

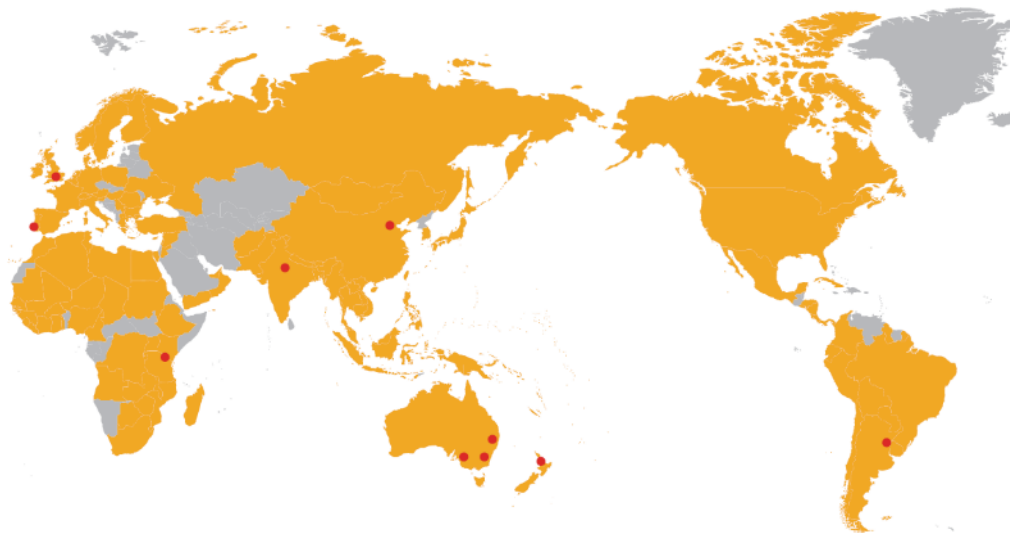
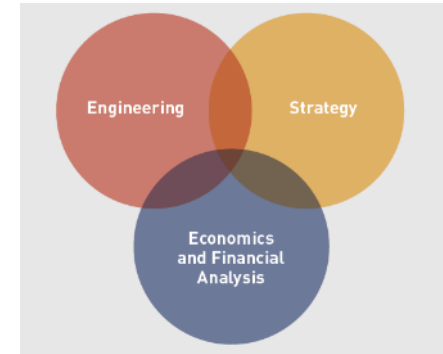


Towards 100% RE for Islands

Case studies

About ITP

- Specialist renewable energy consulting firm
- Over 35 years international experience and 1,500 projects
- Founded in the UK in 1981
- Major regional offices in UK, India, China and Australia
- Part of the ITP Energised Group



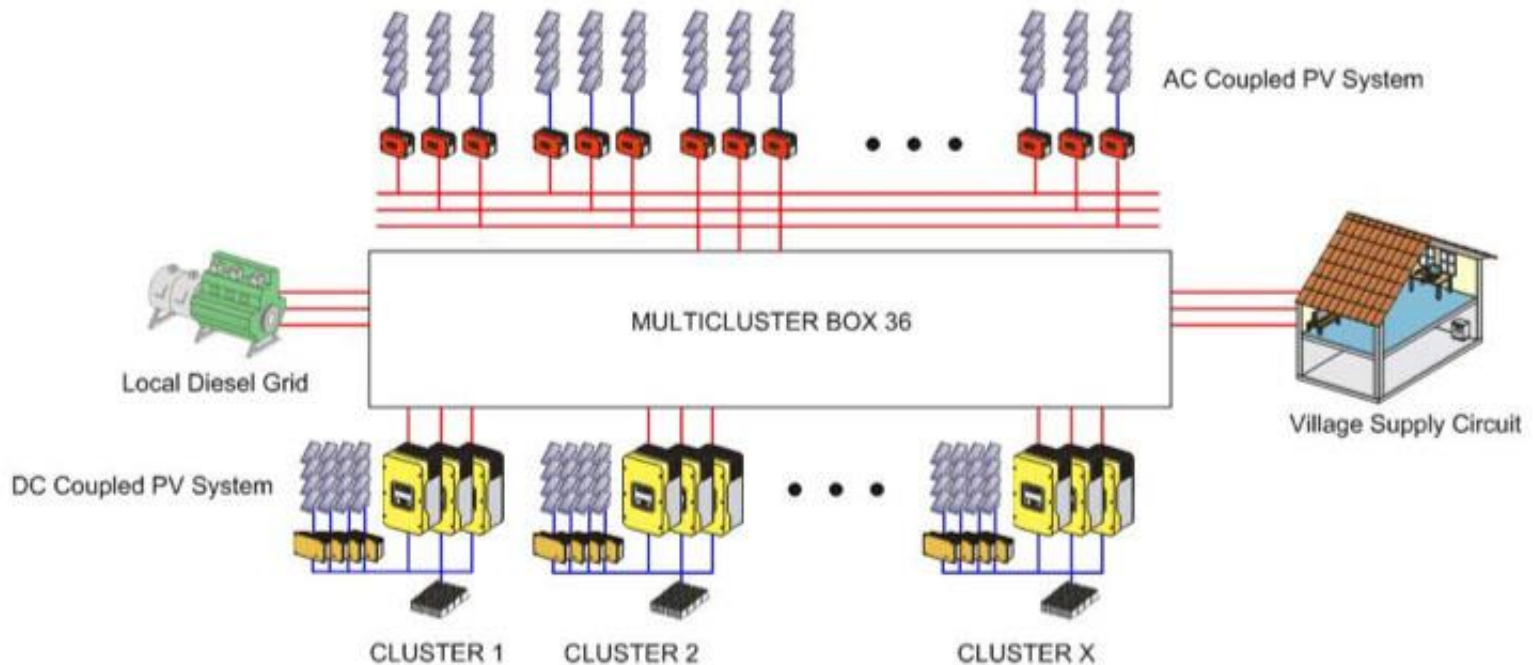
- Head office in Canberra, offices in SA, NSW and NZ
- Active in Australia and the Pacific region for over 10 years
- Involved in RE projects of all scales (1 kW to 50+ MW)
- Services
 - Engineering Consultancy
 - Project Engineering
 - Energy Markets and Advisory
 - International Aid and Development

Case Study 1: Tokelau



- First “Solar Powered Nation”
- Approximately 1,500 people across 3 remote coral atolls
- Project completed in 2012
- Approximately 930 kW PV and 8,000kWh batteries
- Over 95% of electricity from solar
- Similar approach then employed in Cook Islands and Tuvalu

Case Study 1: Tokelau



- Standard SMA Sunny Island design
- Designed using MFAT common design principles
- Flooded lead acid batteries

Case Study 1: Tokelau



Case Study 2: Upolu, Rarotonga, Port Vila

- Larger centralised grids serving population centres
- Less difficult logistics – regular flights and port facilities
- Lower penetration of renewable energy – systems designed to provide less than 30% of midday load
- Requirements for SCADA and central control
- System sizes
 - 2.2 MW PV Upolu, Samoa
 - 960 kW PV Rarotonga, Cook Islands
 - 750 kW PV Port Vila Vanuatu

Upolu, Samoa



Rarotonga, Cook Islands



Port Vila, Cook Islands



Tuvalu Energy Sector Development Project (TESDP)

- Taking the lessons from previous projects and applying them to provide high levels of RE penetration into a main grid.
- High level of donor coordination and cooperation. NZ MFAT, UAE Masdar and World Bank all undertaking projects in parallel.



TESDP – Overview

- Four-year program funded by the World Bank, started in 2015
- Provides assistance in energy efficiency, prepayment metering, and renewable energy
- Will push renewable energy penetration on main island of Funafuti well beyond 100% to increase RE contribution
- Population is around 7,000 people
- Midday load is 800 kW on weekdays, 500 kW on Sundays
- 3 x 600 kW diesel generators

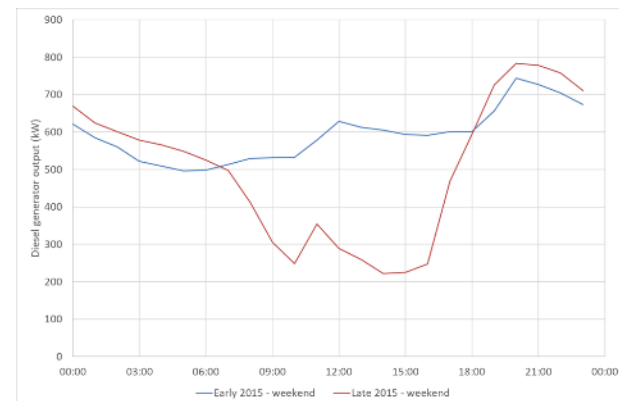
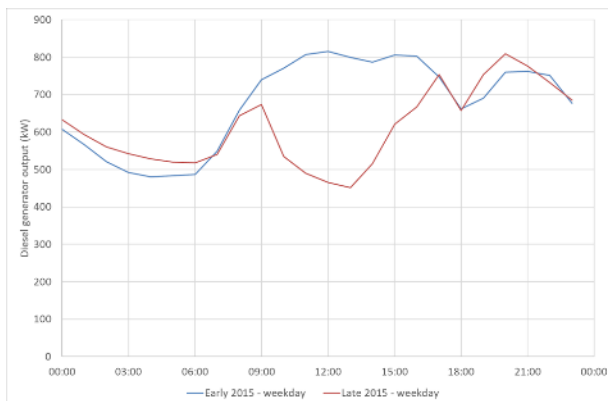
TESDP – Current PV generation



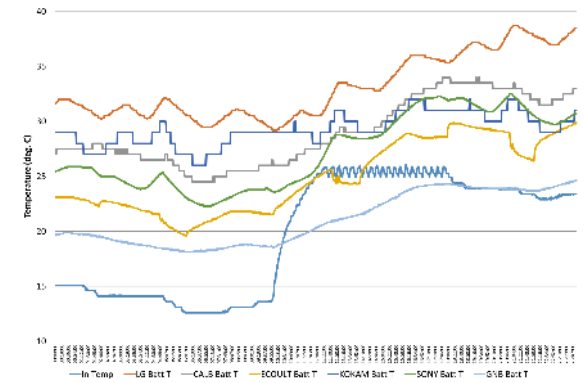
- 750 kWp PV capacity
- PV curtailment device installed on 410 kWp

TESDP – Increasing penetration

- Project will add up to another 900 kWp of capacity
- Goal will be to turn generators off during the day → grid-forming inverter required
- ~1 MW inverter capacity, 1-2 MWh electricity storage
- Expect >40% RE contribution
- Very little space for large amounts of PV
- Requires good communication between PV field and controller at power station



Battery Test Centre (batterytestcentre.com.au)



Thank you

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