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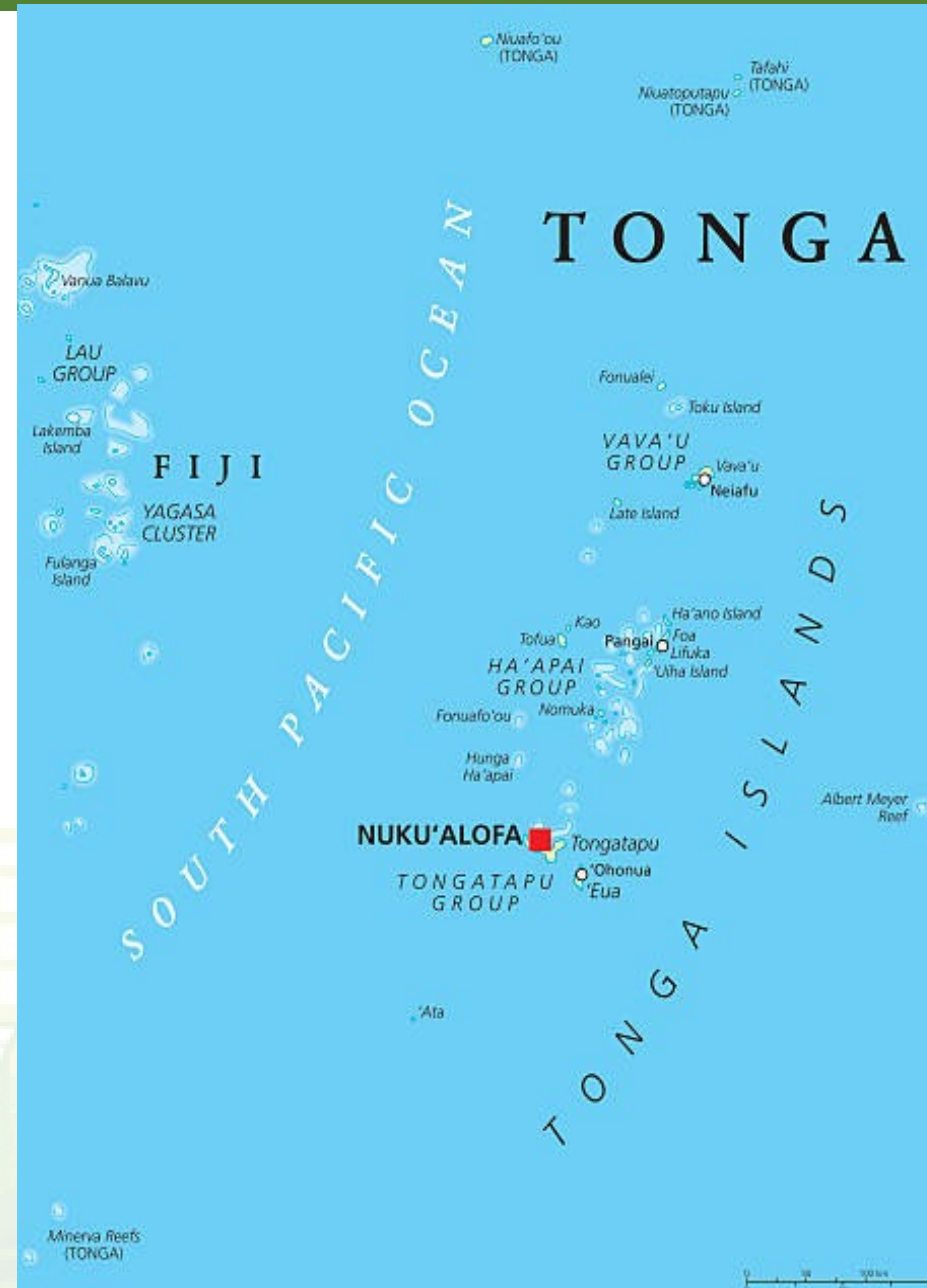
# REGIONAL CONFERENCE RESILIENCE BUILDING TONGA

7–9 MAY 2024 • Galle, Sri Lanka



# BACKGROUND

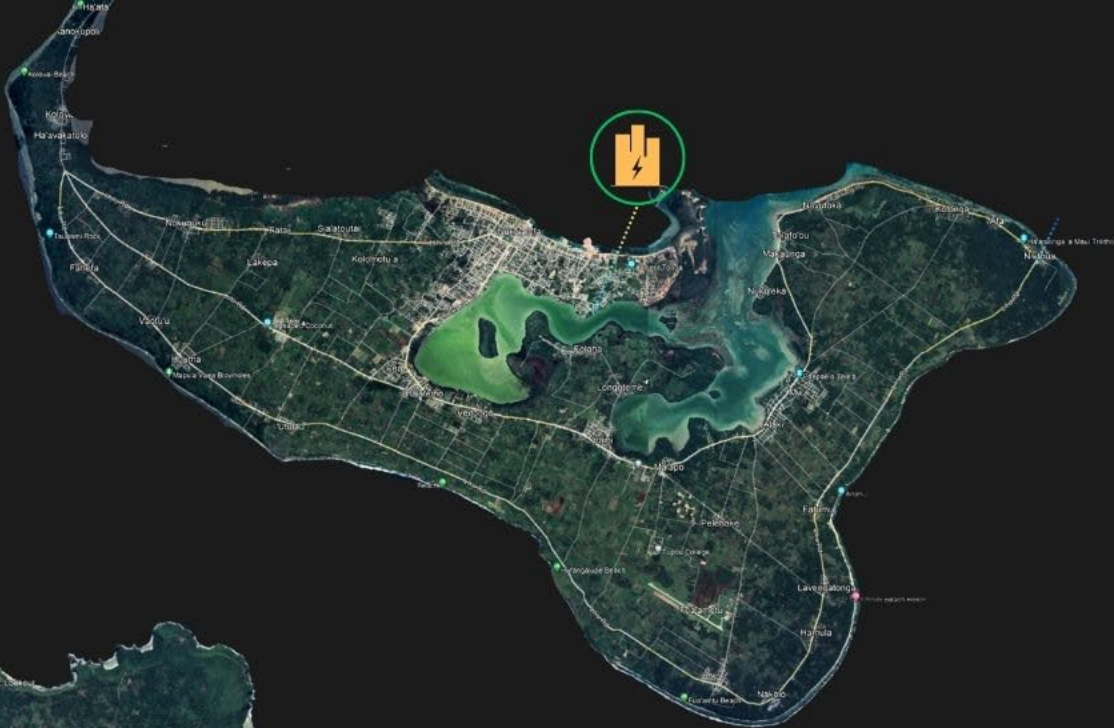
- The Kingdom of Tonga is located in the South Pacific with 4 main island grids of Tongatapu (main island), Vava'u, Ha'apai, Éua
- Total population approx. 100k Total electricity customers 26,000 (81% residential, 19% commercial)
- Tonga's electricity production has been growing by nearly 5% annual since 2014
- Total installed RE Capacity of 13MW, Diesel installed capacity of 21MW
- Energy Mix: RE avg. monthly 22% vs 78% diesel generation
- Line losses approx. 9%
- Problem: Effective management of our island grid to maintain reliability and affordability of electricity whilst transitioning to renewable energy. Financing of maintaining grid resilience is key for this transition.
- Opportunity: Strategic review towards ensuring grid resilience during the transition phase to RE. Collaboration with ADB and other donors in administering, financing an of transitioning to RE, upcoming enabling projects and RE projects in the pipeline



# GRID IN 2010

## TONGATAPU

- 1 POWER STATION



## 'EUA

- 1 POWER STATION



## HA'APAI

- 1 POWER STATION



## VAVA'U

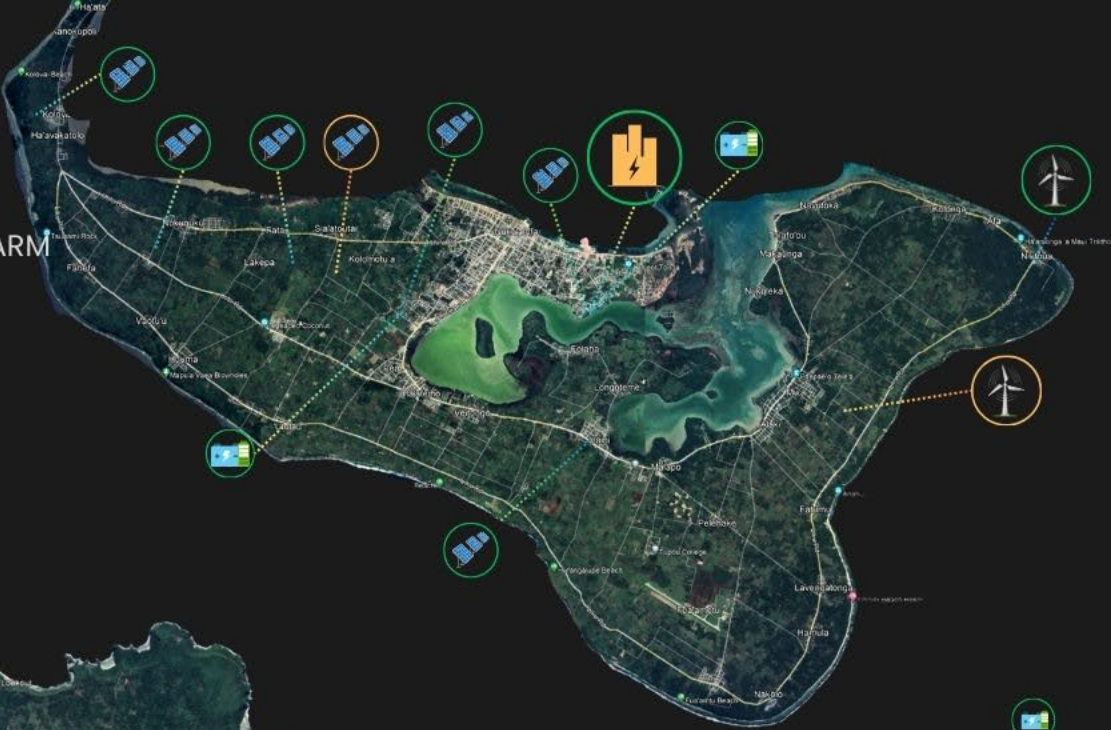
- 2 SOLAR FARM ALSO INCLUDING OPERATIONAL BESS TREP
- 1 POWER STATION



# GRID IN 2024

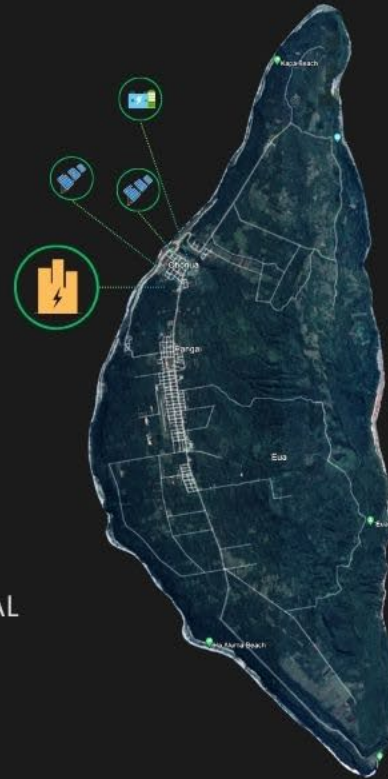
## TONGATAPU

- 6 SOLAR FARM
- 1 UPCOMING SOLAR FARM
- 1 WIND FARM
- 1 WIND FARM IN PROGRESS



## 'EUA

- 2 SOLAR FARM ALSO INCLUDING OPERATIONAL BESS TREP
- 1 POWER STATION



## VAVA'U

- 2 SOLAR FARM ALSO INCLUDING OPERATIONAL BESS TREP
- 1 POWER STATION



## HA'APAI

- 1 SOLAR FARM INCLUDING OPERATIONAL BESS
- 1 POWER STATION



# SYSTEM – GRID RESILIENCE FOR TONGA

- Resilience towards:
  1. **Climate events challenges** (tropical cyclones, HTHH Eruption) through network upgrade projects to the grid, improving power reconnection from 1 month to just 1 week in cyclone Harold (ADB Funds to NNUP Area 1 & 5)
  2. **Smart Grid Challenges:** Efficient and effective power generation management due to complex and intermittent nature of energy mix, solar, wind, BESS and diesel generation a big challenge especially with the skill gaps of power generation engineers. TPL aiming to complete its power management system in June to effectively automate power gen functions
  3. **Increase RE integration challenges:** As TPL is rapidly transitioning to 70% RE by end of year 2025 collaboration with ADB to manage upcoming 20MW solar with strengthening of the grid through the ADB project GREEST Project 33 & 11kv upgrades.
- Social Aspects:
  1. TPL's Network upgrade projects not only enhances resilience but also offers free new connection to homes who have access to electricity for the first time
  2. 20% of Project construction team are Lineswoman
  3. Community consultation prioritized especially with promoting women participation towards effective implementation of the projects
  4. Promoting more businesses owned by women especially in remote islands where our renewable energy projects with ADB has enabled shift of avg. electricity hours from 4 hours to 24 hours enabling more women towards setting up their own businesses



# CONCLUSION – GRID RESILIENCE IN TONGA

- **Summary**

1. **Strategically Plan for technological challenges** in order to maintain grid resilience you cannot underestimate technological challenges of new and intermittent nature of renewable energy technology
2. **Strategically planning for Capacity Building needs to manage these technologies:** In order to effectively and consistently maintain the reliability of our renewable energy technologies and the smart grid transition, staff trainings and capacity building to be prioritised
3. **Continuous Learning:** Continuously reviewing grid performance and strategic plans for the country to be able to learn and resolve past issues
4. **Power of Collaboration:** For SIDS such as Tonga enabling this transition cannot be done alone but will require close collaboration with our partners such as the Asian development Bank. We thank the ADB for your continuous support despite the countless challenges faced.

- **Next Steps**

1. TPL progress its 20WM Solar IPP Project to achieve the nations 70% RE target
2. Working with ADB on securing of GREST Project funds for grid strengthening of the grid
3. Complete current network upgrade project funded through the ADB for our main island CBD areas
4. Complete Power generation control center project June 24
5. Further discussions with ADB towards refining scope for the network distribution control center project (enable smart grid)

