Collaboration on Energy and Environmental Markets

Tokelau Case Study

Part 1 of a series on Energy Resilience in Pacific Island Countries and Territories

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Context

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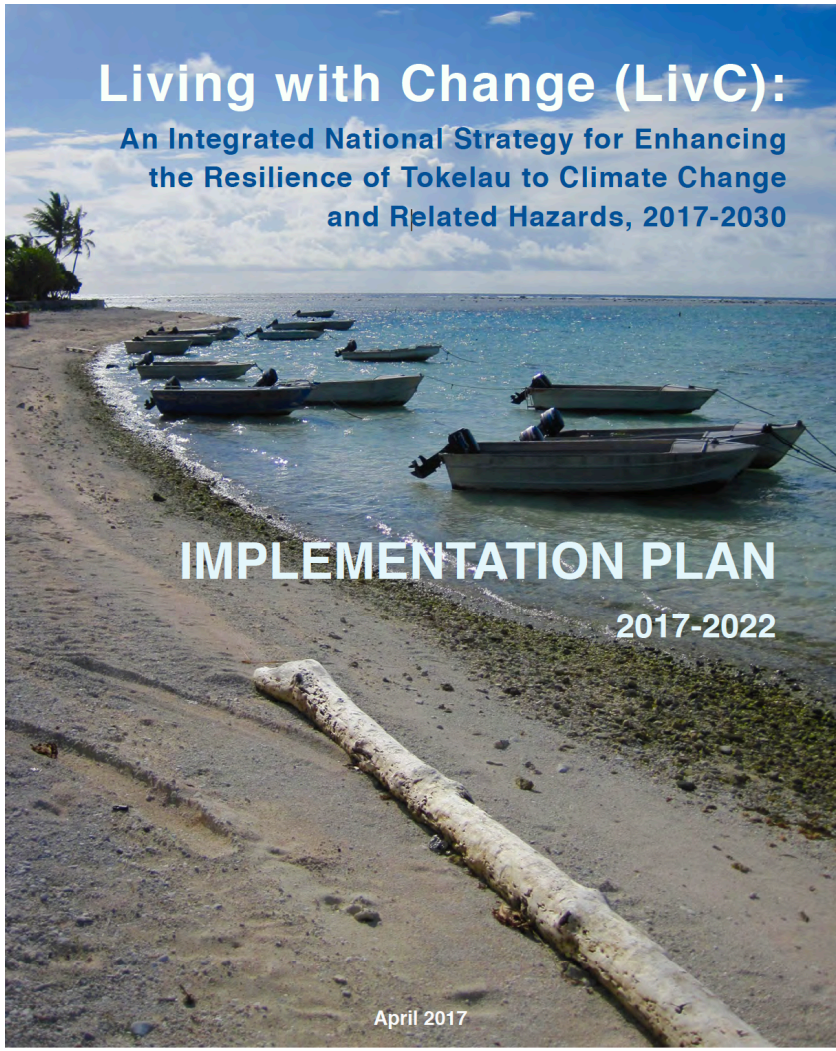
Solar Project

The world's first truly renewable energy nation

'It was a landmark project, which paves the way for a lot of other projects of this scale across the South Pacific.'

- 3 minigrids each around 300kW solar with between 1.1 and 1.6 MWh of battery storage
- Funded by MFAT, Govt of Tokelau
- Prior to TREP the atolls relied on diesel gensets.
- Subsequent addition of 30kW of PV on each island (2016) and the current Renewable Energy Expansion Project (TREEP) - a further 210kW of PV and almost 2MWh of battery capacity.



Resilience challenges

- Remoteness
  - *'Everything is two weeks away'*, including maintenance and spare parts
  - Reliance on external technical expertise - 'maintenance on failure'
- Load growth
  - The TREP introduced 24-hour electricity for communities, increasing reliability and demand
  - Despite an additional 30kW of PV installed on each island in 2016, there has been a reduction in renewable energy contribution
- Tokelau's dependency on imported fuel presents huge financial and logistical challenges
  - *'Diesel is an expensive and logistically demanding source of fuel'*
  - One ship per month delivers diesel to each of the atolls. Sometimes the communities do not get diesel and must go without for long periods of time.

Resilience challenges

- Asset management
  - Harsh environment requires high quality products
  - Constraints of small nation budgets result in maintenance on failure
- Donor dependence
  - Donor dependence puts planning decisions and implementation timeframes outside of Tokelau control

    As the TREP was an ambitious project in such a remote location, the New Zealand Government was hesitant to provide funding, delaying the implementation several years
  - GoT has limited capacity e.g. for planning and tariff design

    Tariffs set too low to invest for load growth, but diesel is still required at times
- And now COVID
  - Tokelau Renewable Energy Expansion Project (TREEP) was set to be installed in 2020, but has been halted by COVID-19
  - COVID-19 has also hindered and system repairs

Planning for resilience

- Equipment quality
  - MFAT's Renewable Energy Mini-grid **Common Design Principles**
- Capacity development
  - Training for utility staff during and after installation, manual operation of generators
- Building reliability and redundancy
  - in distribution network, in TREEP battery capacity
- Tokelau Climate Resilience and Ready Office (TCR2O)
  - Integration of climate change and disaster risk into government and villages' development planning and decision making
- Fiscal discipline required

The Nukunonu array, ITP Renewables