

Pacific Submarine Cables

*“The economic highway of the future
will be made with glass not bitumen”*

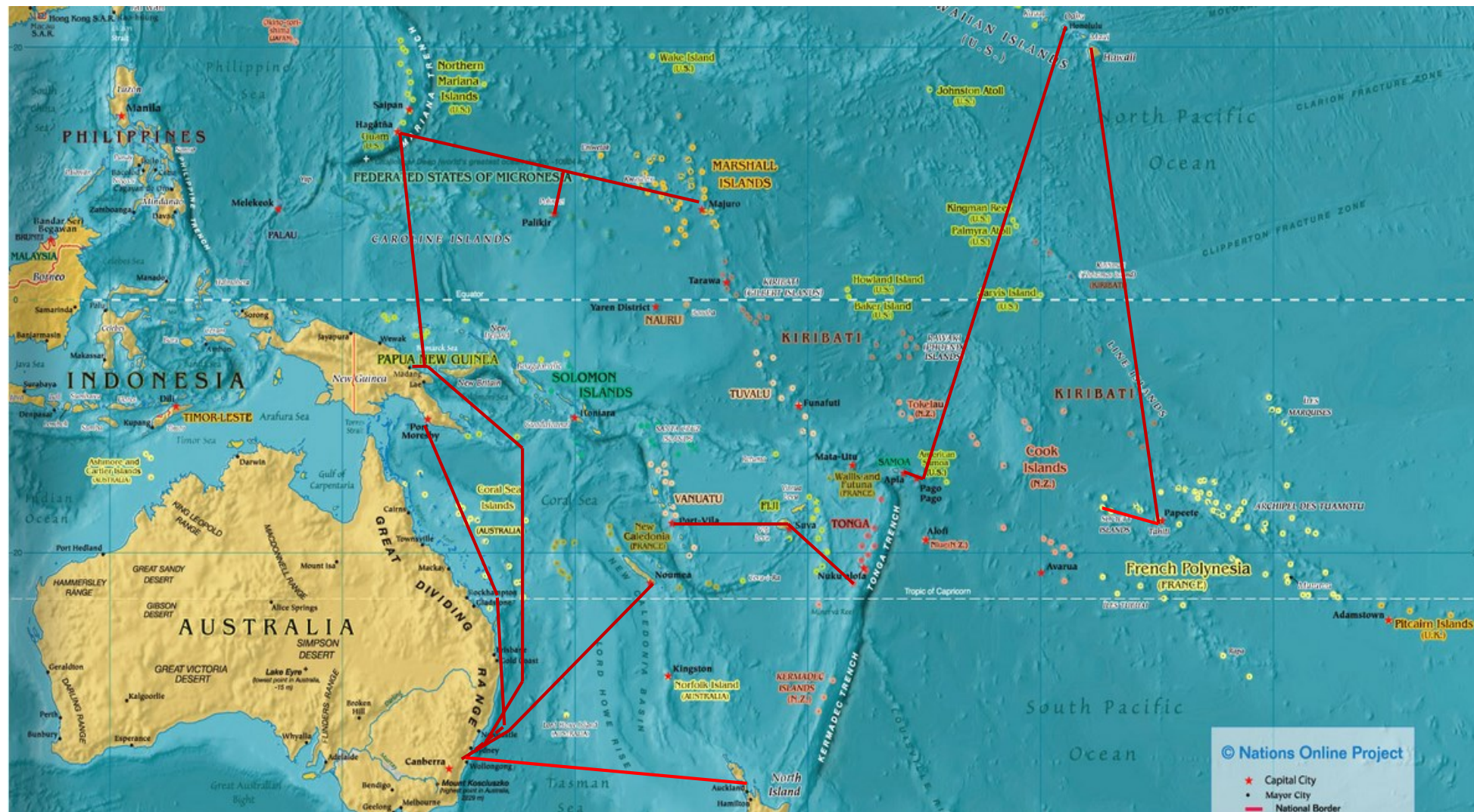
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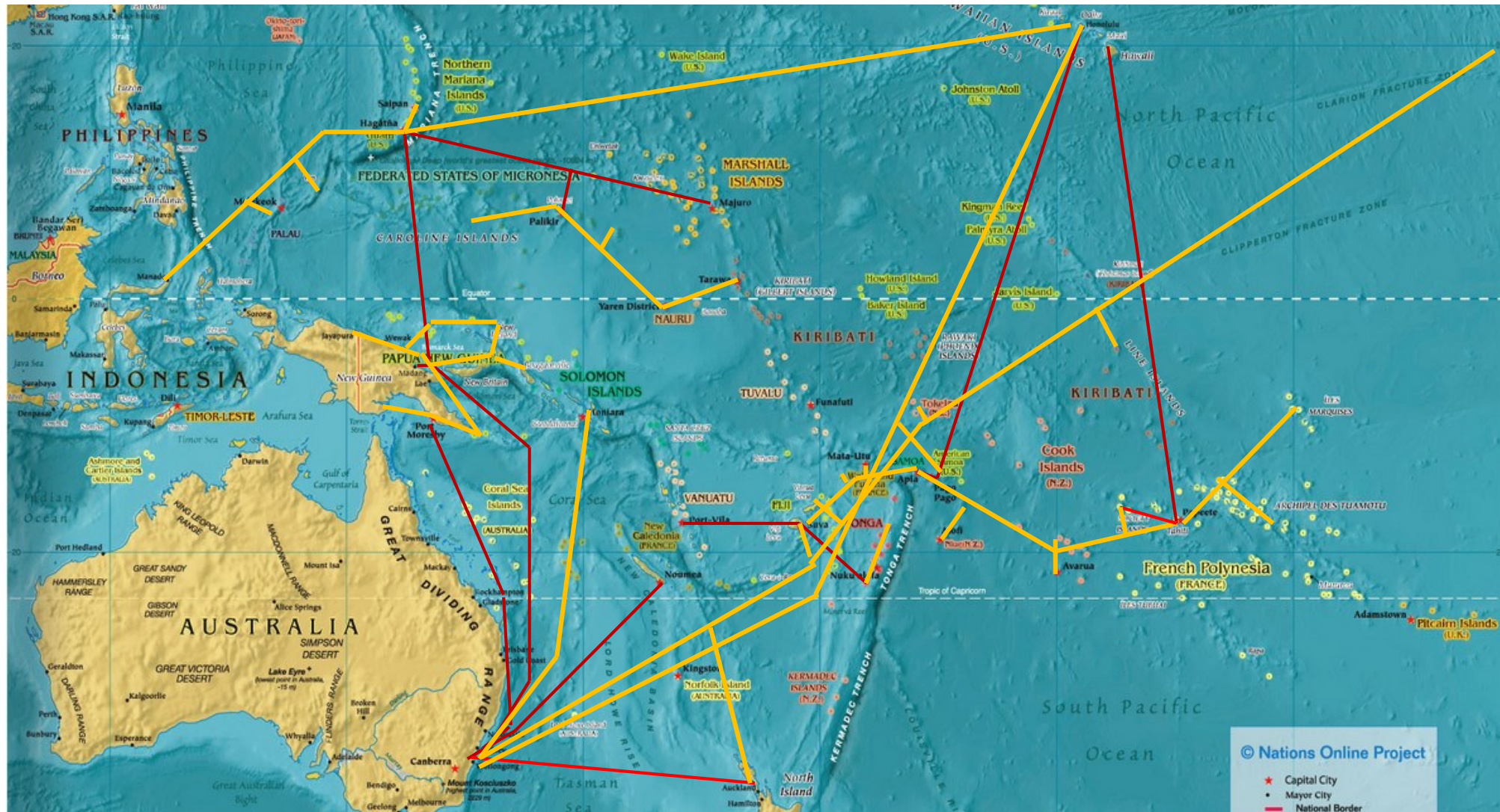


Objective of the Presentation

Cables installed in the last decade



Cables on the Radar



Which countries or territories are missing cables?

Tuvalu

Norfolk Is

Pitcairn Is

Easter Is

There are not many left!

Domestic Submarine Cables

FOCUS TURNING TO DOMESTIC CABLES BETWEEN ISLANDS IN A COUNTRY

- Palau festoon (Palau)
- Saipan-Tinian- Rota (CNMI)
- Chuuk-Pohnpei (FSM)
- Pohnpei – Kosrae (FSM)
- PNG Domestic festoon (PNG)
- Honiara- Auki- Noro (Solomons)
- PICOT: Grand Terre-Ouvea-Lifou (New Caledonia)
- Suva-Savusavu (Fiji)
- Tongatapu-Vava'u (Tonga)
- Wallis-Futuna (W&F)
- Atafu-Nukunonu-Fakaofu (Tokelau)
- Apia-Savaii (Samoa)
- Rarotonga-Aitutaki (Cook Is)
- Tahiti –Bora Bora (French Pol)
- Tahiti – Tuamotu – Marquesas (FP)

Second Cables for Diversity

SOME PACIFIC ISLANDS IMPLEMENTING SECOND CABLES FOR DIVERSITY

- Saipan, Tinian, Rota
- Samoa
- Tahiti
- American Samoa
- Fiji
- PNG
- New Caledonia



Features of Pacific Island Cables

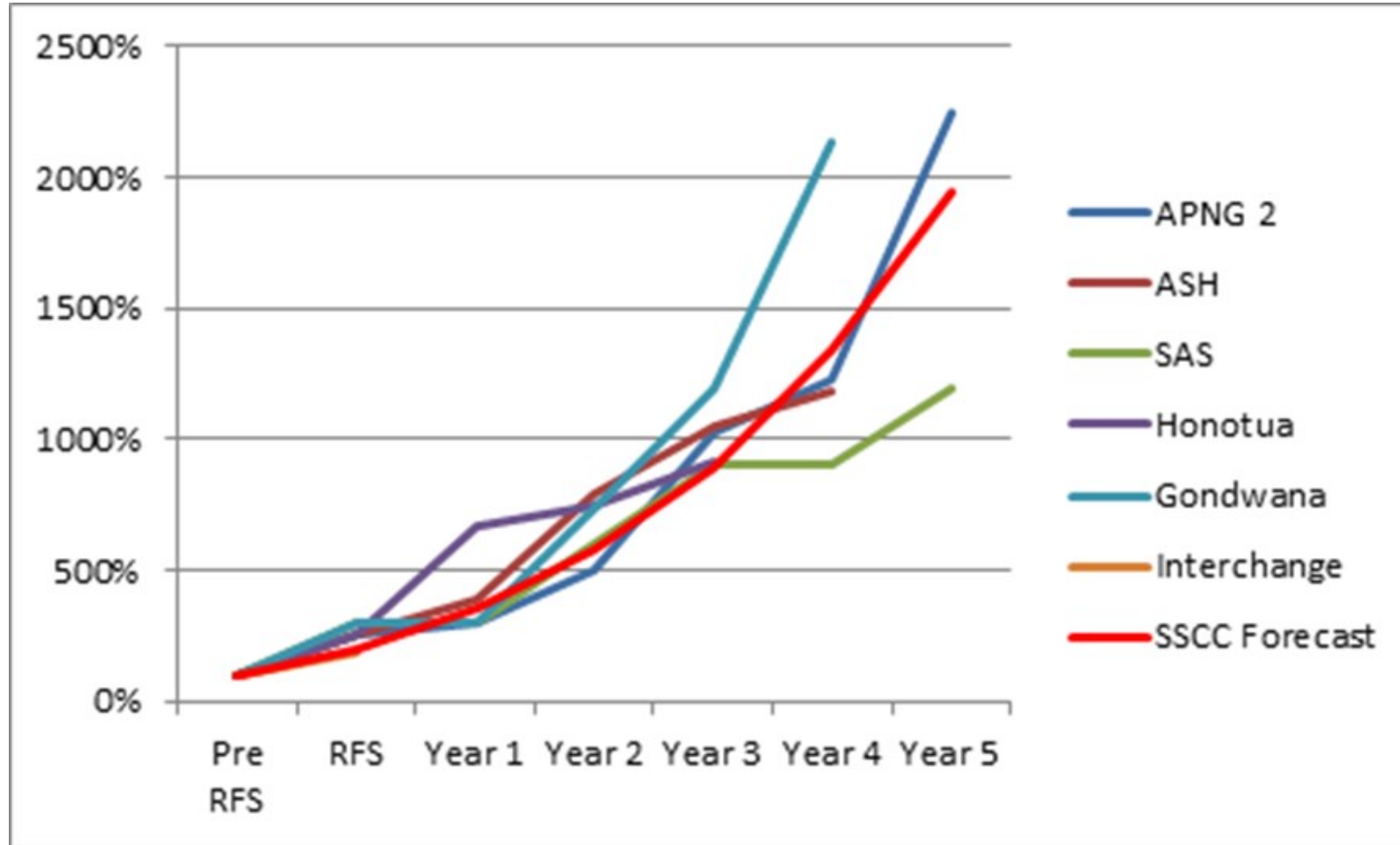
- Megabits and Gigabits, not Terabits
- Very significant lengths
- Critical links – often single umbilical cord key to country's economy
- Prices down from \$1000's per Mbps to \$100's but not \$10's
- Very few capacity buyers
- Opex can be difficult to cover with revenue
- Capex funding a challenge; MDB's often needed
- Skills hard to find and retain
- Skills shortage or opex minimisation encourages outsourcing



Pacific Cable Experience

Cable	Routing	Demand prior to commissioning	Capacity one month after date of commissioning	Capacity Now
APNG2	PNG – Aust	22Mbps	45 Mbps (Nov 2006)	1100 Mbps
Gondwana	New Cal – Aust	150 Mbps	450 Mbps (Oct 2008)	10,000 Mbps
ASH	Pago-Hawaii	35 Mbps	90 Mbps (May 2009)	850 Mbps
SAS-ASH	Apia-Hawaii	15 Mbps	45 Mbps (May 2009)	250 Mbps
PPC -1 spur to PNG	Madang – Guam & Sydney	N/A	20 Mbps (Oct 2009)	4000 Mbps
Honotua	Tahiti -Hawaii	600 Mbps	1500 Mbps (Sept 2010)	14,000 Mbps
Tonga Cable	Tonga-Fiji	80 Mbps	310 Mbps (Aug 2013)	900 Mbps
Interchange Cable	Vila-Fiji	150 Mbps	450 Mbps (Jan 2014)	1250 Mbps

Pacific Cable Experience



Structural Alternatives

- **Consortium Cables:** Capacity and funding linked; all funds from owners equity; no project debt; need to cover costs but no profit, requires multiple owner-buyers.
 - East Micronesia Cable (proposed)
 - Manatua Cable (proposed)
- **“Private” Cables:** Capacity and ownership not linked, funding from equity and project debt; the cable needs to give equity parties an ROI; NPF can participate.
 - Tonga Cable
 - Interchange Cable
 - Palau Cable
 - Yap Cable
 - Tui-Samoa Cable

Few consortium cables due to few users

System Design

Many network & technical elements to consider:

- Point to point route
- Connect to a hub (e.g. Fiji, Guam) to contain cable length
- Connection of Opportunity - Spur off a more major cable
- BU for domestic connections or other territories – planning!
- One fibre pair or two?
- High capacity or modest capacity - repeater spacing?
- Types of landings; safe places to land
- Cable stations – new, existing telecom site; construct or buy building, land ownership
- Connectivity for customers – how accessible will the cable be?

Complexity often overlooked by Governments & Regulators

Building the Business Case

The Development Phase – justifying the investment!

- Choosing the route
- Projecting demand
- Determining the costs
- Sourcing the funding
- Modelling the prices for the requisite revenue
- Regulatory requirements
- Government factors



What are the Costs?

Cable Station costs

Floorspace rental, power, fuel, maintenance costs, consumed spares

Marine Costs

Marine maintenance, funding reserve for repairs, cable depot

Operations Costs

NOC costs, staffing, site security, costs of outsourcing

Administration & Finance

Management costs, Office costs, Debt servicing, Insurance, Billing and Accounts, Leases and Permit renewals, licence fees



Funding

Sources

- Owners' equity
- NPFs
- Commercial banks
- MDBs and aid agencies (WB, ADB, PRIF, AFD, etc)
- Capacity users' deposits

Points to remember

- MDB's only fund upfront costs not ongoing costs
- Can be substantial costs for due diligence
- MDB's typically only fund up to 80%; owners find the rest
- MDBs only lend monies to government



Project Documents



- Cable Structure – e.g. C&MA, MOU or Shareholders' Agreement
- Main Supply Contract
- Landing Party Agreement (LPA)
- Civil works contract
- Loan Agreement
- Capacity Use Agreement (CUA)
- RIO (Reference Interconnect Offer)
- EIA (Environmental Impact Assessment)
- Permits and Licences
- Marine Maintenance Agreement
- NOC and operational support agreements
- Onward connectivity

Comments for Regulators

- Cables sell wholesale and capacity buyers sell retail
- Pricing difficult to set due to need for revenue to cover opex and debt servicing, and acceptable profit
- Annual Operating costs are constant over time (maybe rising at CPI) so unit prices can only fall as fast demand grows.
- MDBs accept that 10% rate of return is OK
- Open access to CLS important so RIO (aka RAO) essential
- Single cable will be a dominant facility but satellites do offer some competitive pressure
- Restoration generally responsibility of capacity buyer not the cable owners
- Backhaul is generally a responsibility of customers, not cable owners who only have to provide space and power (at a reasonable cost) to enable the customers to establish their links to the CLS
- Sharing domestic cables between competing carriers presents challenges to ensuring use



Comments for Governments

- Recognise that cables will facilitate e-commerce which will potentially be the largest enabler of a country's future wealth.
- Promote development of applications to exploit the abundant capacity (e.g. e-health, e-gov, e-learning, teleworking) and enhance the wellbeing of the population
- Promote feeder networks so that CLS does not get bottlenecked
- Work with funding agencies to ensure a appropriate proportion of such funds is applied to communications in the country
- Determine whether you wish to have private investors or direct government ownership.
- If capacity price set too low and revenue does not cover costs, government may need to inject funds to maintain the vital infrastructure
- Governments need to think carefully about taxing at the wholesale level (as it effectively creates dole taxation)



REMEMBER

“The economic highway of the future will be made with glass not bitumen”



Thank You

ENSURE YOUR COUNTRY'S FUTURE