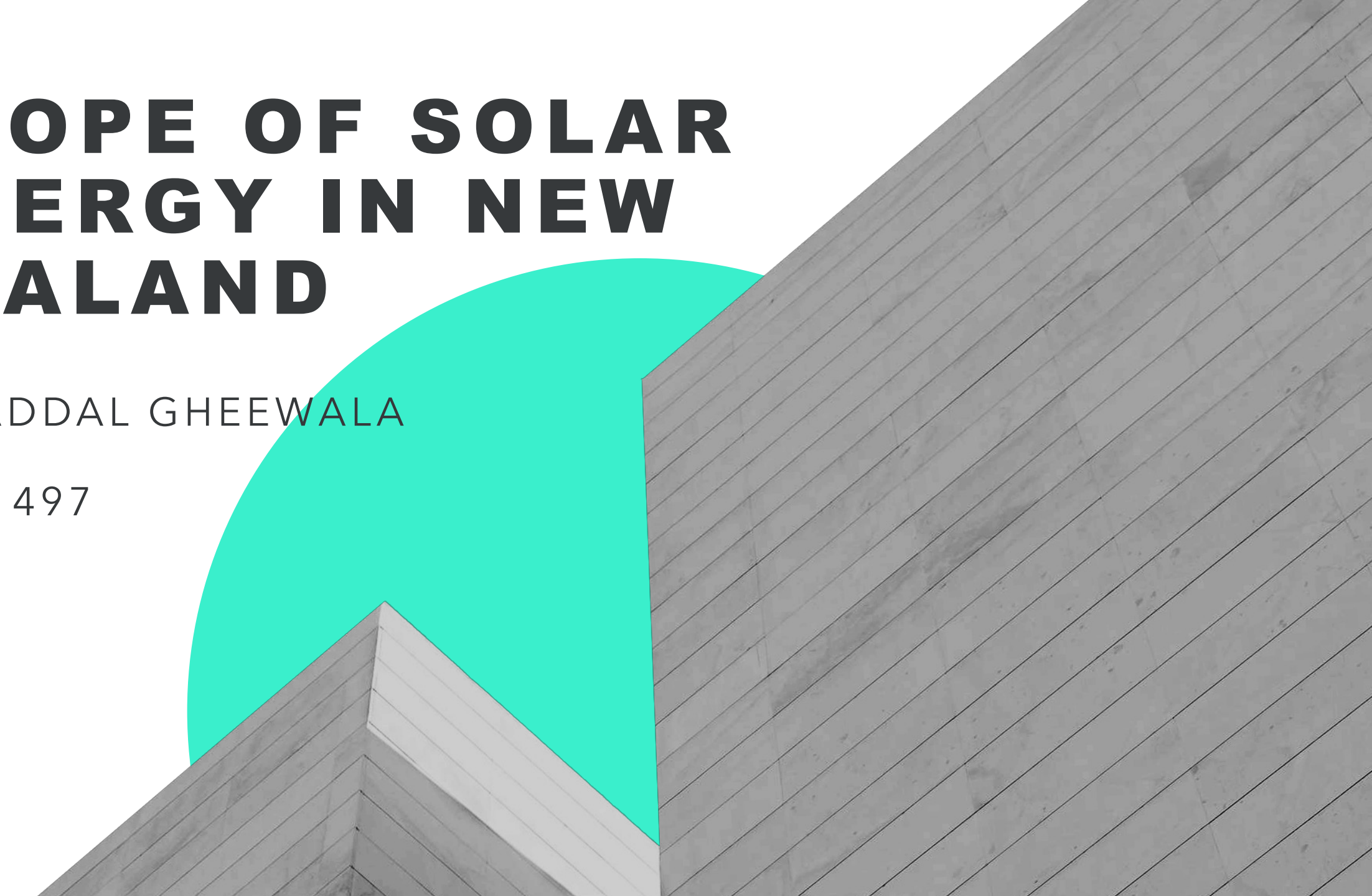
SCOPE OF SOLAR ENERGY IN NEW ZEALAND

MUFADDAL GHEEWALA

EGEE 497



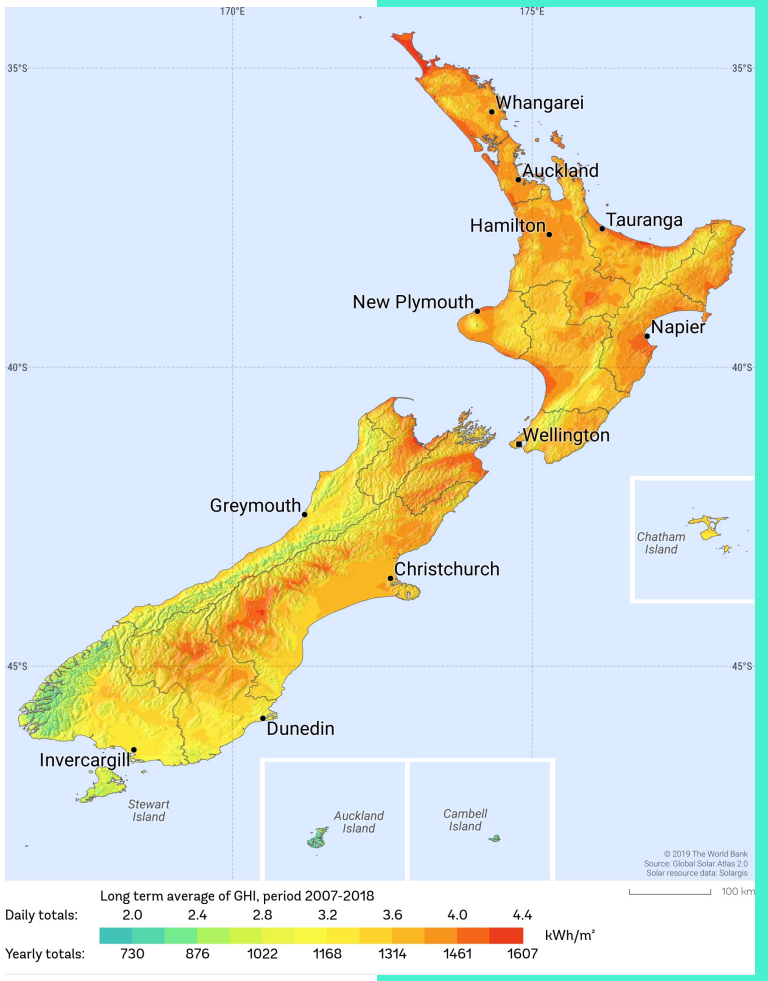
SCOPE OF SOLAR IN NEW ZEALAND

RESIDENTIAL SOLAR

- Lower density housing has the highest solar potential
- Suburbs act as energy collectors to provide excess energy to the city
- Most sunlight in north island hence more residential applications

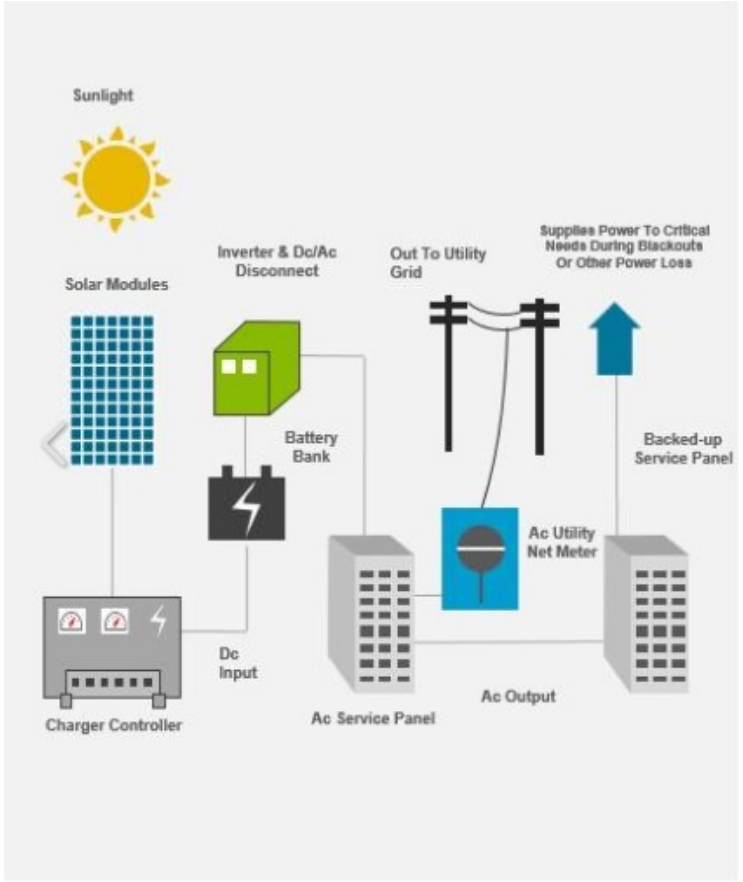
GRID LEVEL SOLAR

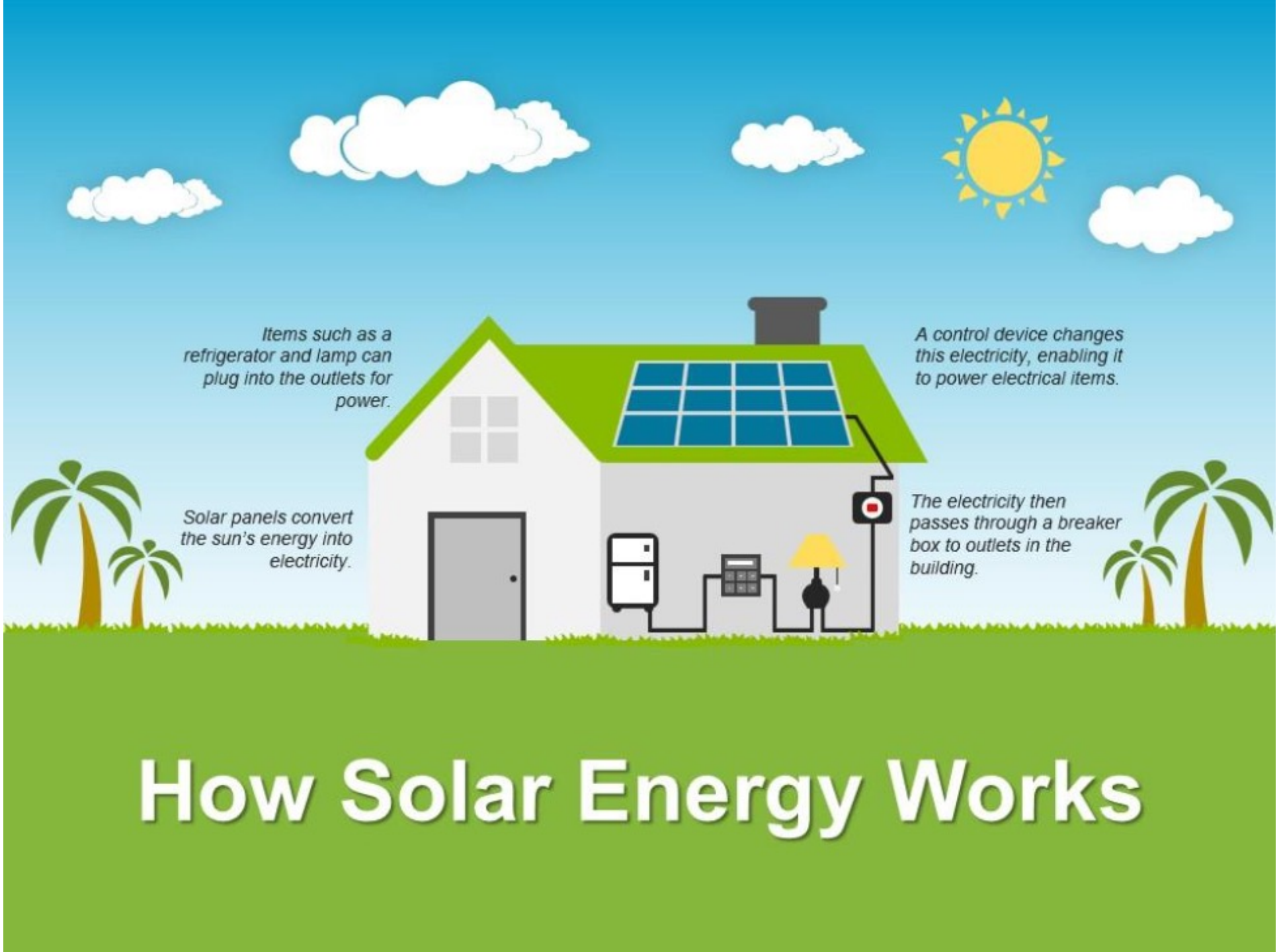
- More grid energy demand in north island (Mostly hydro for smelting process on south island)
- No government incentive to set up solar with the grid (Solar farms)



CONVERSION OF SOLAR POWER

- Solar Energy originated from the sun through nuclear fusion, protons in hydrogen collide in the suns core and fuse to create a helium atom. (174 PW of solar daily on the surface of the earth).
- Photovoltaics convert light into electric current using the photoelectric effect.




Items such as a refrigerator and lamp can plug into the outlets for power.
A control device changes this electricity, enabling it to power electrical items.
Solar panels convert the sun's energy into electricity.
The electricity then passes through a breaker box to outlets in the building.
How Solar Energy Works

APPLICATIONS OF SOLAR ENERGY

Water/Air Heating

Green House application

Distillation of water

Water Pumping

Power Generation for the Grid

Residential power

EV charging

Space fleet power

CURRENT SOLAR POWER IN NZ

Minor projects <15%

Most of the North Island uses Solar for Residential solar roofs and Aggrovoltaics

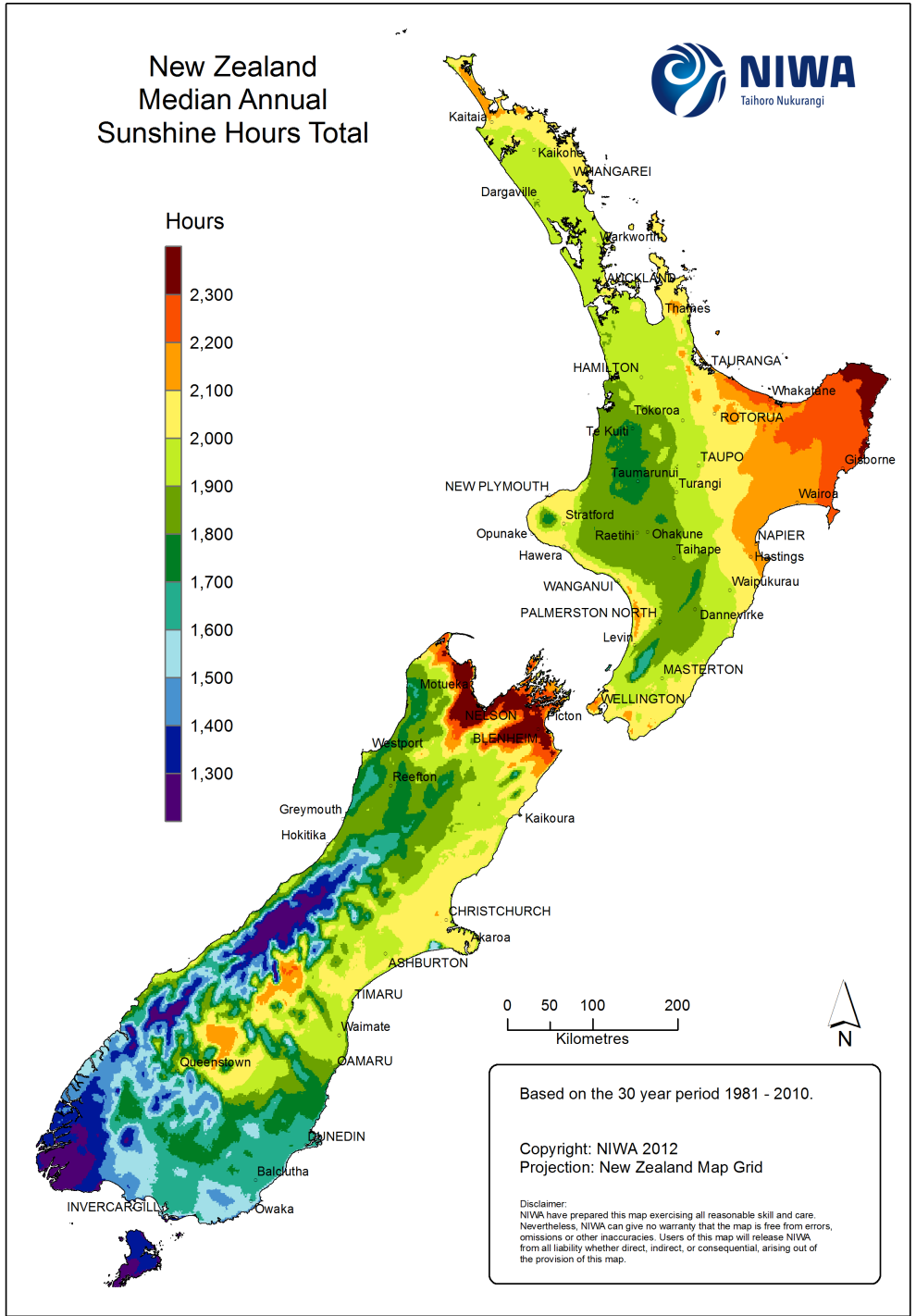
Approx 20-30 cents/kWh to use from the grid (5-20 cents/kWh to buy)

Different utilities have different rates set up

No current government incentives for solar energy

DISADVANTAGES OF SOLAR

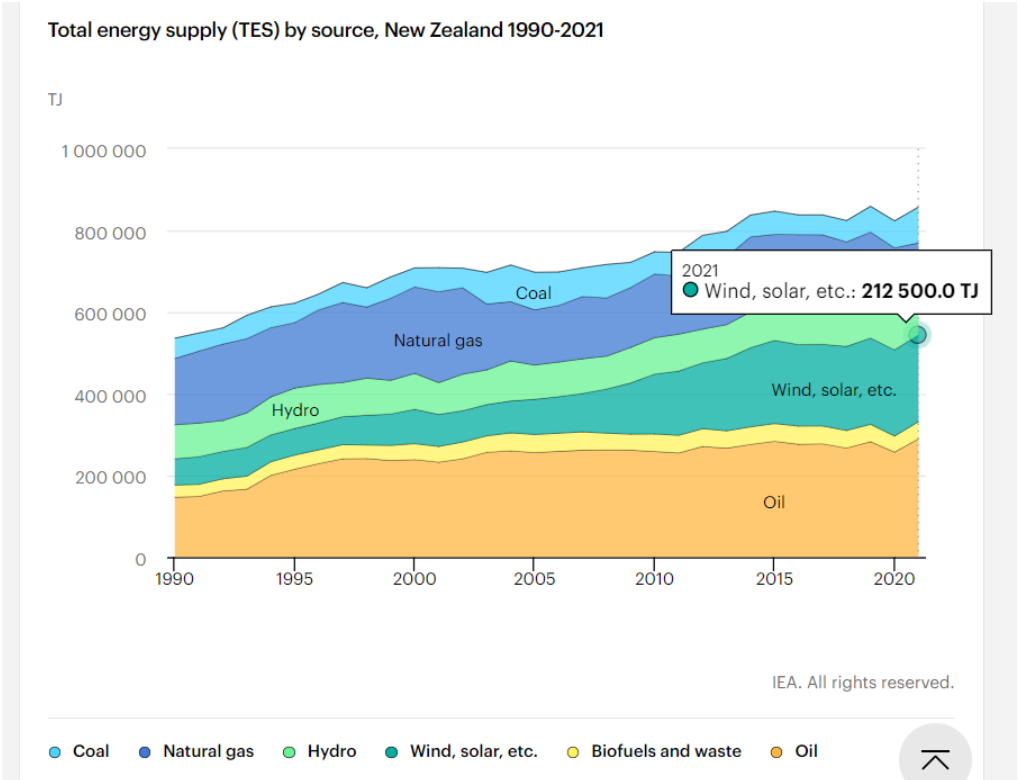
- Not available 24 hours a day (duhh)
- Solar energy not suitable for all homes and locations.
- Transmission costs too high due to lack of infrastructure.
- High albedo in snowy regions



THE GRID AND DER (TECHNOLOGY OF THE FUTURE)

https://www.iea.org/countries/new-zealand

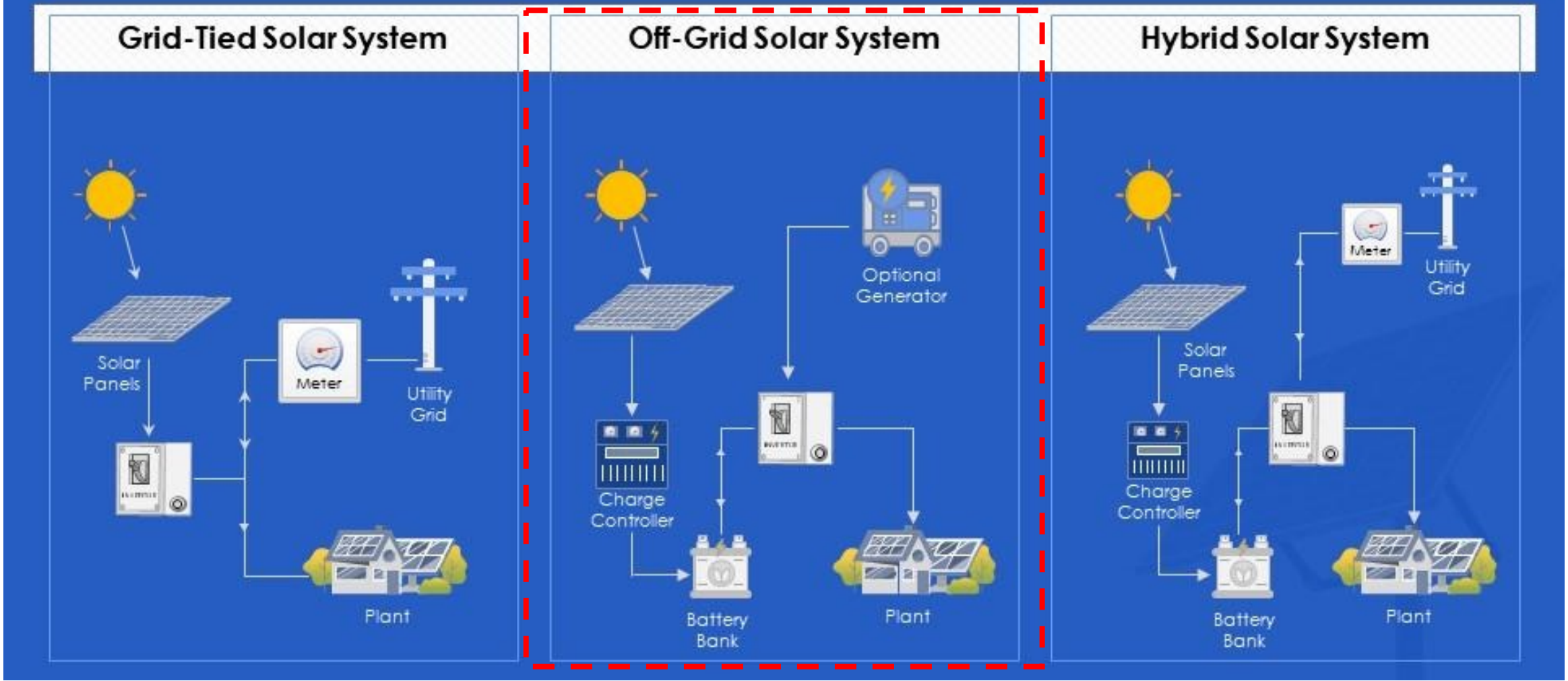
150 MW added in 2021



HOW DOES A DER SYSTEM WORK?

Solar PV Integration Models Workflow

This slide illustrates various solar PV integration models. Models covered in the slide are on-grid system, off-grid system and hybrid system.



THE FUTURE OF DER WITH SOLAR

20% of all vehicles sales were electric in the end of 2022.

11.5% sales of EV/s in the first three months of 2023.

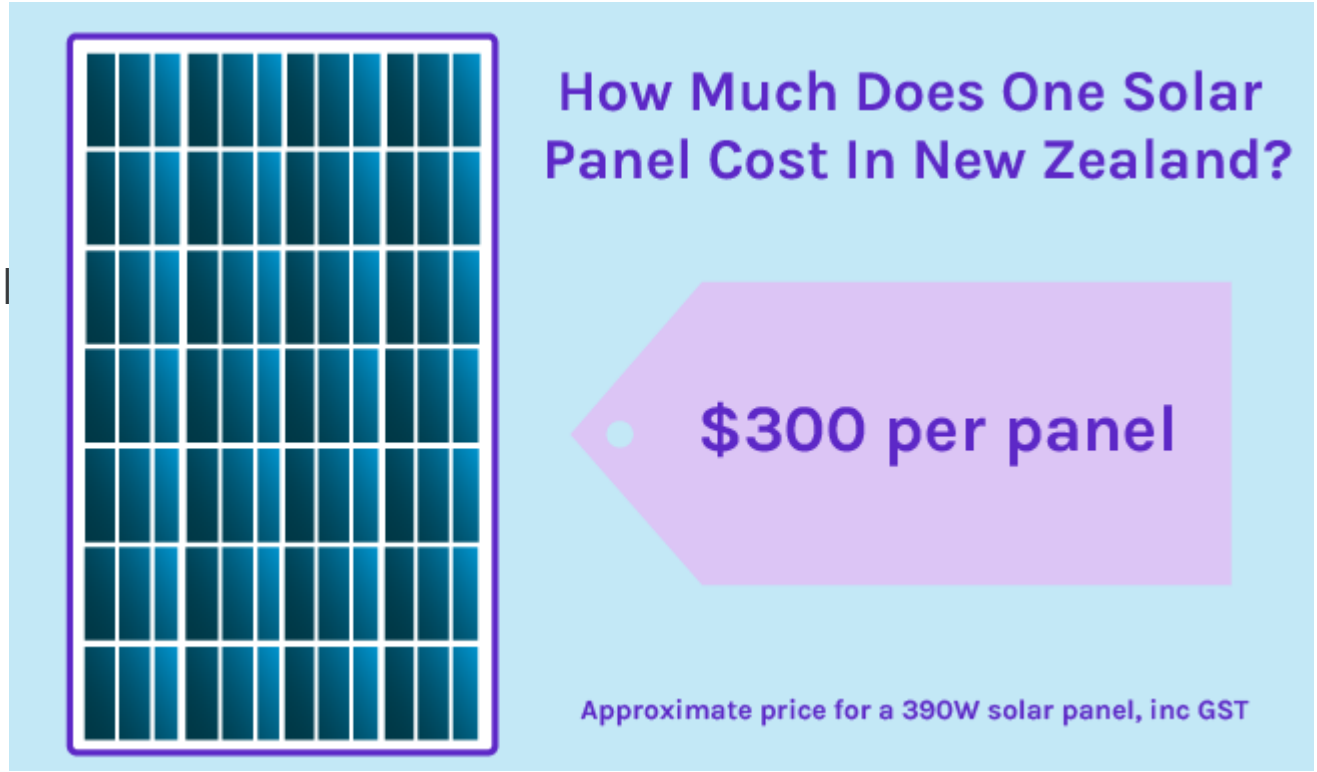
SUMMARY

Growth of solar has grown 16% since 2018.

Future of Solar is unpredictable

DER systems however can help stabilize EV growth in New Zealand

Biggest success stories in terms of renewabl energy (without any government support).



THANK YOU

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Sustainable Energy in New Zealand