# Tonga Energy Road Map 2021-2035

## Discussion points

# Oil supply

**Premise**

- Oil products will continue to account for a large share of Tonga's total primary energy supply
- To increase security of supply and reduce prices, establishment of direct shipments of oil products from Singapore

**Discussion**

- Agreement on how to build, finance, and operate infrastructure to accommodate medium-range tankers needed
  1. Past assessments concluded that a privately-owned medium-range tanker terminal with regulated open access is most beneficial option
  2. Alternatively, the GOT could invest in the additional infrastructure for accommodating medium-range tankers, while agreeing on terms to use the existing assets

# Options for direct shipments

| | Privately-owned terminal with regulated open access | Publicly owned additional infrastructure, ownership of existing fuel assets unchanged |
|---|---|---|
| Benefits | Comparatively minor price reductions of 8-9 seniti per liter expected | |
| Complexity | Single, dedicated company owning and operating the terminal, but some complexity due to open access regulation | Multiple infrastructure owners and operators with agreement, coordination, and supervision of several private sector contracts, for fuel supply, terminal construction, and terminal operations |
| Supply via tenders | Costs might not be reduced as a result of tendering supply (in addition to cost reduction from medium-range tanker port) | |

# Electricity generation

**Premise**

- Electricity generation accounts for a quarter of total primary oil supply
- To reduce usage of oil, electricity generation should switch from oil to renewables
- Available (known) renewable sources are primarily solar and wind

**Discussion**

- Achieving 100% electricity generation from variable (wind) and intermittent sources (solar) will be costly due to numerous technical challenges

# Electricity generation

| Challenge | 70% electricity generation from renewables | 100% electricity generation from renewables |
|---|---|---|
| Flexibility<br>Storage, dispatchable electricity generation, expansion of distribution networks, technologies for fast frequency response (loss of inertia), demand side responses | Some dispatchable electricity generation from fossil fuels<br>Considerable storage required | No dispatchable electricity generation from fossil fuels<br>Even more storage required<br>Renewable-firm resource not yet identified |
| Uncertainty of generation<br>Need for elaborate forecasting of output from renewable sources | Uncertainty somewhat balanced by dispatchable electricity generation from fossil fuels | High uncertainty with only storage as backup |
| Independent power producers | Careful assessment of and legally binding arrangements concerning curtailment of generation in times of oversupply | |

# Electricity consumption

**Premise**

- Electricity consumption for residential sector calculated as 44% of total electricity consumption
- Commercial and public services corresponds to the remaining 56%
- The residential sector is the fastest growing electricity consumer in Tonga

**Discussion**

- Limiting growth of residential electricity to 1% per year might be challenging for a SIDSs country that is developing

# Electricity consumption

| | Energy Efficiency Standards for Appliances and Buildings |
|---|---|
| Benefits | Reduction in electricity consumption |
| Complexity and challenges | Minimum energy performance standards (MEPS) for appliances<br>Expansion of MEPS appliances is necessary<br>Application of more stringent standards might be costly<br>Energy efficiency standards for buildings<br>Adoption of energy efficiency standards to building code<br>Passive ventilation, daylighting, cooling techniques to reduce energy consumption<br>Increased use of solar water heaters to replace electric heaters |
| Issues and requirements | Government subsidies on MEPS appliances and loan programs<br>Curtailment of import of non-compliant appliances<br>Identification of baseline and common practice for various appliances<br>List of eligible equipment and suppliers<br>Building awareness and knowledge |

# Transport

**Premise**

- Oil products will continue to account for a large share of Tonga's total final energy consumption,
- Transport represents nearly 90% of total final oil consumption
- Electrification of transport (EoT) could reduce oil consumption

**Discussion**

- Electric vehicles might contribute to reduce oil consumption, but there are numerous obstacles (costs, increased electricity load and sufficient charging infrastructure)
- Fuel efficiency standards for vehicles with some EoT might be a more practical approach to reduce oil consumption in the transport sector

# Transport

| | Electric vehicles | Fuel efficiency standards |
|---|---|---|
| Benefits | Reduction in oil consumption by switching from oil products to electricity | Reduction in oil consumption due to lower fuel demand |
| Costs | Higher cost of electric vehicles<br>High costs for charging infrastructure | Higher cost of more efficient vehicles |
| Issue and uncertainties | Education, acceptance and uptake of electric vehicles by consumers<br>Requirements towards electricity generation, network and dispatch | Acceptance of higher vehicle prices by consumers<br>Enforcement of efficiency standards |

# Thank You

GGGI

www.gggi.org

Follow our Activities on
Facebook and Twitter