Imagining Pacific Ports in 2050

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Image generated by DALL E

Disclaimer

- No one can predict the future. For sure the future won’t look as I have painted it!

Climate change impacts - weather

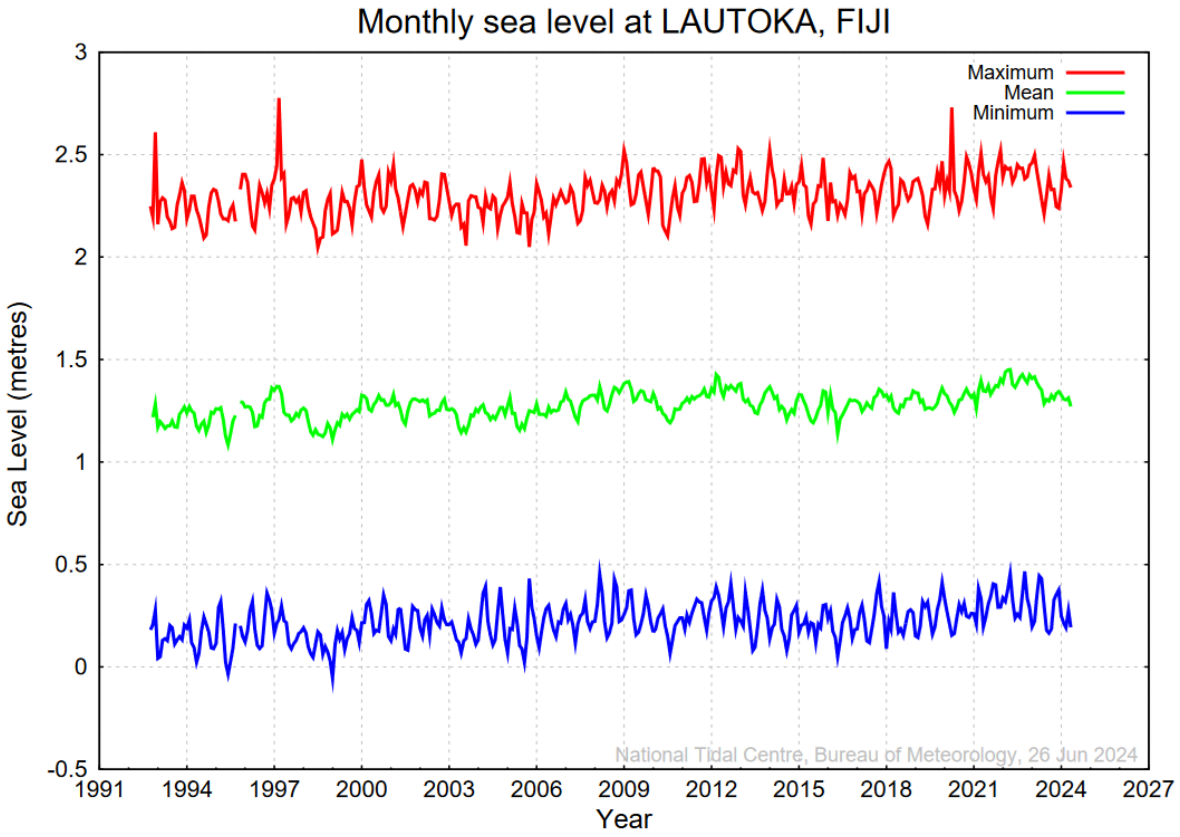
Very hard to predict

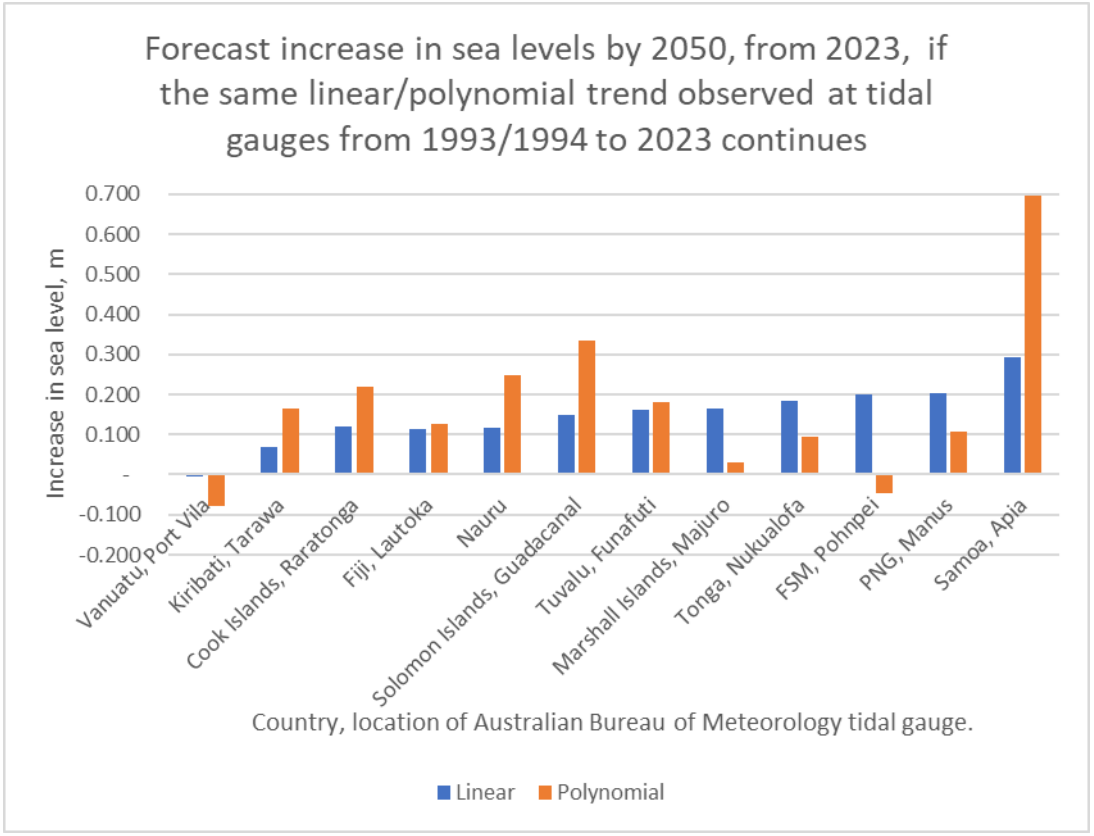
For the west Pacific:

- Tropical cycle frequency to decrease, but intensity to increase
- Storm surge events to increase
- Temperatures to increase.

https://www.met.gov.fj/aifs_prods/Climate_Products/Country%20Report%20Fiji.pdf

Climate change impacts – sea levels





Lautoka plot, and trends developed from data provided, from:
http://www.bom.gov.au/oceanography/projects/spslcmp/data/monthly.shtml

Energy supply

- PICs will have reduced their dependence on fossil fuels for electricity generation and land-based transport,
- Domestic vessels travelling very long distances will still use hydro-carbon based fuels, but those travelling shorter distances won’t be.
- Ports will be near 100% electric in operations, with solar panels covering roofs (which already makes economic sense now in 2024).

Land transport

- As battery prices plummet and performance improves all vehicles (cars first, then buses and trucks, and finally specialist equipment) will be electric, and autonomous.
- Most vehicles entering Pacific ports will be electric, some will be automonous.

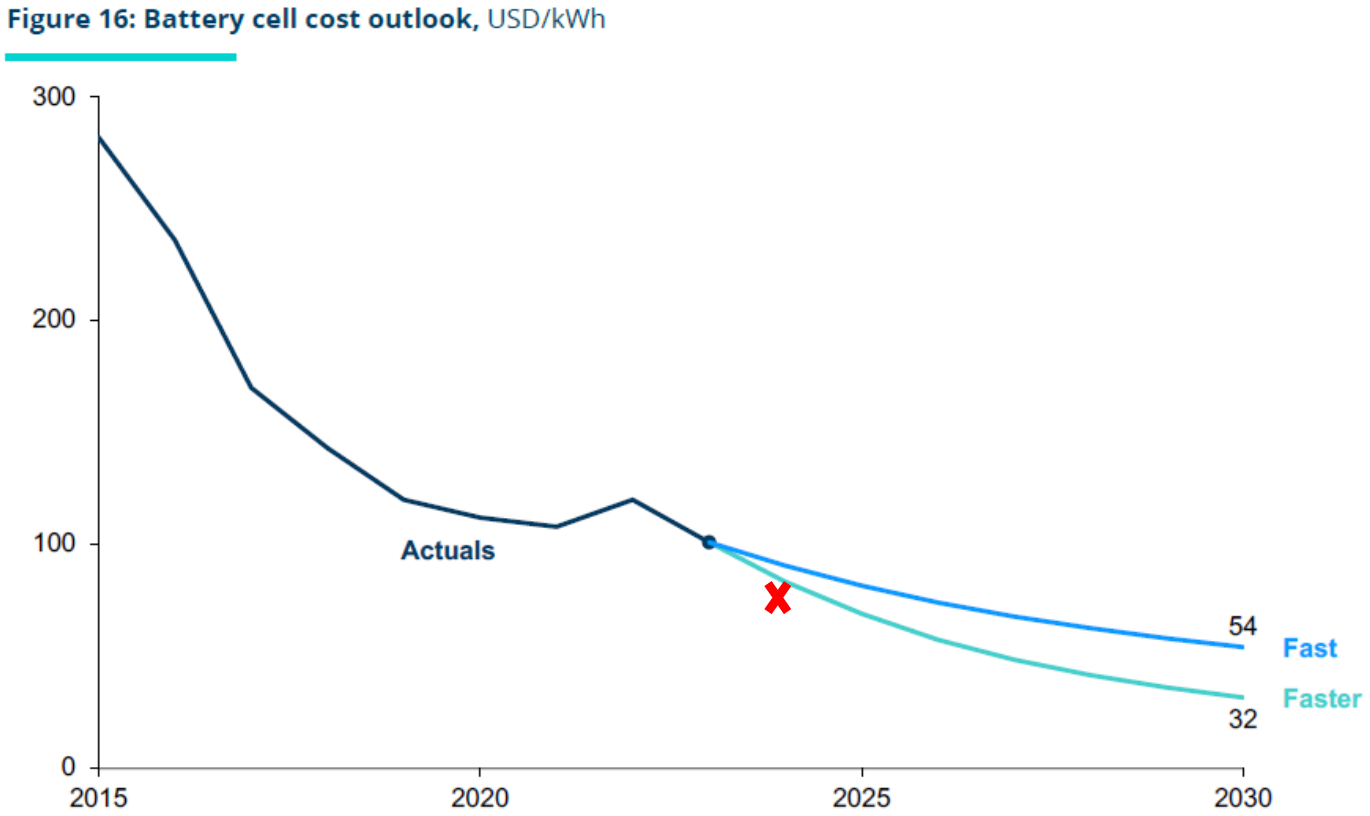


Image from X-Change: Batteries, The Battery Domino Effect, RMI, https://rmi.org/wp-content/uploads/dlm_uploads/2023/12/xchange_batteries_the_battery_domino_effect.pdf

Ships and bunkering: Little apparent change with fuels

- LNG?
- Methanol?
- Ammonia?
- Hydrogen?
- Biofuels?
- Nuclear?
- Alternative fuels won't be widely used in PIC domestic vessels

- Retrofit of old vessels is challenging

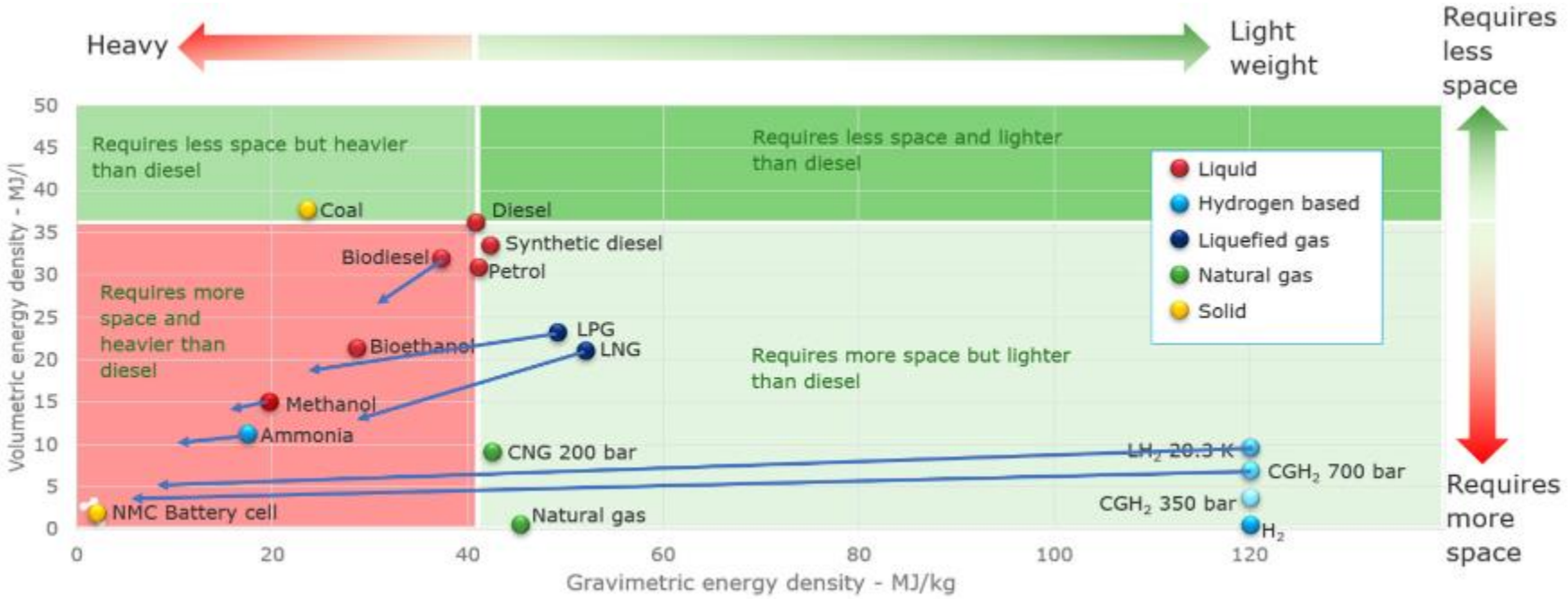


Image from Comparison of Alternative Marine Fuels, 2019, DNV.GL https://safety4sea.com/wp-content/uploads/2019/09/SEA-LNG-DNV-GL-Comparison-of-Alternative-Marine-Fuels-2019_09.pdf

Ships and bunkering: batteries

- By or before 2050 it will be cost-effective to replace diesel tanks with batteries, and diesel engines with electric motors, in existing vessels, as the energy density of batteries will be 10 times higher than today.
- This will gradually flow through to domestic vessels at PIC ports
- Ports will provide “bunkering” of electricity.
- High-power shore power (in the MW capacity) will be in demand at PIC ports.
- Diesel to battery-electric vessel conversions will be in demand in PIC dry-docks.

Cargo handling

- Rapid advances in AI and humanoid robots will enable faster and safer cargo handling, including operating existing machines.
- Cargo handling will be battery electric, and automated in most, if not all, Pacific ports.

Port operations

- The same AI and digitalisation advances will result in logistics operations being largely automated.
- IT security will be of extreme importance.
- International PIC ports in countries with good digital skills (e.g. Fiji) will ride this wave, which will improve port efficiency, but unless there is a strong move to digitalization, others will struggle.
- Domestic terminals to be digitalized

Port usage

- Very hard to get any data on trends
- I think that tourism and cruises will pick up to 2050, but the cruise industry has extremely high emissions intensity (t CO2e/passenger) that PICs should be conscious of.
- Can ports play a role in PICs adding value to their fishing sectors?

Summary

- Climate change: Stronger storms, less often, variable SL rise
- Land transport: Electrified, partial automation
- Ships & bunkering requirements: Fossil fuels Electric
- Cargo handling: Automation well advanced
- Port operations: Digitalisation
- Port usage: Cruises up, Fishing value add (?)

Suggested priorities: GREEN

- Solar PV and electrification
- Shore power, but the cost of electricity, per kWh, must be below 15% of the cost of diesel, per litre. (Large solar PV systems will enable this)
- Efficiency and electrification (starting with auxiliary engines) retrofits of domestic vessels.

Suggested priorities: CLEAN & RESILIENT

- CLEAN:
  - Shore power and electrification
  - Not linked to this presentation:
    - Provision of clean tap water at domestic wharfs to reduce plastic bottle pollution.
- RESILIENT:
  - As per GREEN, noting that solar and shore-power could generate additional revenue.
  - Digitalisation, data, AI, IoT and internet security skills
  - Facilitation of value-add to the fishing industry.
  - Not linked to this presentation:
    - Tariffs which incorporate asset replacement costs.

8020Green

- The 8020 principle states that effort and reward are unbalanced.
- 8020Green helps organizations apply the 8020 principle to massively improve business and environmental performance, with a focus on energy usage and supply.

Thank you

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