

Success Story

Inside Territory Generation's enterprise frontier

Territory Generation



Location: Northern Territory, Australia
Order date: 2017
Completion: 2019
Industry: Power

Tropical desert country

Northern Territory or NT, is a federal territory covering the central north region of Australia. With an equivalent coverage area of France, Spain, and Italy combined or 1.4 million square kilometers, it is the third largest federal division of the country and, in its own right the eleventh largest country subdivision in the world.

Whilst the history of the NT began over 40 thousand years ago with the Indigenous Australians, the 250 thousand strong population today are sparsely spread across this geographic region. Australia being amongst the leading modern nations with its economy ranking in at 14th worldwide, we are a country that depends totally upon an always-on and secure supply of energy.

Accomplishing this, nonstop all day every day especially in the NT carries with it huge engineering and natural challenges. With small communities isolated throughout great distances, the electrical poles and wires and long roads are sometimes the only signs of civilization. However, energy must be supplied to the homes, schools, hospitals, businesses and tourist attractions regardless of the drastic weather conditions that range from cyclonic rain and winds in the north and extreme temperatures and desert storms in the central interior.



Image 1: Twisted power pole after 1974 cyclone, Territory Generation

Challenges at hand

Territory Generation (TGen) produces over 90% of the electricity in the NT, with their power generation fleet spread up to 1,800 kilometers apart from each other, feeding in 585 megawatts of electricity from 8 power stations. This geographic isolation meant responding to and investigating problems in these harsh and inhospitable landscapes, carried with it a heightened level of responsibility for any individual needing to carry out remedial work. With it the added issue of working alone, posed a potential risk to a person should an emergency occur. Being able to drastically mitigate and in some cases eliminate these circumstances was paramount.

Power stations can have a typical life span that can exceed 60 years. It's extremely common for major utilities to have a generation portfolio that drastically vary in age. TGen, having generation history dating back to 1934, meant the individual power station operator interfaces were implemented, engineered and configured differently, with no clear concept of standardization across the fleet.

This complex landscape meant the operator and engineering knowledge between sites were not easily transferable, as multiple methods to operate, fault find and maintain the sites had to be kept in place. Which in turn inhibited the ability to respond quickly to network changes as well as anticipate and accommodate fluctuations and streamline the integration of new and renewable energy.

To overcome the logistical, maintenance and safety challenges, while still delivering on TGen's strategic direction in being able to seamlessly expand new energy sources into the generation fleet required holistic thinking. To this end, TGen engaged with leading engineering and consultancy partners to formulate a long term and sustainable resolution using best practice principles. Following an extensive consultation period, the decision to pursue an Enterprise Operations Center concept was formulated.

Meeting business objectives

Internationally renowned and independent consultancy company PSC was awarded the role as TGen's contract manager whose responsibility extended onto evaluating and selecting the best technology and engineering partner for Territory Generation.

The key selection criteria entailed an all-encompassing platform that,

1. Had the lowest total cost of ownership
2. Could be implemented in the shortest time frame
3. Was easy to use across a broad employee skillset
4. Was expandable to accommodate additional sites in the future.

Ultimately Yokogawa Australia & New Zealand was selected to deliver the solution and bring TGen's concept into reality and become TGen's main technology partner.

On approaching the challenge, the system was designed with a high degree of flexibility allowing generation capacity to be retired, upgraded, maintained and expanded at any time without operational interruption.

FAST/TOOLS was originally developed for Royal Dutch Shell in 1978 for supervisory control of the onshore and offshore oil and gas platforms, fast forwarding 40 years it has now become Yokogawa's platform of choice for multiple critical and process intensive applications.

The FAST/TOOLS Enterprise Operations Center can interoperate with nearly any PLC or DCS system currently being employed in the field today. This allowed the integration of all the generation sites to be deployed and cut over without disturbing the operations.



Image 2: Yulara power station, Territory Generation

Yokogawa Australia & New Zealand Project Lead Engineer Tejas Sathe said:

“Prior to commissioning we discovered that the existing control and protection equipment had aging communication protocols. Which meant we had to swiftly engage our R&D center in Netherlands to incorporate the legacy protocols. Which we locally verified before implementing on TGen sites, to ensure no unexpected delays in commissioning.”

With completion due in early 2019, TGen has already retired aging generation units and seamlessly integrated a new 8.3 million-dollar 5-megawatt battery in Alice Springs. Taking into consideration Alice Springs is a 2-hour flight away from the Darwin based Enterprise Operations Center; the decision to go enterprise operations is already justifying itself.

Territory Generation Chief Executive Officer Tim Duignan said:

“The Battery Energy Storage System is an important milestone in the Northern Territory's transition to renewable energy and a critical piece of infrastructure to support the Northern Territory Government's Roadmap to Renewables strategy.”

With the command and control center manned 24/7, workplace safety was improved as the field technicians are always in contact with the control center regardless of the time of day. This continuous two-way communication fundamentally reduces response times as well as enables proactive action plans in case of an emergency.

The FAST/TOOLS system is harmonized across the entire fleet in accordance to international ISA101 standards, this standardization allows operators to quickly predict, diagnose and respond to abnormal situations through enterprise wide standardized HMI screens and globally interpretable alarm information.

The hidden advantage that operators can rapidly learn and understand the system regardless of experience level, a challenge for all Australian industries. With the Northern Territory preparing for strong industry growth within the natural resources sector, surety of supply is an absolute must to ensure availability and reliability for future demand.

Territory Generation Chief Executive Officer Tim Duignan said:

“Usually you find operations centers managed from a technology or operations perspective, but Territory Generation recognizes that the visibility and control provided by the EOC gives us a crucial commercial and strategic advantage. We are able to respond faster to network changes, accommodate demand fluctuations, improve the integration of renewable energy, and ultimately make better business decisions.”

The FAST/TOOLS Enterprise Operations Center is a commercial off the shelf solution that provides a clear birds eye view of the entire generation portfolio, allowing the operator to precisely dispatch electricity on-demand that ensures the lowest cost of energy generation is achieved. It is also an enabler of increasing workplace safety by reducing response times in the case of an emergency.

With its enhanced scalability, IIoT analytics connectivity and platform independency, small to large power generation providers can immediately take advantage of an established and field proven platform that is easy to use and can be implemented with a quick turnaround whilst reducing overall total cost of ownership.



Image 3: Territory Generation CEO Tim Duignan in the Remote Operations Center (ROC)

For more Information and Contact

[SCADA System](#)

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