Centre for Energy and Environmental Markets

UNSW THE UNIVERSITY OF NEW SOUTH WALES SYDNEY • AUSTRALIA



SOLAR SETUP

Transforming Electricity Generation in the Remote Northern Territory

Dr Ben Elliston
Senior Research Associate

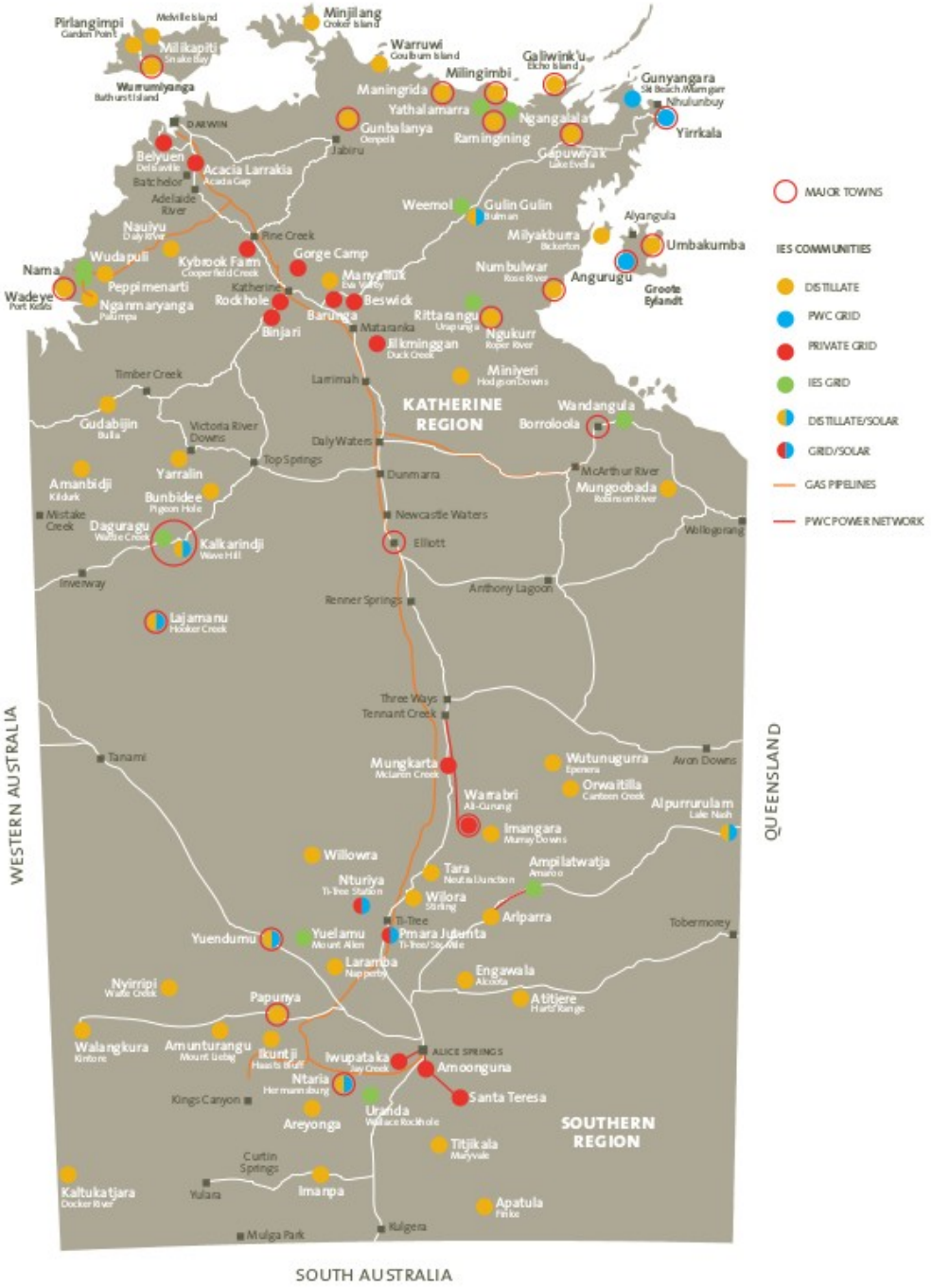
Outline

- Context of remote power generation in the NT
- SETuP
  - What is it?
  - What are the goals?
- Our knowledge sharing plan
  - Sharing experience with ARENA, the industry, researchers and the general public

Context

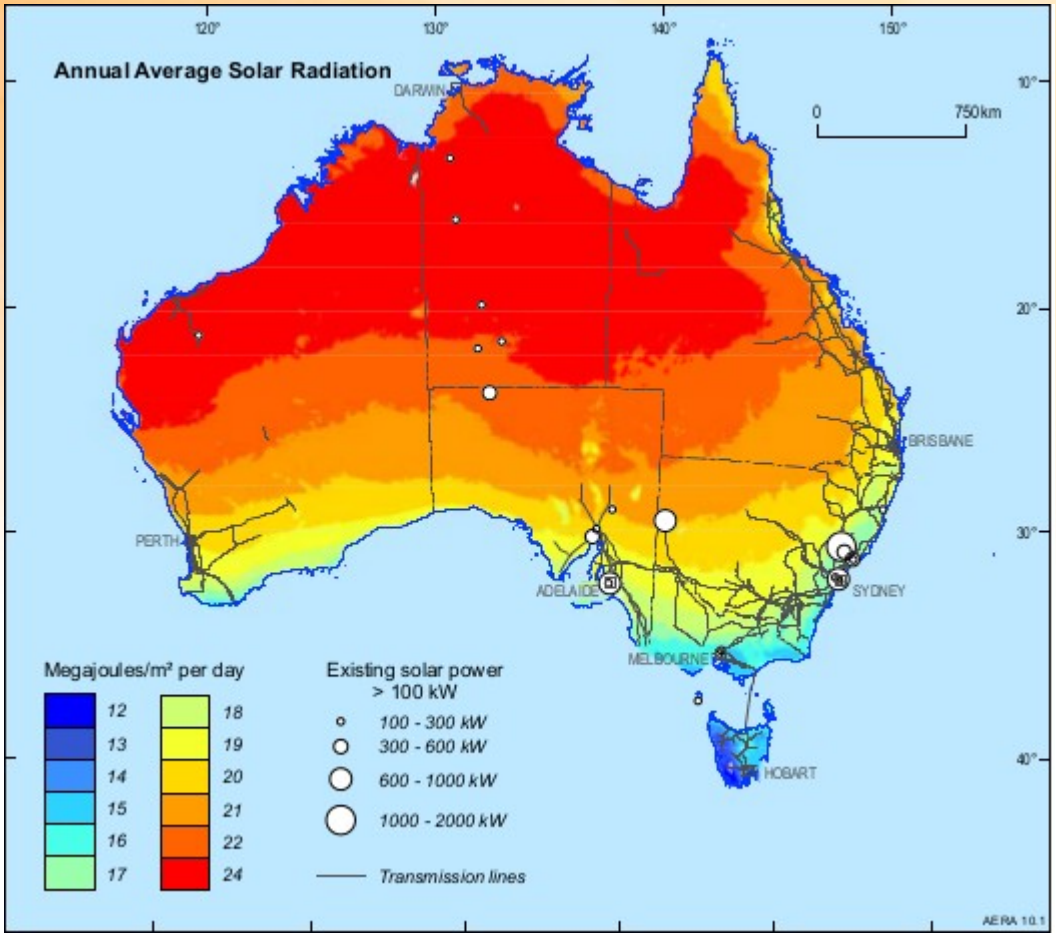
- Power & Water operates 52 diesel power stations in remote communities
  - Long distances from Darwin, Alice Springs and Katherine regional offices
  - Installation, O&M and mobilisation costs are high
  - Harsh environment: heat, humidity, dust
  - Capacity planning difficult due to year-to-year load variation
- Installation and operation is complex!

Energy Source Map 2012



Various Alice Springs projects

Solar Systems dishes at Hermannsburg



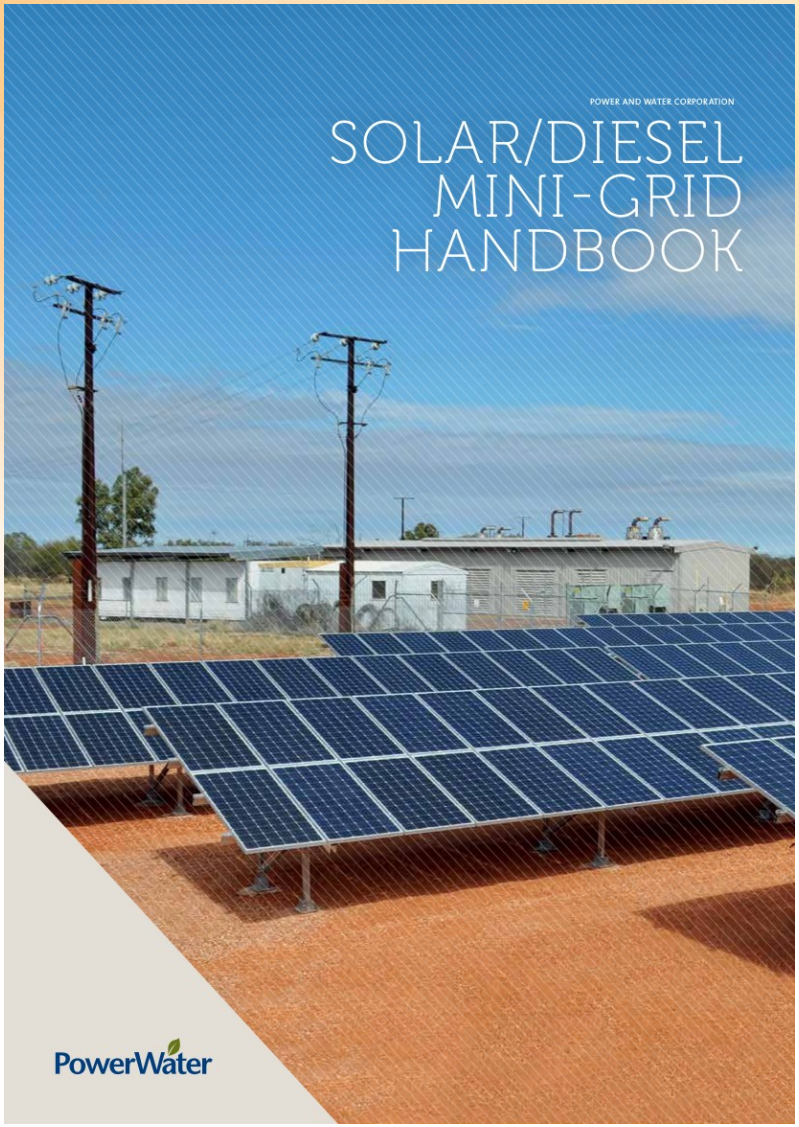
Exceptional solar resource in the NT (Source: AERA)

Diesel delivery can be difficult, especially in the wet season

Ti Tree power station

SOLAR SETUP

- A $55m project delivered by Power & Water Corporation with project partners UNSW, CDU, ACEP and CAT
- Part funded by ARENA ($27.5m) and financed through the NT Government ($27.5m)
- Objective: make solar energy a standard, integrated part of the remote power supply business
- Two components
  - 9 MW of PV across over 30 medium penetration sites
  - 1 MW Daly River project at high penetration


POWER AND WATER CORPORATION
SOLAR/DIESEL
MINI-GRID
HANDBOOK
PowerWater

Knowledge Sharing Deliverables

- Publication of hybrid system performance data
- Update of Solar/Diesel Mini Grid Handbook
- Extension of open source ASIM model
- Delivery of ESO and Indigenous community solar and safety training
- Partnerships with CDU, ACEP and UNSW with real world environments for hybrid mini-grid research at undergrad and postgrad level

Main research questions

- How do PV/diesel systems operate in practice?
- Does PV alter maintenance requirements?
- Will the system last as designed?
- Stakeholder perceptions
- Model verification
- Control system benchmarking and evaluation
- What is the opportunity cost of spilled solar electricity?

Data collection

- Most remote power stations currently collect and store operational data (dial-up)
- A few sites are transmitting data back to Darwin via satellite
- Sat. bandwidth is limited which makes high resolution data collection more challenging
- Data are stored in Darwin in a database suited to real-time data called the PI System (Process Intelligence). We will extract data from PI and process it according to the ARENA data specification.

Public data sharing

- High resolution hybrid operation data
  - PV power, frequency, AC voltage, etc.
- PV generation data and pyranometer data
  - Most of the 30 sites will have pyranometers
  - This makes for a large ground network!
- Visualisation of PV, temperature and demand data
- Updating the Solar/Diesel Mini-grid Handbook

Thank you