

# COMPANY CAPABILITIES



2020

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## Company Capabilities

Tropical Energy Solutions provides turnkey solutions for grid-connected and off-grid energy generation, tariff analysis/optimisation, energy brokerage, project management, energy efficiency and demand management applications.

***We identify, promote and implement solutions that are clean, reliable and economically viable.***

We are focussed on delivering products and services that suit tropical environments and conditions.

Predominantly servicing Regional Queensland Australia, with offices based in Townsville, we work collaboratively with leading manufacturers and their representatives, operating in three core business areas:

- 1 - **Technical Services** - engineering of innovative energy solutions including the design, development and installation of grid connect, hybrid and off-grid power systems;
- 2 - **Energy Management Services** - designing Energy Management Systems, conducting Energy Audits, developing Demand Management Strategies, Tariff Optimisation Strategies, and negotiating Energy Brokerage Solutions for commercial operations and property developments;
- 3 - **Project Management Services** – for a variety of energy related projects. Operational and compliance based services with a focus on delivering value for money, compliant, high quality projects on-time and on budget.

Tropical Energy Solutions capabilities include:

- Proven experience with commercial scale grid connect, off-grid and hybrid power system design and installation;
- Tailor-made Energy Management systems for organisations, buildings and specific processes;
- Consulting Services and Energy Audits in accordance with AS/NZS 3598:2014;
- Development and delivery of training programs to assist in the implementation of Energy Management Systems and recommendations resulting from Energy Audits;
- Development and delivery of education and training packages in renewable power systems and energy management;
- Technical services for the engineering, project management and operation of innovative energy solutions;
- The ability to meet the requirements and objectives of a wide range of industries and government agencies.

In all activities we combine best practice with hands-on experience and compliance with the relevant AS/NZS or ISO standards.

Tropical Energy Solutions staff have significant professional experience in the national and international marketplace including:

- Project Management;
- Engineering;
- Training and Business Development.

## Key Staff Profile

The TES team collectively possesses vast knowledge across all areas of energy measurement, management, rationalisation, grid connect and Remote Area Power System (RAPS) design, installation and maintenance. Additional to our in-house experience, TES enjoys strong working relationships with component manufactures. Being able to leverage support and assistance directly from factory engineers ensures that challenges are overcome in a prompt and compliant manner.

The following table outlines the capabilities for key staff:

Name	Adam Wilson
Position	Director – Tropical Energy Solutions
Responsibilities	<ul style="list-style-type: none"> <li>• System Engineering</li> <li>• System Deployment</li> <li>• Business Management</li> <li>• Research &amp; Development</li> </ul>
Qualifications	<ul style="list-style-type: none"> <li>• Qualified Electrical Fitter Mechanic</li> <li>• Qualified Mechanical Fitter</li> <li>• Clean Energy Council accreditation for grid connected, stand-alone and hybrid power systems (CS)</li> <li>• Qld Construction White Card</li> <li>• Selectronic Certified Integrator</li> <li>• Fronius Service Partner</li> </ul>
Experience	<ul style="list-style-type: none"> <li>• 11 years' experience in electrical energy generation systems maintenance, diagnosis and repair</li> <li>• 3 years' experience in business management</li> <li>• 7 years' experience in workplace safety system design and auditing</li> <li>• 8 years' experience in renewable energy systems</li> <li>• Advanced research and analytical skills</li> <li>• Auditing and workplace assessment skills</li> <li>• Training and presentation skills</li> </ul>

Name	Mark Lewis
Position	Energy Management Specialist – Tropical Energy Solutions
Responsibilities	<ul style="list-style-type: none"> <li>• Project Management</li> <li>• Energy Auditing</li> <li>• Tariff analysis</li> <li>• Energy Broking</li> <li>• Training, development &amp; delivery</li> </ul>
Qualifications	<ul style="list-style-type: none"> <li>• Cert IV Training and Assessment</li> <li>• Clean Energy Council Accreditation - stand-alone power systems</li> <li>• Clean Energy Council Accreditation – grid connect design</li> <li>• Honours TSM MGT</li> <li>• Qld Construction White Card</li> </ul>
Experience	<ul style="list-style-type: none"> <li>• 9 years' experience in commercial energy auditing (approximately 300 audits)</li> <li>• 9 years' experience in project management of PV solar systems including analysis of energy consumption, system selection and system yield modelling</li> <li>• 9 years' experience in corporate energy management</li> <li>• 20 years' experience in training (OJT, classroom and field)</li> <li>• 12 years' experience in government administration</li> <li>• 13 years' experience in staff management</li> <li>• 14 years' experience in project management</li> <li>• Advanced training and presentation skills</li> </ul>

<b>Name</b>	<b>Adam Ramsay</b>
<b>Position</b>	<b>Service Technician – Tropical Energy Solutions</b>
<b>Responsibilities</b>	<ul style="list-style-type: none"> <li>• System servicing, fault finding and maintenance</li> <li>• Project logistics</li> <li>• System installation</li> <li>• Workshop Manager</li> </ul>
<b>Qualifications</b>	<ul style="list-style-type: none"> <li>• Statement of Attainment copper joiner</li> <li>• B class asbestos removal ticket</li> <li>• Qld construction White card</li> </ul>
<b>Experience</b>	<ul style="list-style-type: none"> <li>• 5 years' experience Telecommunication technician</li> <li>• 6 years' cabling running and conduit installation experience</li> <li>• 1 year's copper jointing experience</li> <li>• 5 years' Fibre Optics fault finding, splicing and installation experience</li> <li>• 7 years' construction industry experience</li> <li>• 5 years' civil construction experience</li> <li>• 2 years' horticultural experience</li> </ul>

<b>Name</b>	<b>Tammy Wilson</b>
<b>Position</b>	<b>Contracts Administrator</b>
<b>Responsibilities</b>	<ul style="list-style-type: none"> <li>• Administration &amp; Project Support</li> </ul>
<b>Qualifications</b>	<ul style="list-style-type: none"> <li>• Certificate IV in Contracts Administration</li> <li>• Qld Construction White Card</li> <li>• Justice of the Peace (Qual)</li> </ul>
<b>Experience</b>	<ul style="list-style-type: none"> <li>• 11 years' experience in contract administration</li> <li>• 11 years' experience Tier 1 Construction</li> <li>• Experience in staff supervision and project management</li> <li>• Quality Assurance, 3rd party accredited systems and auditing, Workplace Health &amp; Safety Compliance</li> <li>• Advanced contract and tender analysis</li> <li>• Advanced business administration skills</li> </ul>

<b>Name</b>	<b>Alex Harrison</b>
<b>Position</b>	<b>Office Manager</b>
<b>Responsibilities</b>	<ul style="list-style-type: none"> <li>• Office Management</li> <li>• Accounts Receivable/Payable</li> <li>• Maintain Project Financial Records</li> </ul>
<b>Qualifications</b>	<ul style="list-style-type: none"> <li>• Certificate III Business Administration</li> <li>• Blue Card</li> <li>• Mental Health First Aid Certificate</li> <li>• WH&amp;S Certificate</li> <li>• MYOB Bookkeeping and Accounting Certificate</li> <li>• MYOB Advanced Bookkeeping and Accounting Certificate</li> </ul>
<b>Experience</b>	<ul style="list-style-type: none"> <li>• 6 years' experience in business administration</li> <li>• 2 years' experience hospitality</li> <li>• 3 years experience working with disabilities/mental health</li> </ul>



## Reference Projects

Tropical Energy Solutions has delivered projects to meet the needs of a diverse range of customers. These include undertakings from Far North to South East Queensland, remote areas of Queensland, Northern Territory, Torres Strait Islands and several interstate projects. We have also provided Power Systems and training in Fiji and Papua New Guinea.

The sustained growth of our company is attributed to the recommendations by our satisfied customers. Below outlines some of the companies, organisations and local government authorities that Tropical Energy Solutions has and continues to work with to deliver value adding projects across a variety of business functions.



The following case studies further highlight Tropical Energy Solutions ability to deliver complex and varied projects to a diverse business cross-section.

## CASE STUDY 1. James Cook University – Daintree Rainforest Observatory

The Daintree Rainforest Observatory (DRO) is a unique site and has undergone extensive expansions and modifications over many years to cope with the facilities growing operations. The facilities current load profile incorporates:



- 40 bed student dorm style accommodation
- 10 bed self-contained researcher accommodation
- 4 bed self-contained staff accommodation
- Commercial kitchen
- Amenities and ablution block
- Lecture theatre
- Climate controlled laboratory
- Outdoor laboratory
- Office and Administration building
- IT facilities
- Workshop
- 50m Liebherr tower crane
- Weather station



### DESIGN

The above loads are powered from the 3 phase RAPS system designed, installed and maintained by Tropical Energy Solutions. Its current configuration is:

- 12 x 6kW battery inverters configured into 4 separate clusters
- 460kWh AGM battery bank
- 12 x 5kW string inverters
- 72kWp PV array deployed in a decentralised arrangement
- 2 x 40kVa diesel back-up generators with auto start and control



The DRO RAPS has recently undergone a mid-term refresh. The system configuration has been optimised with battery capacity extended by a further 230kWh. This opportunity was also taken to audit the sites compliance to current Australian Standards and Regulations. Tropical Energy Solutions completed this audit and the associated works to achieve full site compliance.

## CASE STUDY 2. Burdekin Shire Council – Energy Management Project

Burdekin Shire Council has worked consistently with Tropical Energy Solutions since 2014. The original project was to audit and identify potential areas for energy rationalisation and savings. This project has given rise to multiple sub-projects involving the implementation of recommendations made by Tropical Energy Solutions.



### PROJECT DETAILS

#### - Level 3 Energy Audit – Principle Contractor

Tropical Energy Solutions undertook a large scale, high level energy audit of all Council energy accounts and delivered significant and ongoing savings through energy efficiency measures and rationalisation. These include:

- Closure of 18 accounts that have no associated energy use or limited practical value (total savings > \$11,000)
- Tariff optimisation for >70 accounts (total savings >\$50,000)
- Energy efficiency upgrades on a site-by-site basis (calculated savings >\$166,000)

#### - White Roof Projects – Project Manager

As a result of the 2014 audits Council began to implement passive solutions across major energy consuming infrastructure. Tropical Energy Solutions managed this project and provided technical analysis of energy savings. This project delivered savings across the board and Council enjoyed a short payback period.

#### - Jones St Depot 30kW PV System – Project Manager

Installed in 2017 under the recommendation and management of Tropical Energy Solutions this modest investment allowed the high consuming Jones St depot to reduce energy demand enough to be reclassified by Ergon as a small customer and as such enjoy the much lower tariff prices of T20 small. Annual savings of \$30,000 are being achieved.

#### - LED Lighting Upgrades – Advisor

With the LED lighting upgrades completed in the main administration building Council has realised lower energy costs not only through reduced lighting consumption but also through reduced air conditioning demand.

#### - Young St Administration Building 100kW PV System – Project Manager

This project is the culmination of the works related to the original 2014 audit and is the last piece of the energy efficiency model developed by Tropical Energy Solutions.

As a whole, this body of work gives a definitive financial value to the holistic energy management principle that has been engineered by Tropical Energy Solutions. To this point savings for Council have been significant and consistent, proving there is not one single solution and pay back is achieved faster through a holistic approach.





### CASE STUDY 3. Monsoon Grazing Company – Basalt River Station

Basalt River Station (BRS) is located approximately 180km from Charters Towers, North Queensland. Although not geographically remote, this site is quite isolated due to challenging access. Travel times for the 180km journey can exceed four hours. This is a decentralised site that incorporates:

- Main homestead
- School house
- Staff residence
- Workers quarters
- Workshop
- Pumping facilities



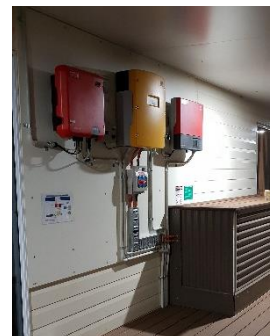
#### DESIGN

BRS takes advantage of a “micro-grid” RAPS design which allows cost savings in infrastructure, fault isolation and redundancy. Distance between the infrastructure is not great but would represent a significant investment in services infrastructure if powered by a common RAPS. Compounding the value found in savings from reduced infrastructure, is the fault isolation aspect. If either of the two independent systems were to experience a failure the effect will not be felt globally throughout the site. The redundancy introduced by having multiple components with identical programming allows for quick and easy site triage. Staff can quickly move assets to where the highest demand is experienced.

##### Homestead RAPS

This is the primary system for the site and powers the large homestead with consumption of 89-90kWh/day. It also provides energy for the detached schoolhouse. The system specifications are:

- 8kW battery inverter
- 2 x 5kW string inverter
- 12.96kWp PV array
- 80kWh Exide Gel battery bank
- Integrated 8kVa generator



##### Staff Amenities RAPS

The amenities RAPS powers the eight bed accommodation complex, workers amenities, workshop and pumping station. This system is slightly smaller in response to a transient workforce.

- 8kW Battery Inverter
- 5kW string inverter
- 4.68kWp PV array
- 67kWh Exide Gel battery bank
- Manual generator control



## CASE STUDY 4. Energy Management and Technical Services

### Education and Development

#### Townsville City Council Employee Training:

As part of Townsville City Council's Network Demand Management project to reduce energy demand through technical and behavioural changes, Tropical Energy Solutions developed a one day training package for managers and employees. The training covered the basics of how consumption and demand affect operating costs, how different load groups may be used more efficiently, behaviour change in the workplace, energy efficient building design, understanding tariffs and billing, and renewable energy opportunities. To date we have conducted seven training sessions in Townsville plus another in Port Moresby for the National Capital District Commission.



### Energy Audits

#### McKinlay Shire Council Energy Audits

This project examined the tariffs, energy consumption, demand, and physical attributes of 16 privately owned electricity accounts from cattle stations across the region. The desired outcome was to determine a suitable for an off-grid energy system trial to be conducted by the McKinlay Shire Council. These audits required a deep understanding of not only energy consumption and Ergon tariffs, but also an ability to see beyond the data and accurately understand how an off-grid energy system would complement the way energy is consumed on each site. Adding to the complexity of the job were the following considerations:

- All sites were spread over a vast geographic area
- The project required a short timeline
- Many site loads were powered by diesel generating sets and accurate consumption data was not available
- Individual participant availabilities made planning economical site visits challenging

This project was however delivered ahead of time and on budget.



## CASE STUDY 5: Industrial Solar Generation and Monitoring

### NEM Group Solar Project

NEM Group is a laser cutting business based in Stuart, Townsville. They were using 300,000kWh of electricity annually and operated Ergon Energy's Tariff 20 (Large). This is a transitional tariff and only available until 30 June 2021. They would then have been moved to a demand based tariff that would see annual costs rise by \$15,000.

Tropical Energy Solutions was engaged to provide a 132kW grid connect solar power system. This complements a 50kW system already installed, bringing total solar capacity to 182kW.

While remaining on Tariff 20 (Large) the system provided savings of \$0.41/kWh. Allowing for weekend shutdowns this equates to \$69,300 annual savings if all generated power can be utilised during the week. The demand based tariffs that replace Tariff 20 (Large) are different. Consumption charges are significantly less, daily service fees are much higher and there is a demand charge.

Tropical Energy Solutions and NEM took a very strategic approach to this project. The original plan was to install the solar system to deliver significant savings while the transitional tariff remained. During this time, we would monitor solar generation, site consumption and demand. This data would provide the basis for the design of a smart battery bank that would discharge when the system saw a peak demand event about to occur.

What actually happened was that after three months our monitoring showed that the site would very likely consume less than the 100,000kWh/year small customer threshold. NEM was then reclassified as a small customer. The combination of self generated power from the solar system and the reclassification to small customer deliver annual savings of \$95,000.



## Contact Details

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