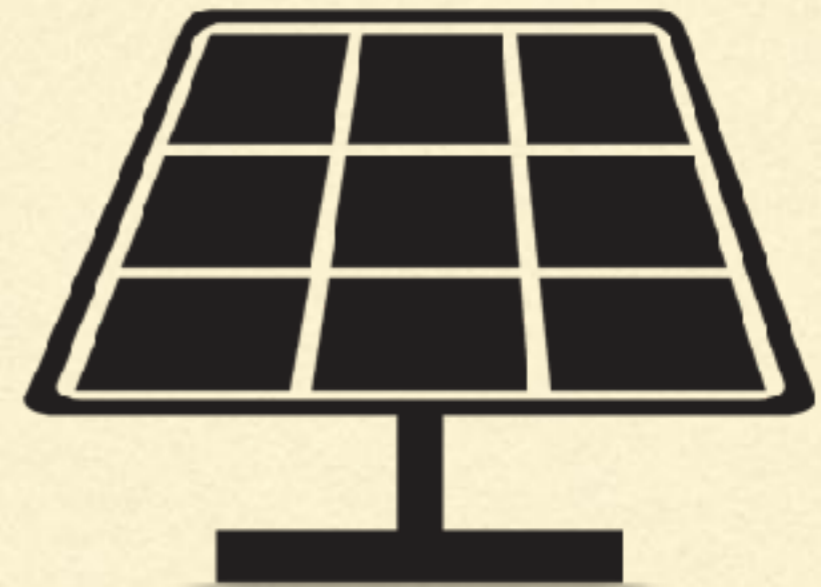

IS SOLAR RIGHT FOR NEW ZEALAND?

by Ali Muhsen
Pennsylvania State University
EGEE 497 - Sustainable Energy in New Zealand



HYPOTHESIS

Although New Zealand's climate allows for PV panels to provide significant energy, solar is not the most economically sound choice for near-future development.

OUTLINE

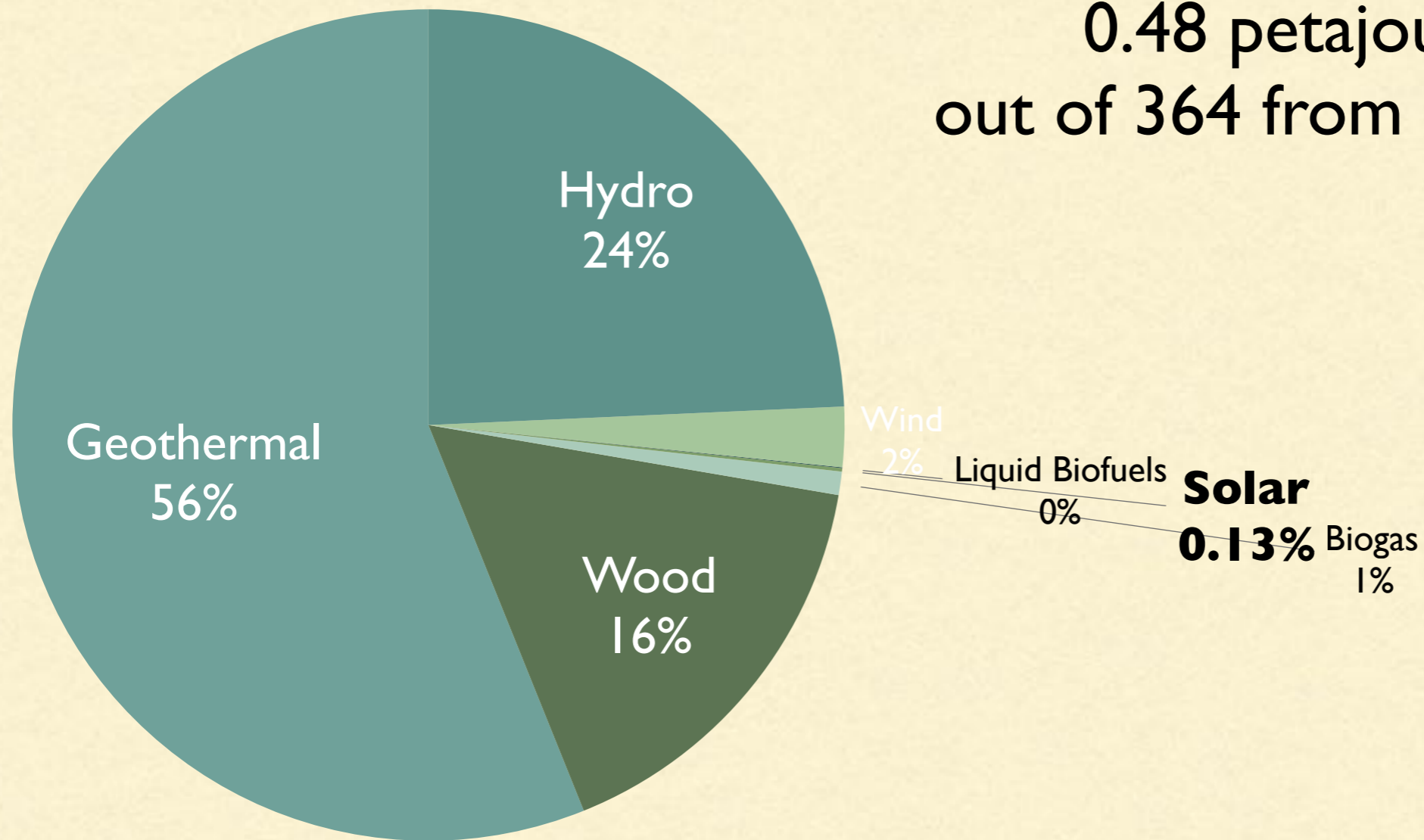
- Energy
 - Economic
 - Environmental
-

NZ SOLAR ENERGY SUPPLY

- 0.48 petajoules Solar
 - 0.12 petajoules go to Electricity generation
 - 0.36 petajoules go to residential use
-

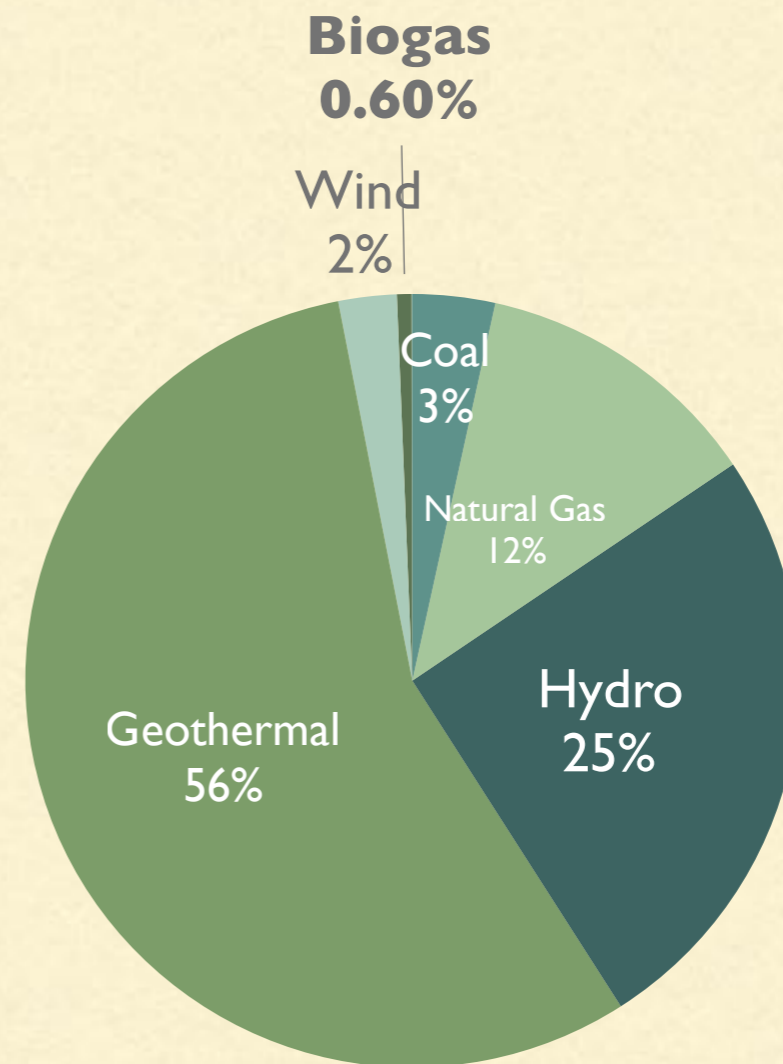
NZ Renewable Energy Supply

0.48 petajoules solar
out of 364 from all renewables



ELECTRICITY GENERATION

- Total: 5500 GWh
- Solar: 33 GWh
- Coal: 330 GWh
- ~270 GWh from imported coal



Data obtained from "Energy in New Zealand 2016 Report"

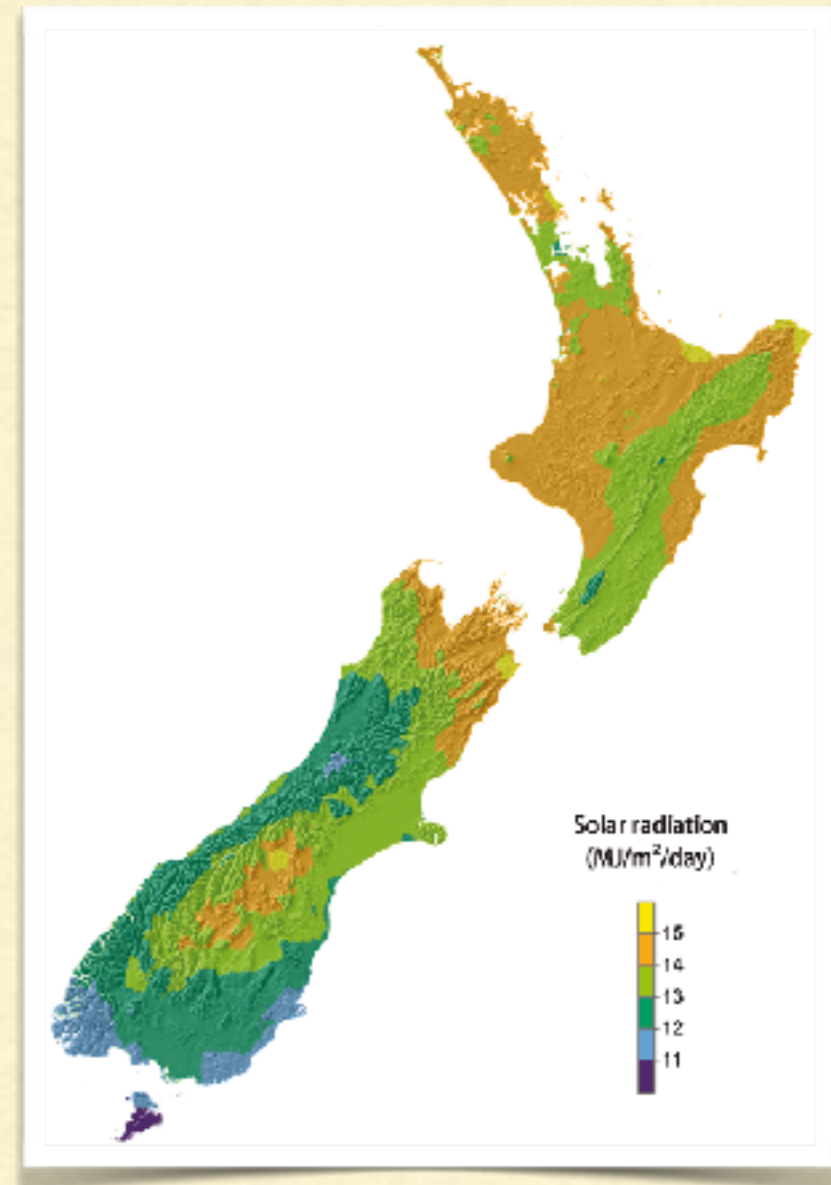
TIWAI POINT ALUMINUM SMELTER

- Alumina --> Aluminum
- Purest Aluminum
- 335,290 Tonnes in 2015
- Peak \$400/ton (2014) expected to go down to \$100/ton
- \$600m/year from exports
- Reduction from 572 MW to 400 MW



ECONOMICS [FOR HOUSEHOLDS]

- Grid cost 28c/KWh
- Net-metering is offered in New Zealand (buy back rate 7-8 cents/KWh)
- Cost-effectiveness
- Variables (Usage times vs Sunlight times, batteries)



ECONOMICS [FOR POWER COMPANIES]

- Use of solar power in households contributes to reducing strain on the grid during peak hours.
 - Too much solar reliance on solar can hurt power companies by loss of revenue.
 - Increase in solar users would lead to decrease in buyback prices.
 - Generating electricity through solar is costly on a large scale (\$150-\$200/MWh) vs Increasing other renewables supply (\$80/MWh)
-

ENVIRONMENTAL

- More than 80% of New Zealand's electricity is generated by environmentally friendly renewables.
 - 100% not impossible, but highly unlikely due to economics and reliability.
-

“We have about 55 percent of our generation as hydro so you have to have something that you can turn on when it goes dry.”

–Mark Binns (CEO of Meridian Energy)

CONCLUSION

DISCUSS

SOURCES

- <http://www.nzas.co.nz/pages/nzas-facts/>
 - <https://www.tvnz.co.nz/content/dam/images/news/2015/07/01/tiwai-point-aluminium-smelter.jpg.hashcd.7118b63c.desktop.story.right.jpg>
 - <http://www.radionz.co.nz/news/national/302509/huntly-power-plants-to-stay-open-until-2022>
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