

ACEF Pacific Regional Session

Navigating the Energy Transition in Tonga: Strengthening Security and Resilience in a Changing Climate



05th June 2025

Agenda



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| 1 | Background/Climate Impacts |
| 2 | Energy Trilemma/Quadrilemma |
| 3 | Generation & Distribution experience |
| 4 | Key Takeaways |
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Background

- Small Island with Major Challenges

- Located in the South Pacific with 4 main island grids of Tongatapu (main island), Vava'u, Ha'apai, 'Eua
- Total population approx. 100k Total electricity customers 26,000 (81% residential, 19% commercial)
- Tonga's electricity production has been growing by nearly 5% annually
- Total installed RE Capacity of 13MW, Diesel installed capacity of 21MW
- Energy Mix: RE avg. monthly 22% vs 78% diesel generation
- Line loss approx. 9%



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Climate Impacts

-Resilient energy and infrastructure is not a luxury, it's a **necessity**.

🌀 Tropical Cyclones (2010–2025)

- 2010 – Cyclone Rene (Cat 4)
- 2011 – Wilma (Cat 4)
- 2012 – Evan (Cat 4)
- 2014 – Ian (Cat 5)
- 2018 – Gita (Cat 5)
- 2021 – Harold (Cat 5)

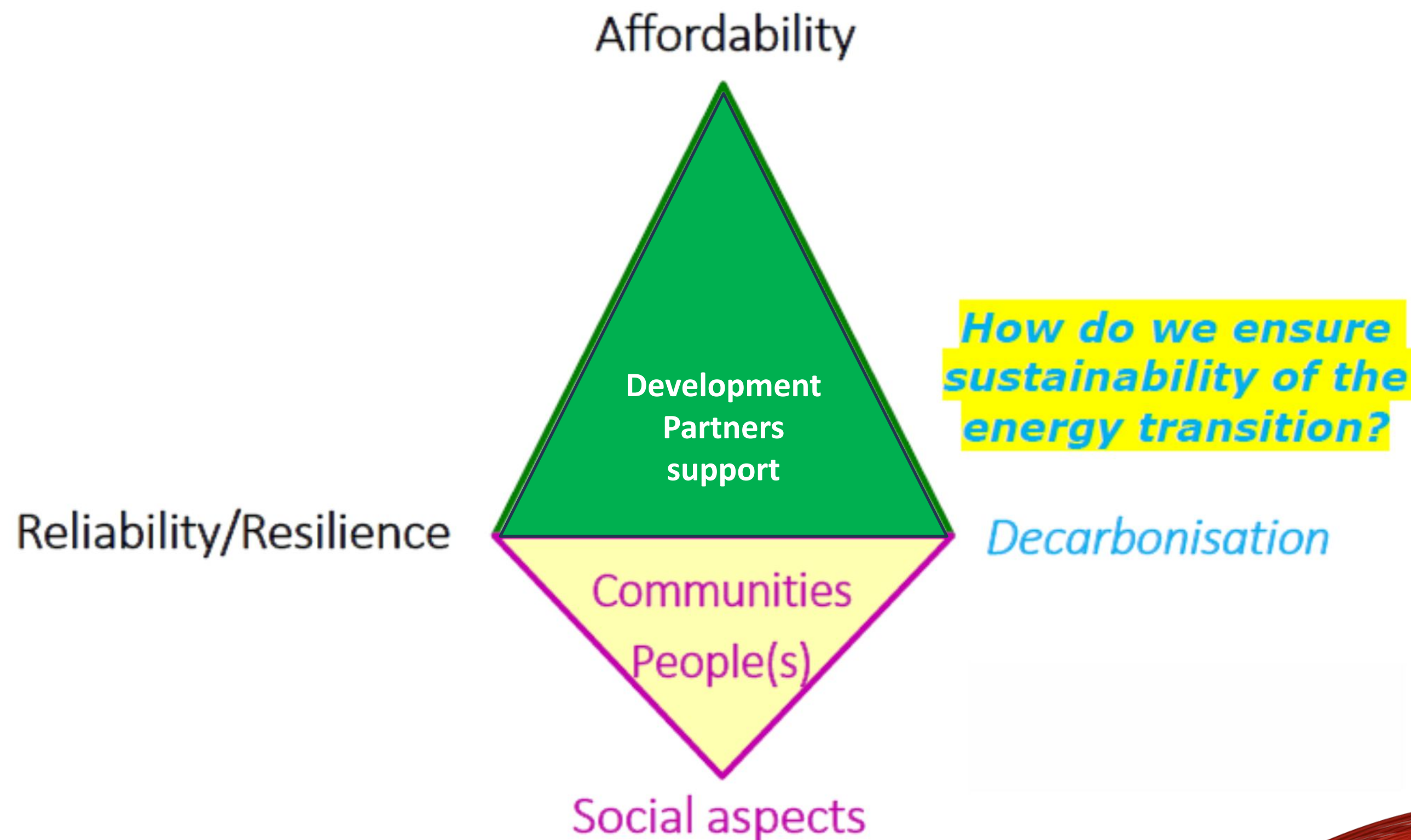
🌋 Volcanic Eruption

- 2022 – HTHH Volcanic Eruption with Coastal Tsunamis



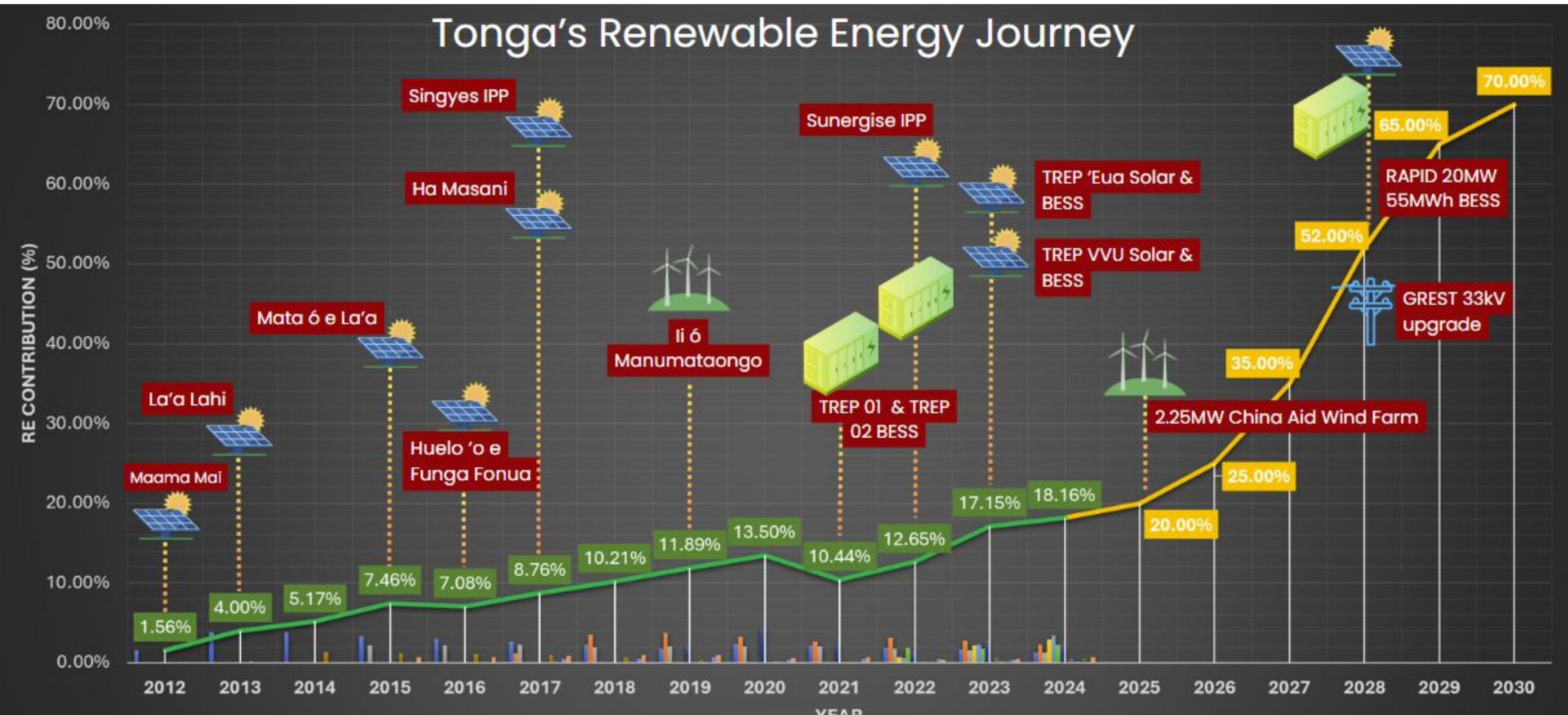
The Energy Quadriema

Sustainable Transition whilst managing



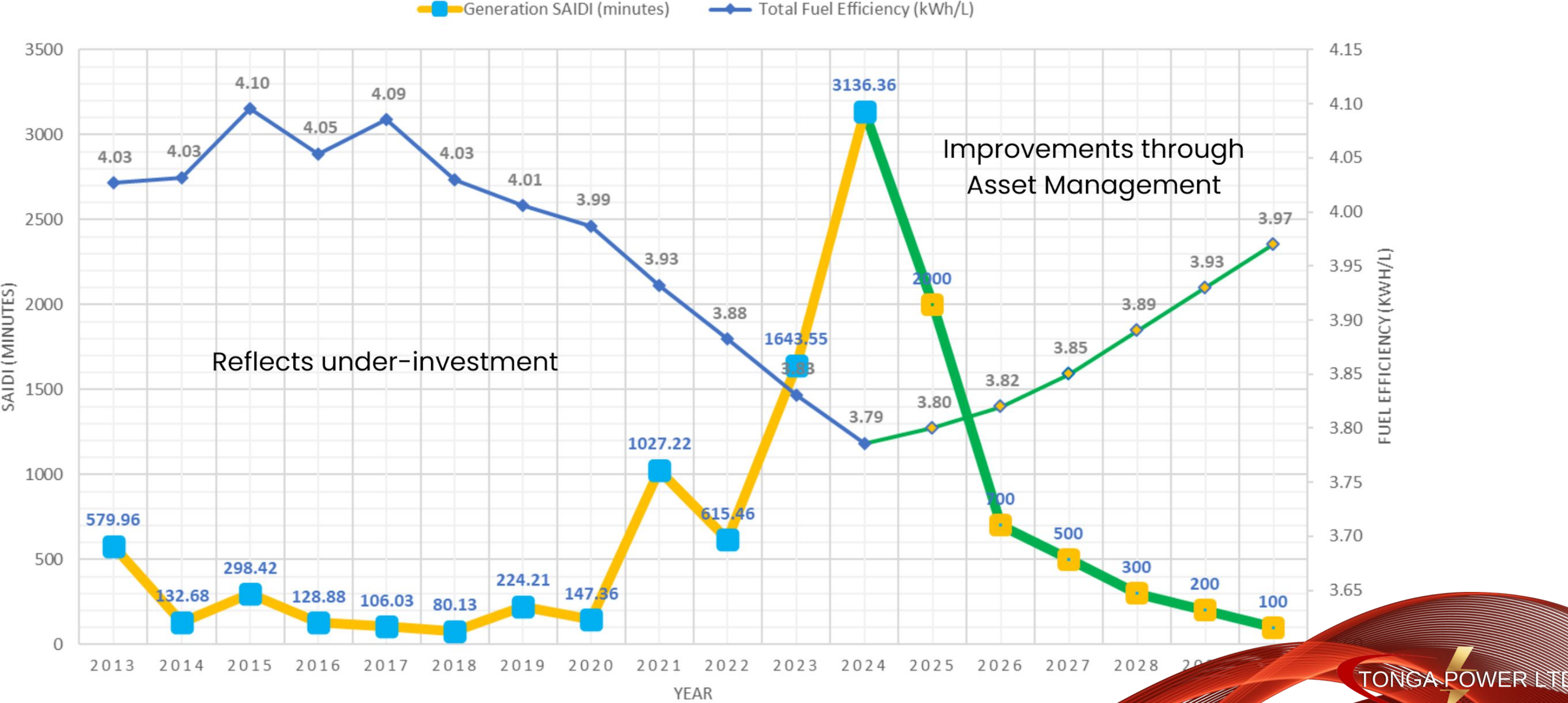
Tonga's transition

- It takes a lot more than just renewable generation



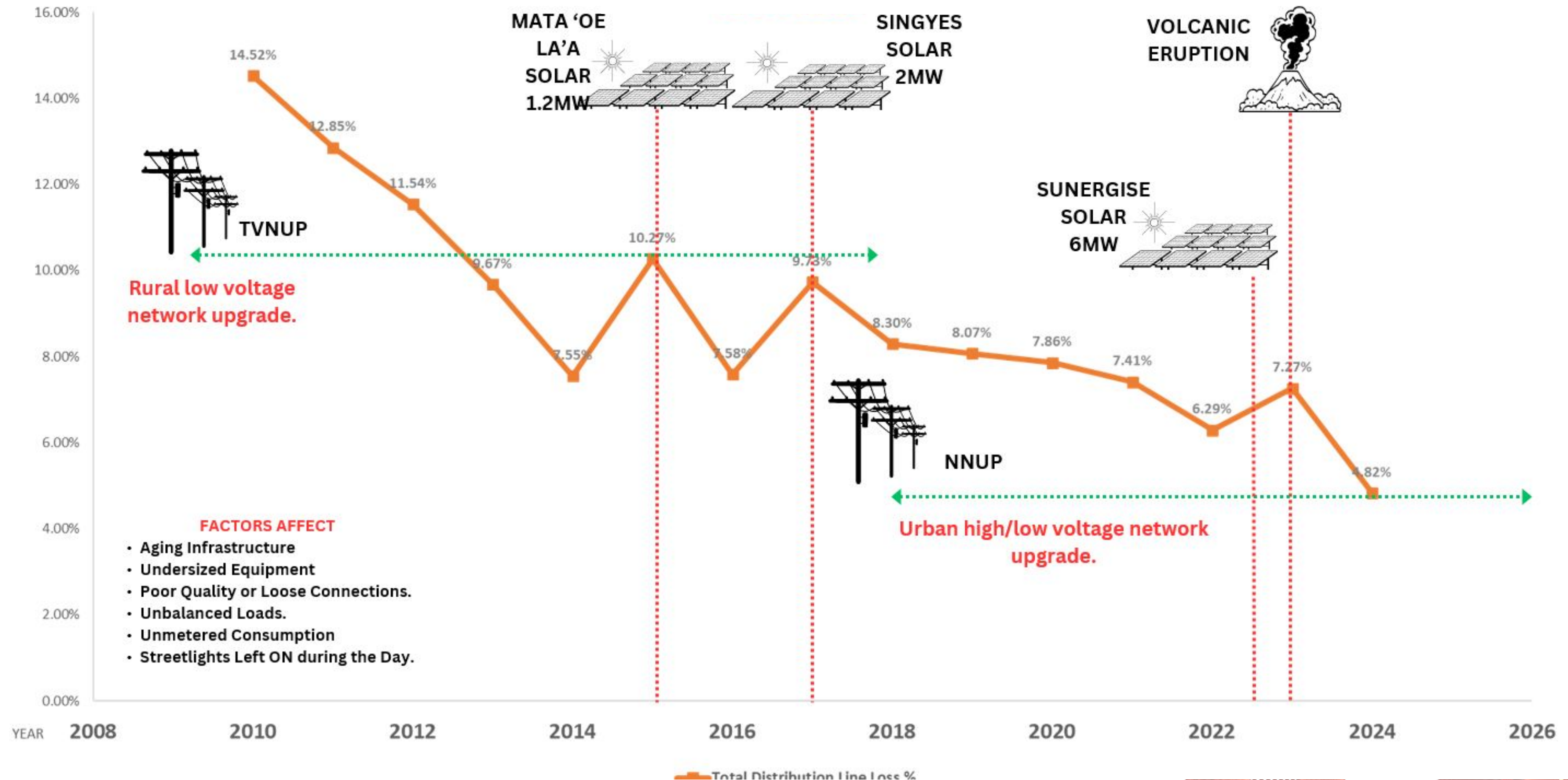
Generation experience

- Limiting costs impacts reliability and renewability negatively



Distribution experience

- Investment in transmission should precede the introduction of new renewables



Key Takeaways

- *Climate Events experienced is evident of the **need** for Energy Resilient infrastructure to ensure sustainability of the Energy transition*
- *“A resilient energy future requires consistent management of **both renewable and conventional generation** — ensuring green energy integration while maintaining diesel generation for grid stability and inertia.*
- **Strategic Integration:** *“To ensure energy security and affordability, renewable generation must outpace demand growth — not chase it. Delay risks locking in fossil fuel dependence and cost instability.”*
- **Asset Management:** *“Energy resilience is built not just on new investments, but on how well we manage and maintain the assets (Power gen/Network) we already rely on every day.”*
- "Ensuring that all aspects of the Energy quadrilemma (Affordability, Resilience, Decarbonisation, social) is achievable will still require the backing of Development partners for SIDS and participation/alignment of local stakeholders
- Technical expertise and knowledge sharing is ever more important to ensure sustainable operability of the energy infrastructure (*importance of events such as ACEF*)

