

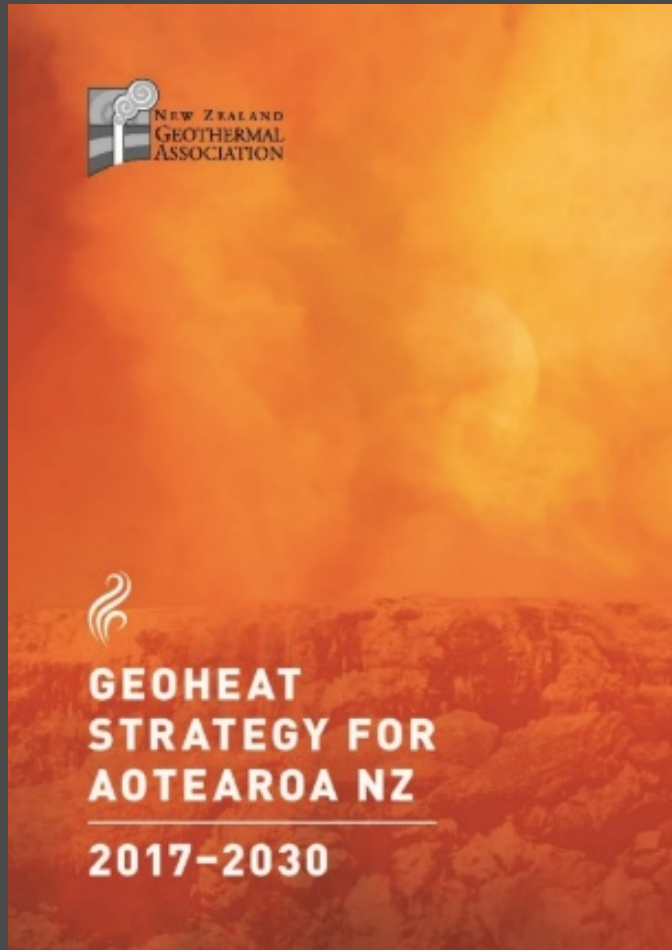
Geoheat



19th July 2022
IRENA Seminar
Powering Agri-Food Value Chains with Geothermal Heat



Cover today



- **Introduction**
- **Greenhousing in NZ**
- **Geothermal**
 - What are you waiting for !
- **Geoheat**
- **Being Strategic**

Tēnā koe e hoa

- **Brian Carey**
 - Mechanical Engineer
 - GNS Science – Geothermal Specialist
 - IEA Geothermal – Executive Secretary

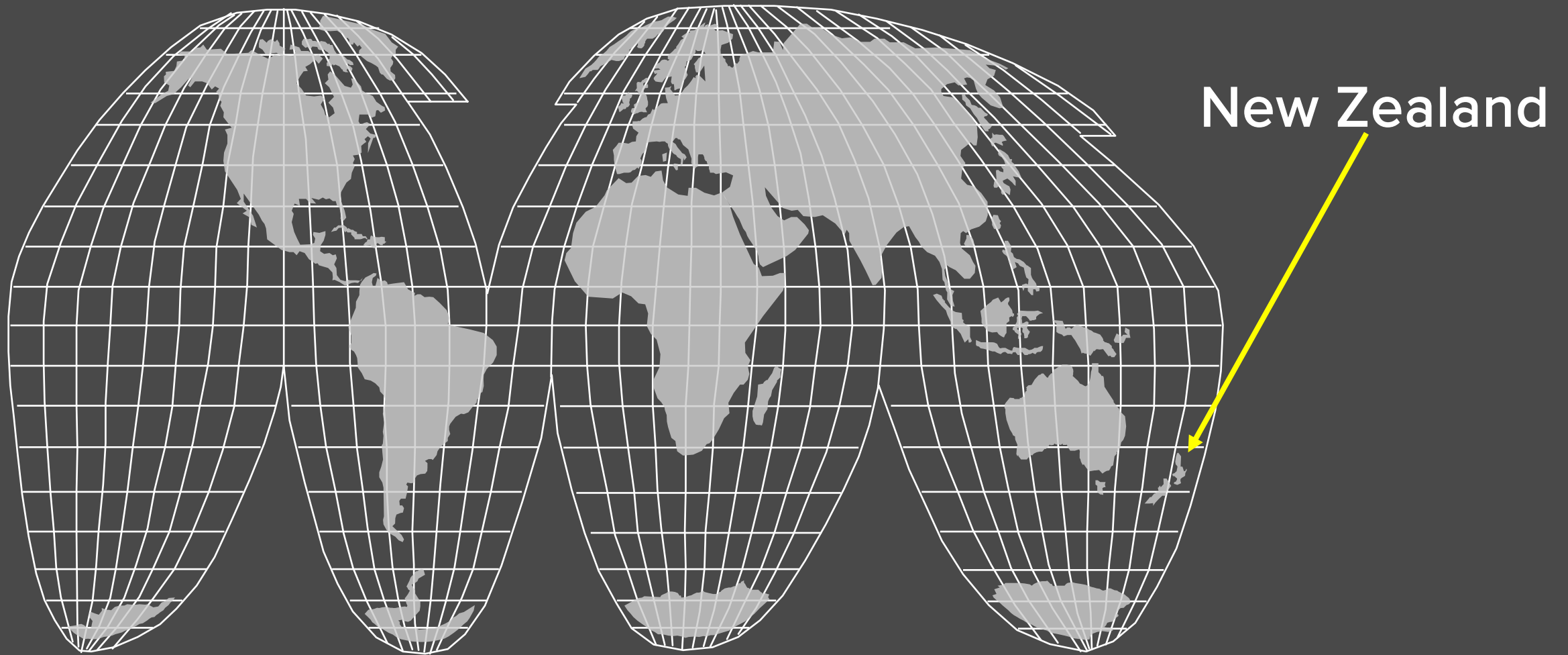


IEA Geothermal



- **Member of the New Zealand Geothermal Association**
 - Worked on the Geoheat Strategy for Aotearoa NZ from inception

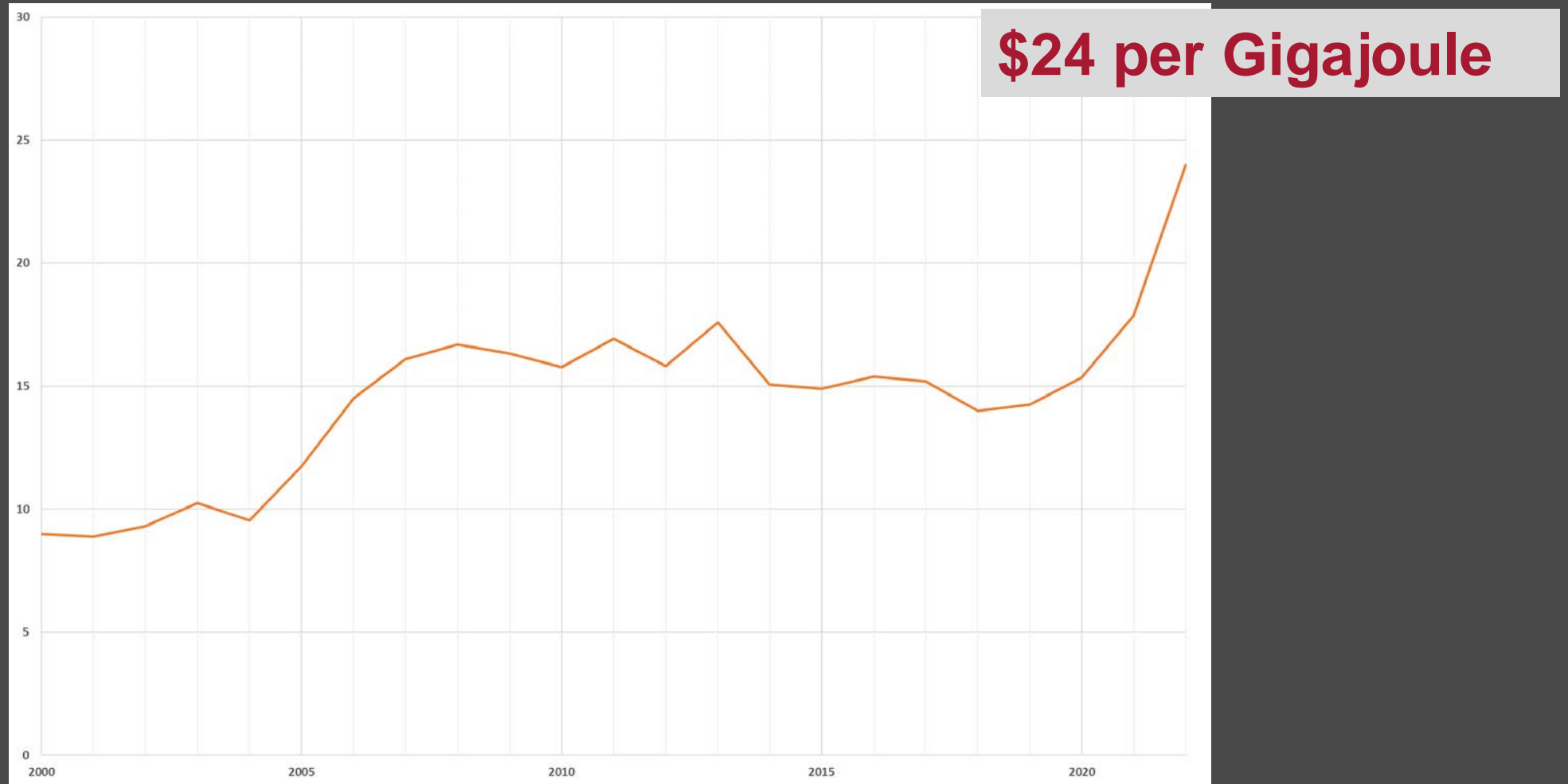
From down under



Green housing - In New Zealand

- **Increasing crop yields using conditioned environments**
 - Temperature
 - Light
 - CO₂ enriched – some crops achieve a 20% increase in growth rate
- **Heat can account for as much as 30% of the operating cost**
 - Gas is commonly used in NZ
 - Cost of gas is rising rapidly
 - >30% increase in 12 months

Cost of Natural Gas – \$ per Gigajoule - Commercial



2000 to 2021 data from MBIE, 2022 Data from the Gas Association

Geothermal



www.nzgeoheat.nz

For the next few slides focus on industrial scale geothermal heat in NZ



RENEWABLE



AVAILABLE



LOW CARBON



PROVEN AT SCALE

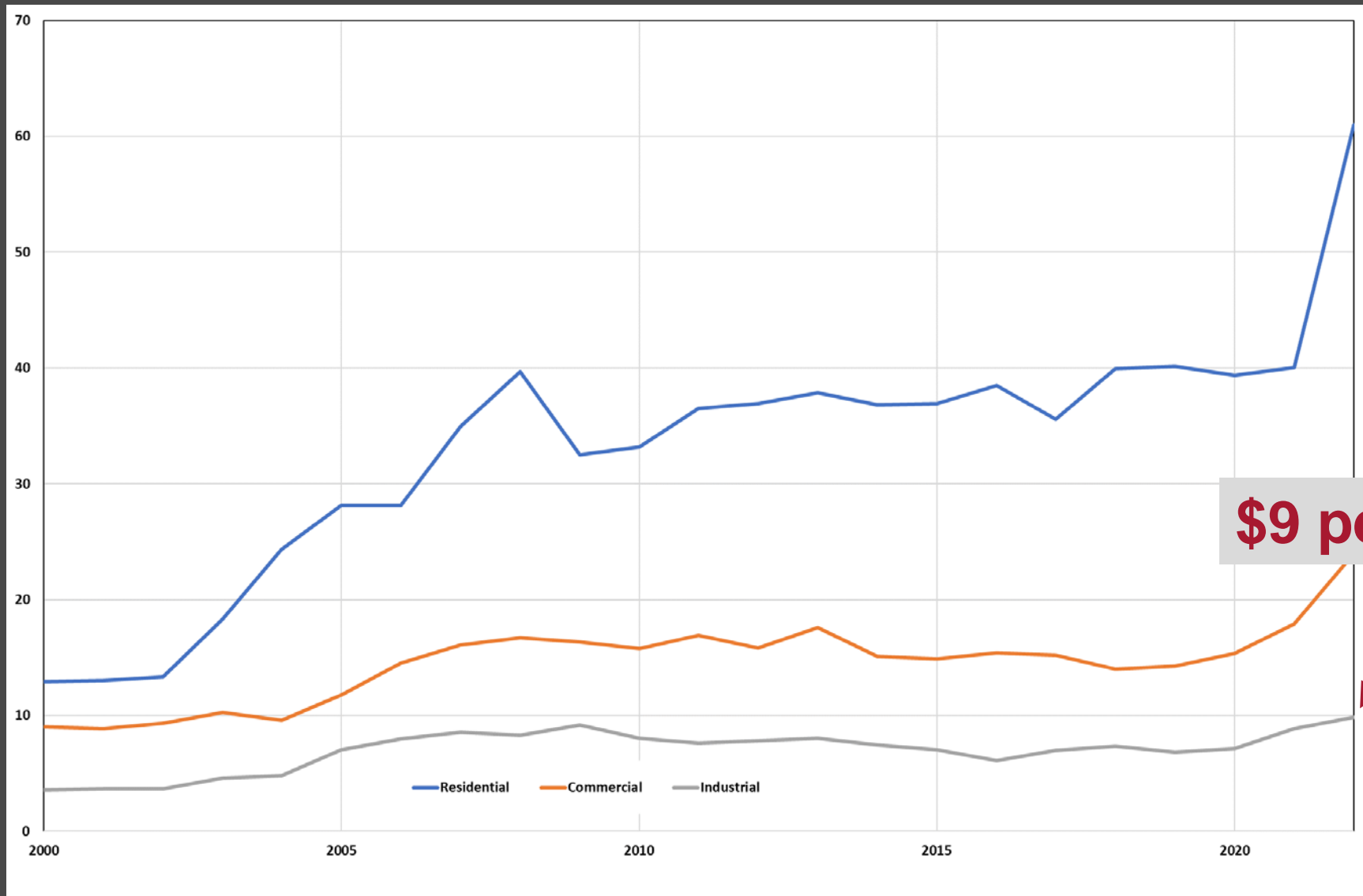


COST EFFECTIVE



LOW RISK

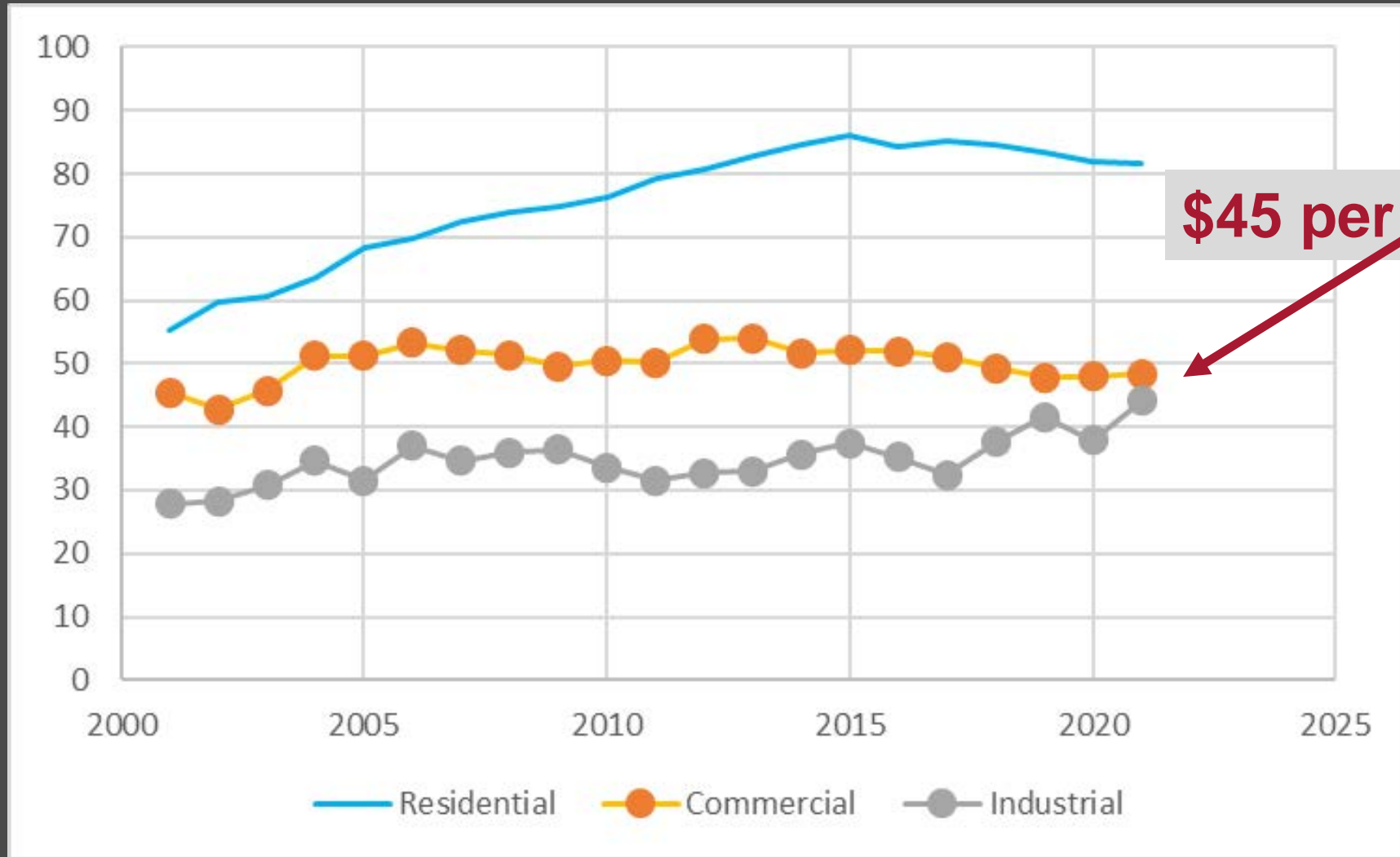
Cost of Natural Gas – \$ per Gigajoule



Industrial

\$9 per Gigajoule

Cost of Electricity –\$ per Gigajoule



2000 to 2021 – MBIE data

Cost of Carbon – Emissions Trading Scheme



Geoheat - Cost Effective Process Heat

Type	\$/GJ	Carbon Factor tCO ₂ e/GJ	Carbon costs	Conversion Factor	Total Cost \$/GJ Delivered
Geothermal - Direct	8	0.0070	\$0.54	0.83	\$10.29
Biomass	8	0	\$0.00	0.64	\$12.50
Electricity - Heat Pump	45	0.0265	\$2.04	3.5	\$12.86
Gas	9	0.054	\$4.16	0.85	\$15.48
Coal	6	0.0944	\$7.27	0.81	\$16.38
Wood Pellets	14	0	\$0.00	0.81	\$17.28
Electricity - Heat Pump	45	0.0265	\$2.04	2.5	\$18.00
Electricity - Resistive	45	0.0265	\$2.04	1	\$45.00

Geoheat Strategy - Approach



- **Overarching Strategy**
2017 – 2030
- **Regular reviews to keep initiatives relevant**

Action Plans

2018-19

2020-21

2022-23

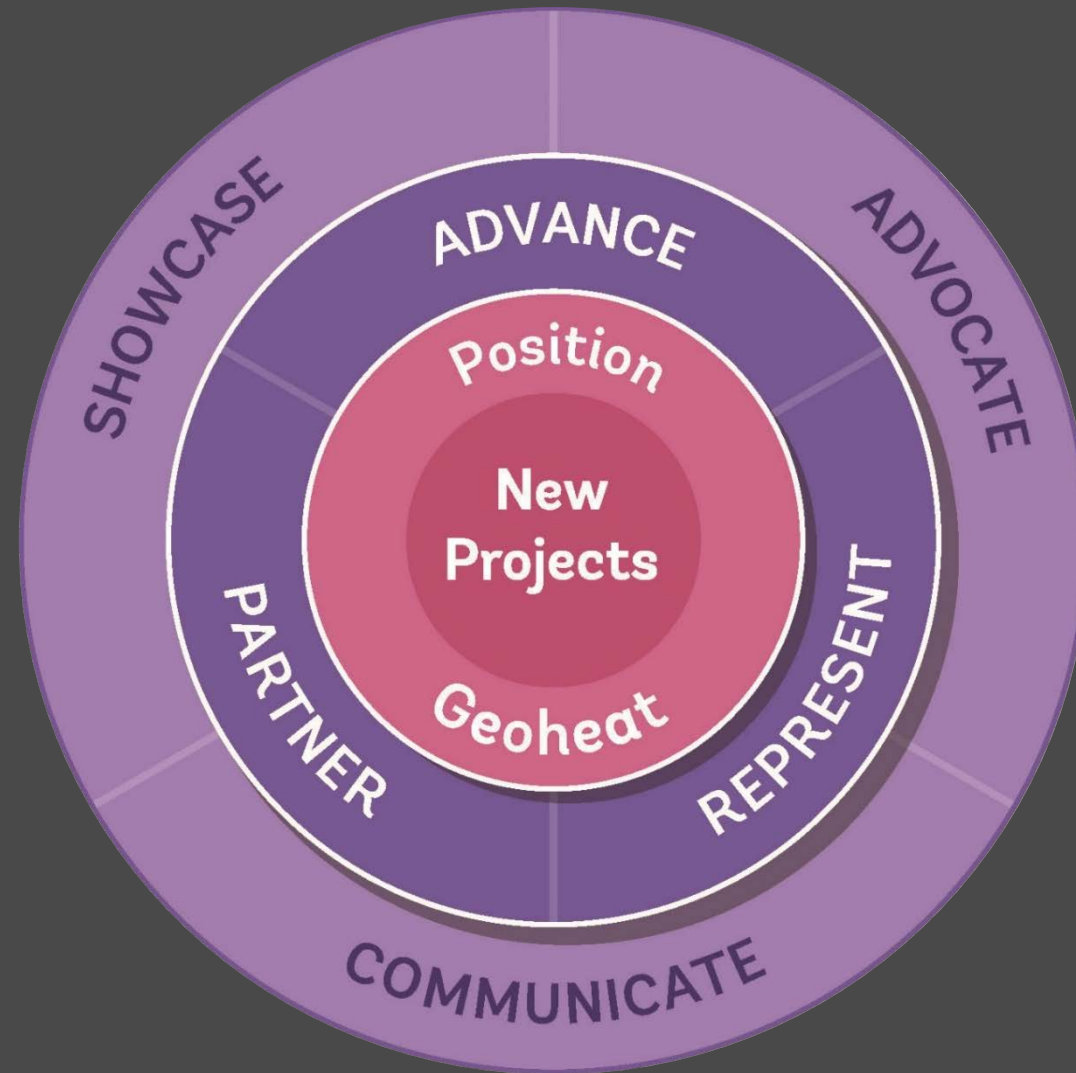
- **2 monthly Action Group meetings**

Seeking to achieve more together beyond the geothermal sector

- **Six Actions**

- Advocate
- Communicate
- Showcase

- Advance
- Partner
- Represent



Working Together



Its about being strategic ...



Geothermal Options – Food production in Africa

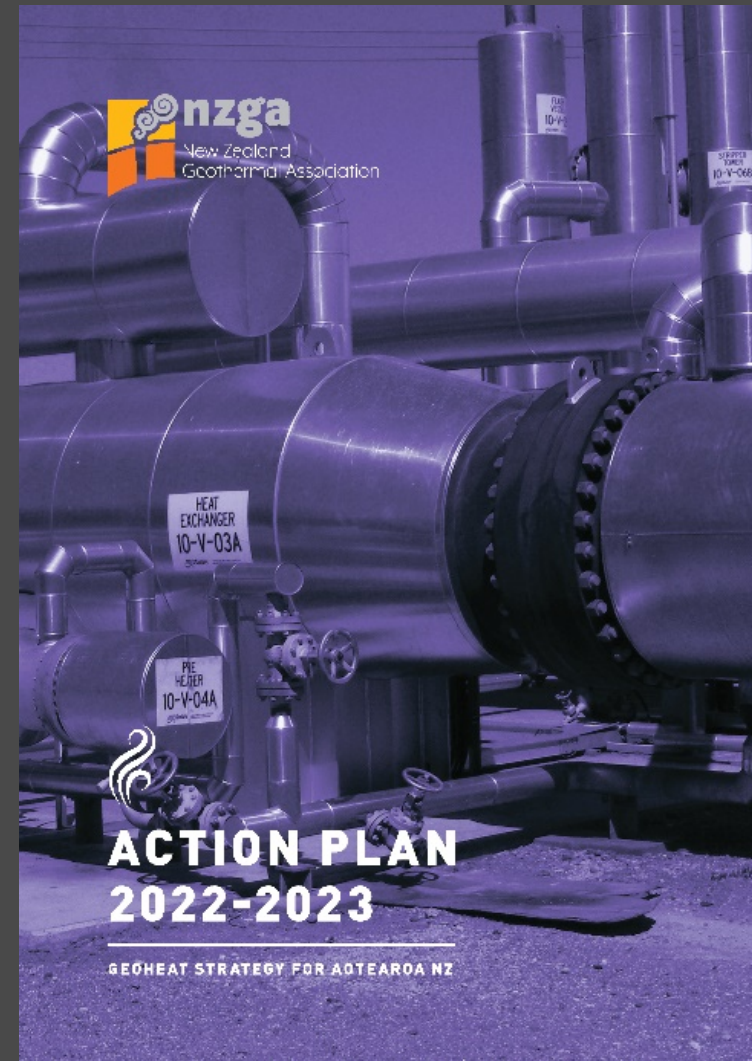
- **Low to moderate temperature geothermal available in some places**
 - Such as at
 - Oserian / Bohemian Flowers - roses
 - Menegai – tomatoes and capsicums
- **Heat pump systems using ambient temperature ground water as the source of energy**
 - These can both heat and cool
 - Deliver 4 units of heat for 1 unit of electricity
- **Are there other options ?**
- **Achieve more with a co-ordinated Strategic approach as opposed to being ad hoc**

Be strategic ...



Make it easier to put the blocks together

Kia Ora



<https://www.nzgeothermal.org.nz/geothermal-in-nz/geoheat/>