can be leveraged to gain even more benefits in future e.g. the residents can explore services such as:

1. Daily monitoring of the radio network status
2. Certification of adherence to future quotas to the Metro
3. Updated metering to address power supplied by a standby generator
4. Energy vending

For more information or to discuss relevant solutions, please contact:

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