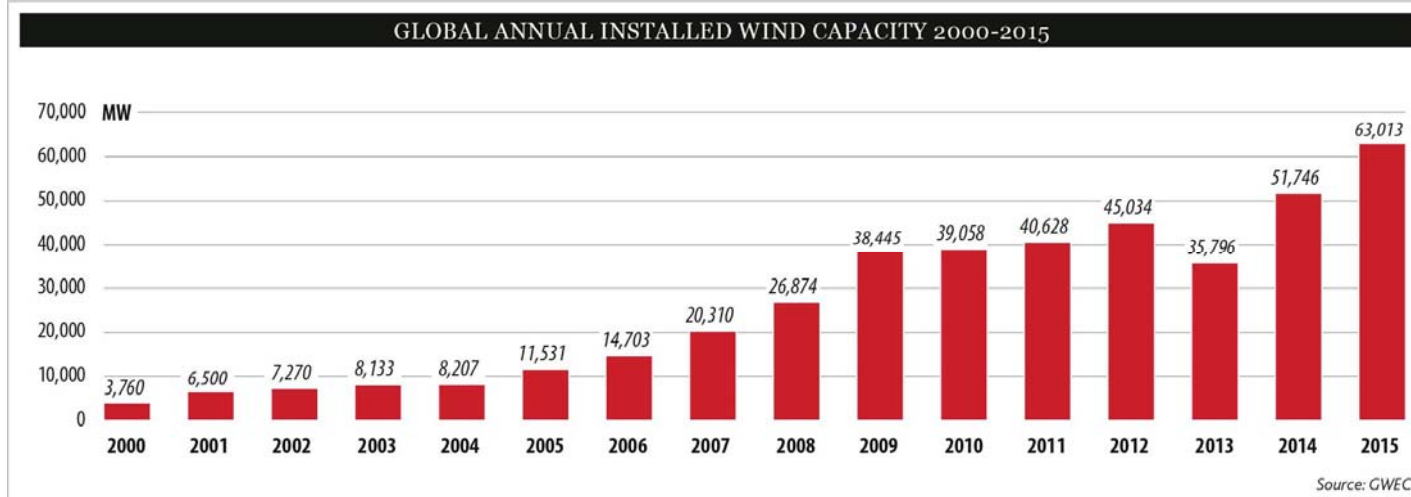
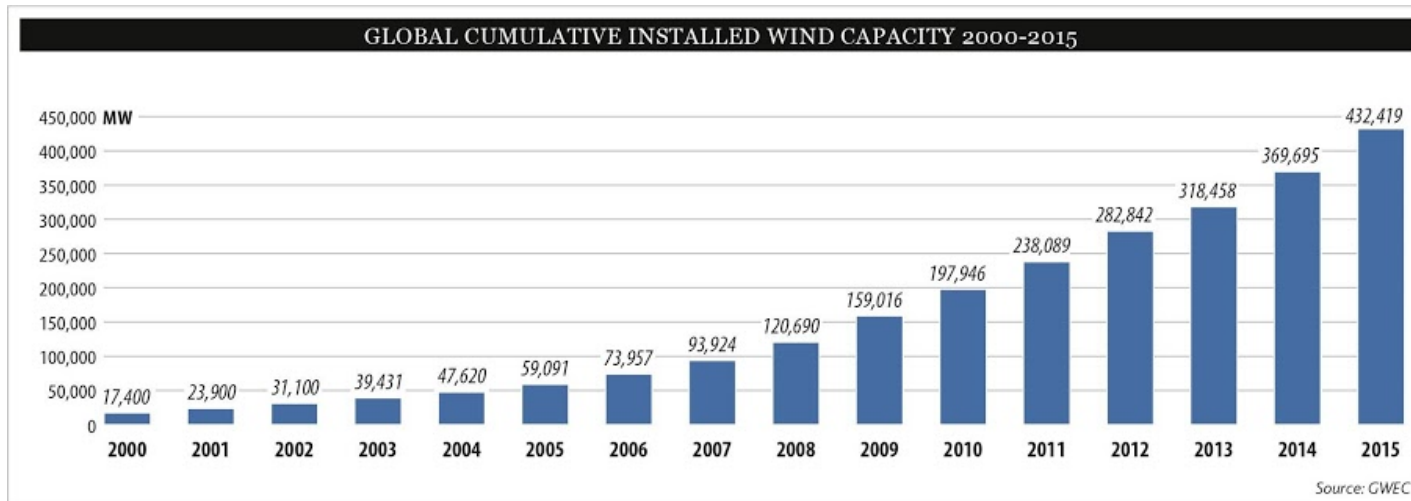


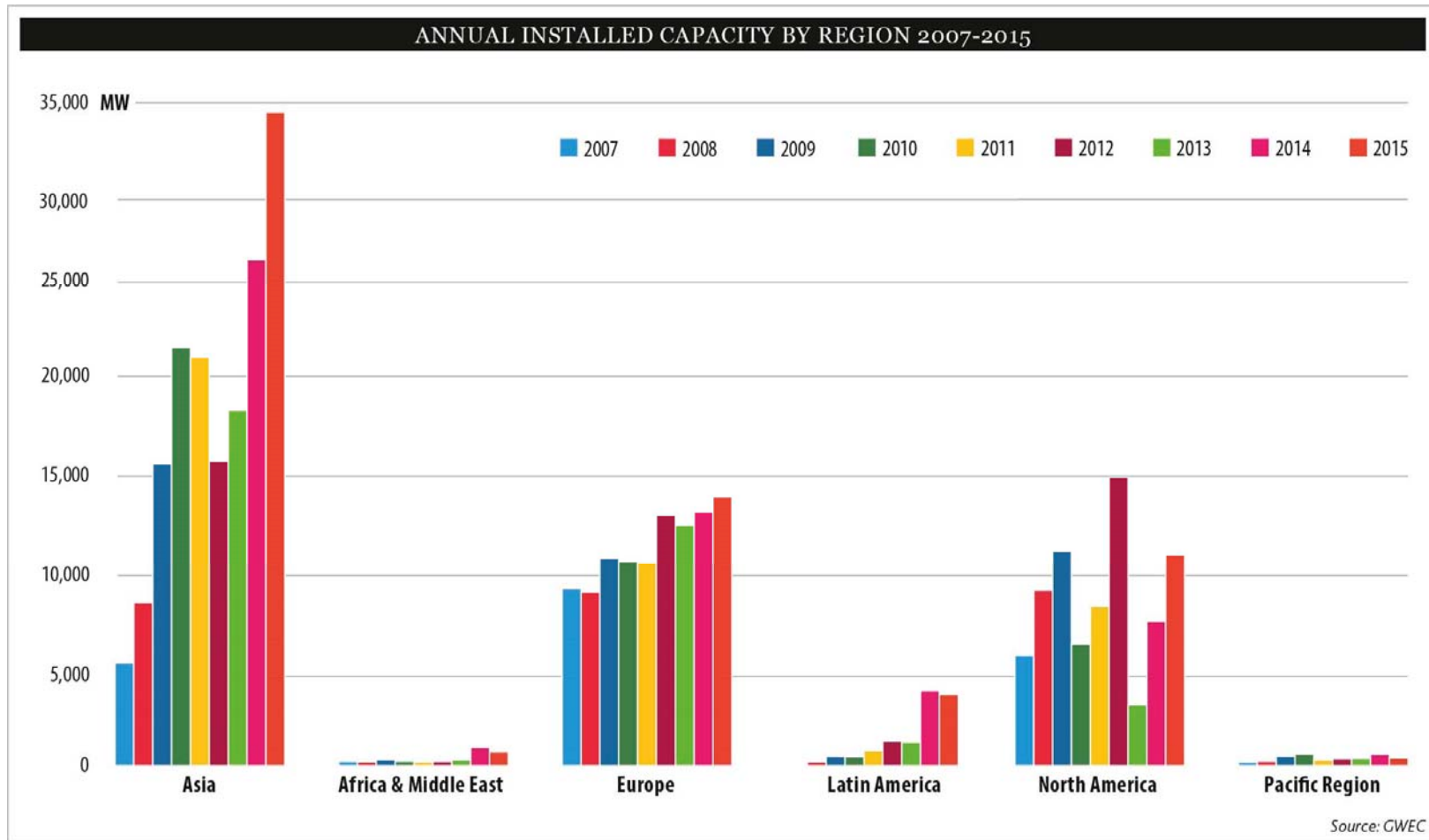


**WIND – NZ's ENERGY ROOSTER OR  
FEATHER DUSTER?**

# Wind Energy Growth Internationally

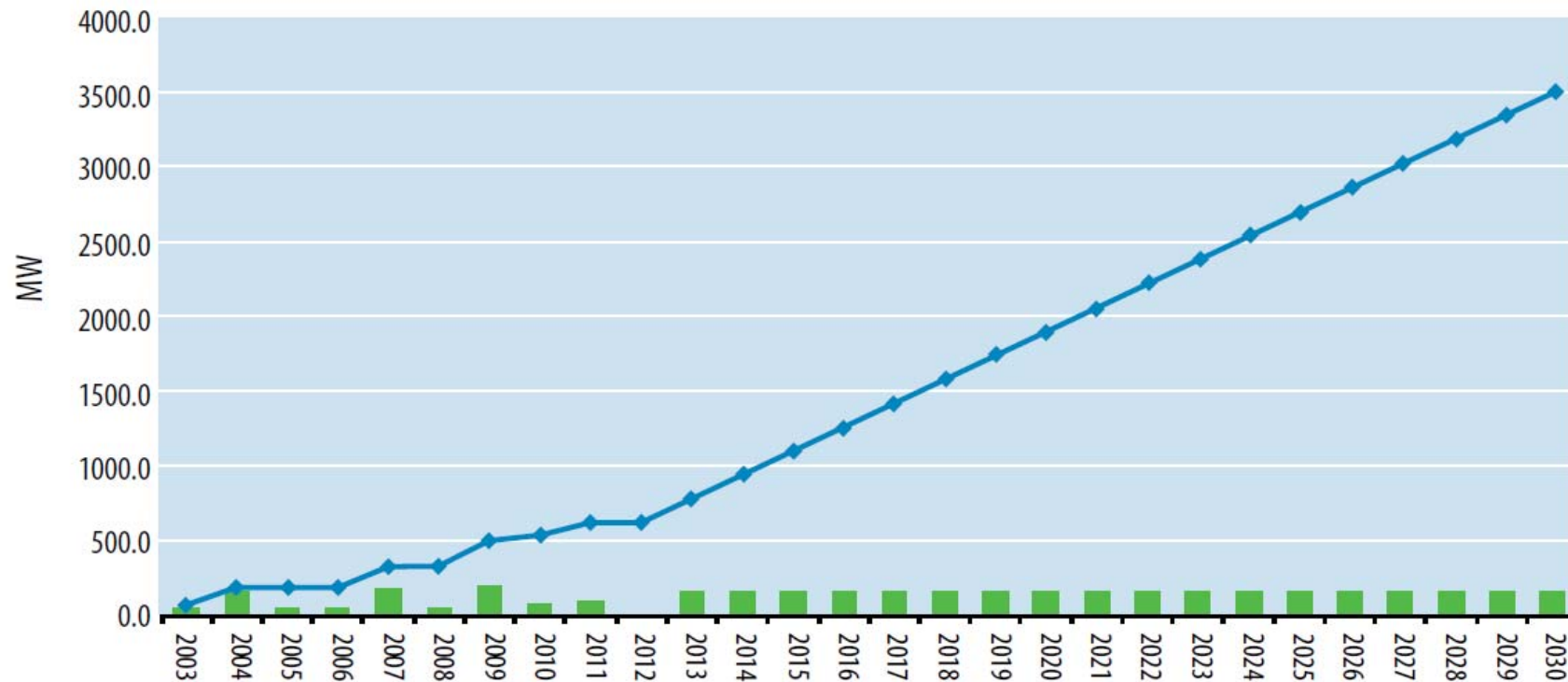


# Wind Energy Growth Internationally (split into regions)



# New Zealand Progress

## Built wind generation with projection to 2030



# Good bits

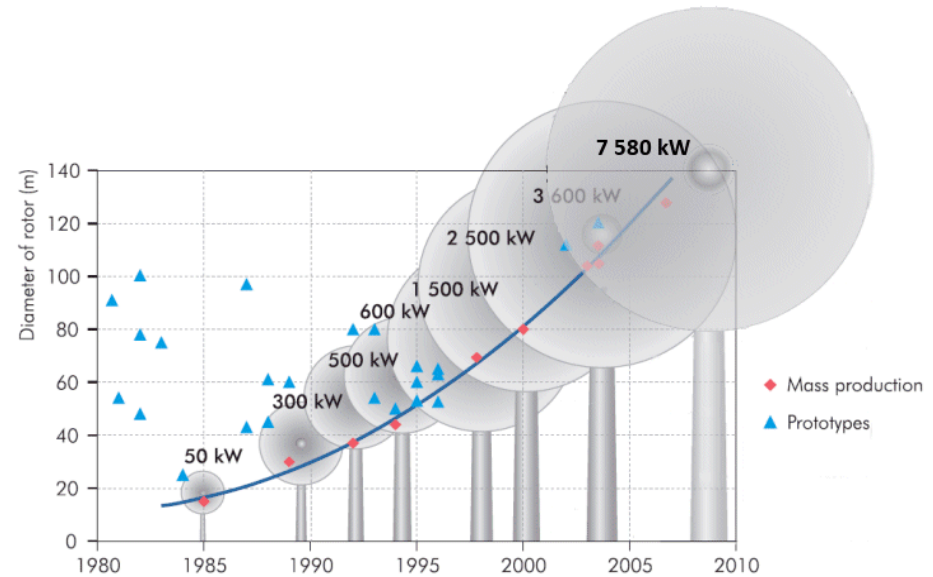
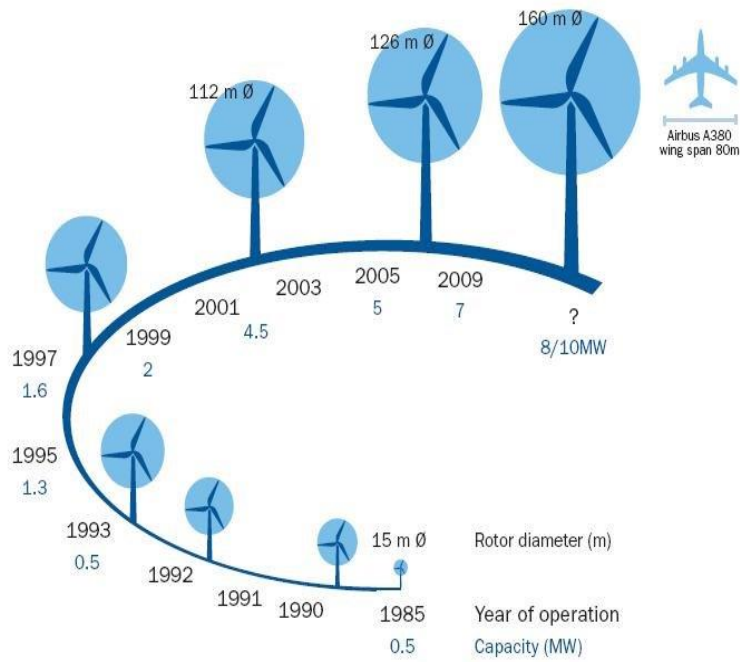
- Diverse wind farms, multiple owners and suppliers
- 16 locations, 690MW
- IP on maintenance at tough sites
- Several consented and ready to go sites (about 2 Huntly's worth) around the country, up to tip height of 160m

# Challenges

- Economics
- Consented turbine sizes versus technology movements (see trend on next slide)
- Consent expiration dates

# Evolution of Turbines

Size evolution of wind turbines over time



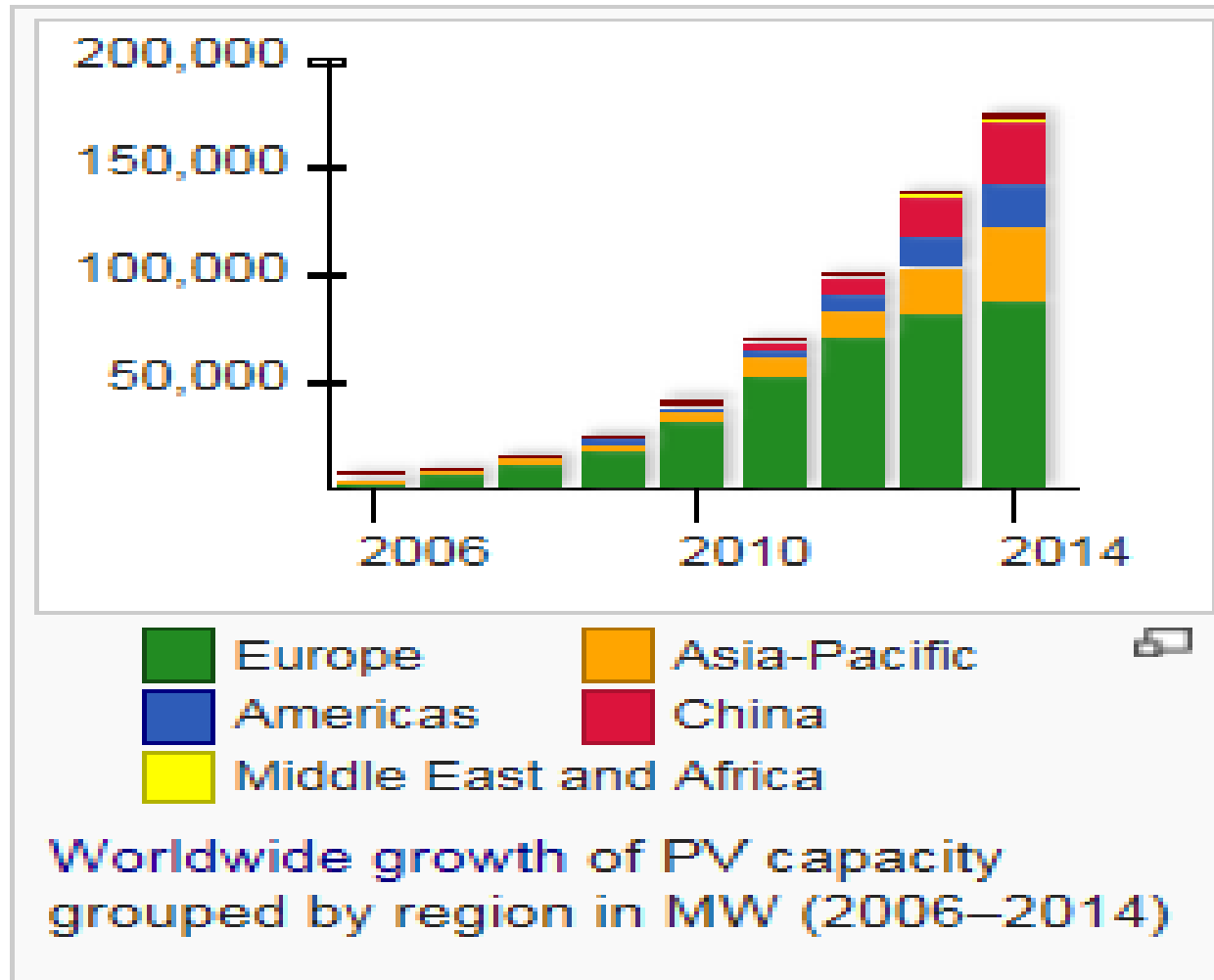
Source: International Energy Agency (IEA)

# Technology Threats

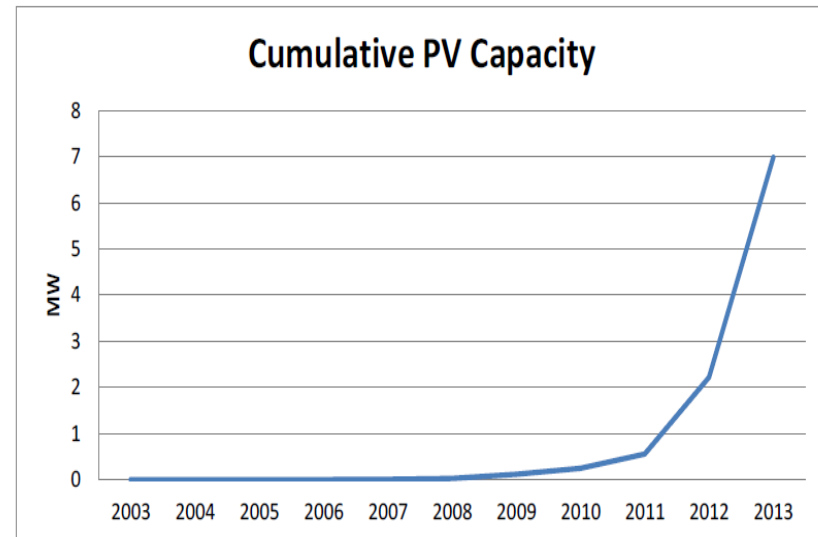
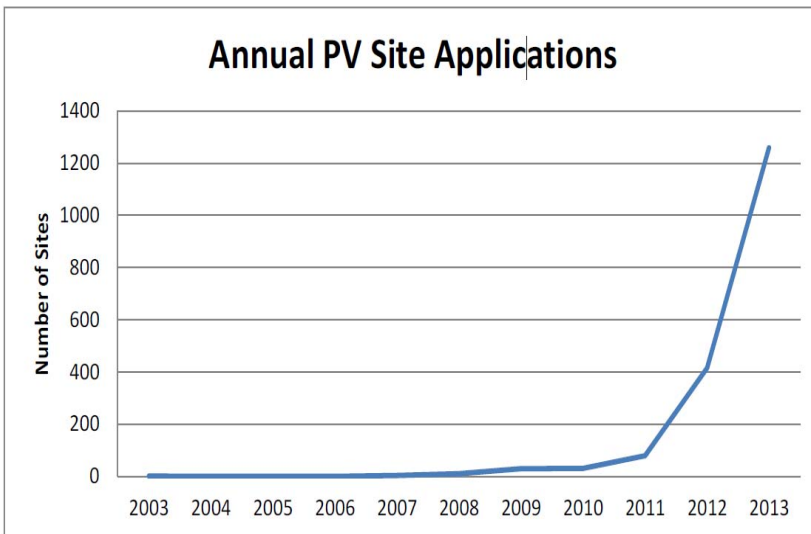
- Solar
- Talk about land use
- Talk about subsidies
- Response of wind industry



# Technology Risk - Solar Growth



# Solar Energy Growth in NZ



# Opportunities

- Thermal closures
- International Carbon thinking
- Speed to completion – wind is fast and leaves land available for agriculture
- Low environmental footprint
- No freshwater issues
- Proven technology
- Good generation profile CF demand profile

# Summary

Wind is ready to go, still part of the mix being built now, fast to first generation, does not compete with existing land use.

Will be part of the future mix.

When things get dusty, you  
need a FEATHER DUSTER!