



New Zealand's EnergyScape

1st Stakeholder Workshop

Hydrogen Economy

Tony Clemens (CRL Energy)

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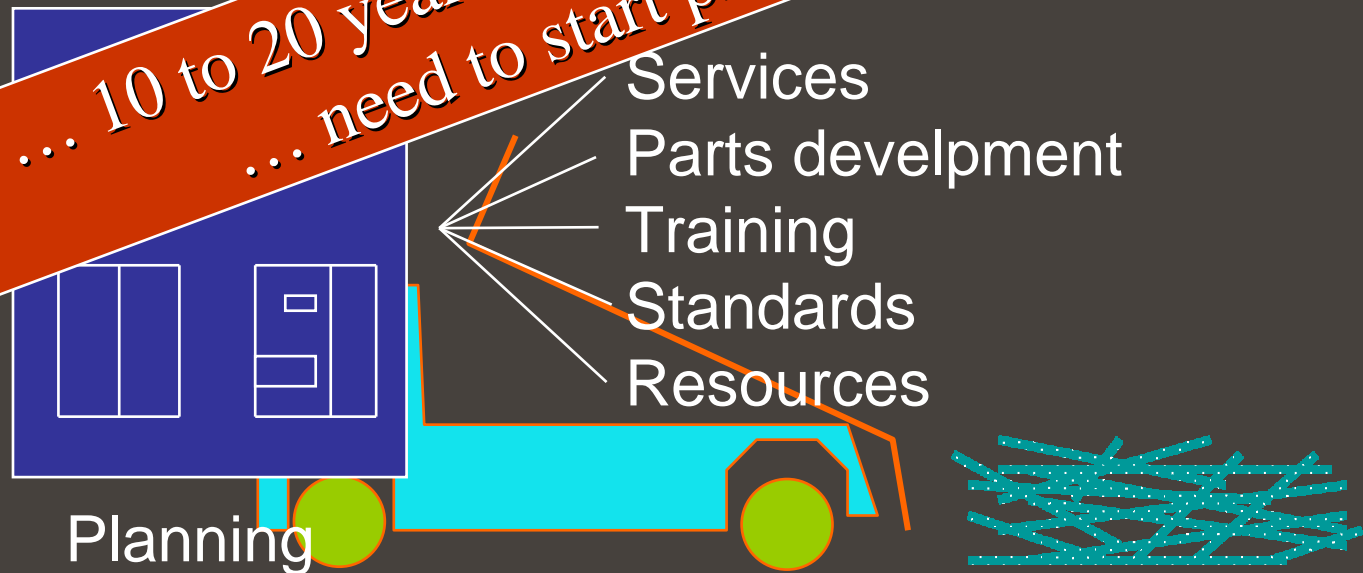


Why Think About Hydrogen Now?

2000 2005 2030 2050

- What will tomorrow's targets be?
 - Low carbon?
 - Energy security?
 - Efficient energy chains?
 - Affordable?
- Hydrogen has the potential to meet these in the future.
- But ...

*... 10 to 20 years from planning to building
... need to start planning now.*



Other Advantages ...

✓ 2000

✓ 2005

✓ 2030

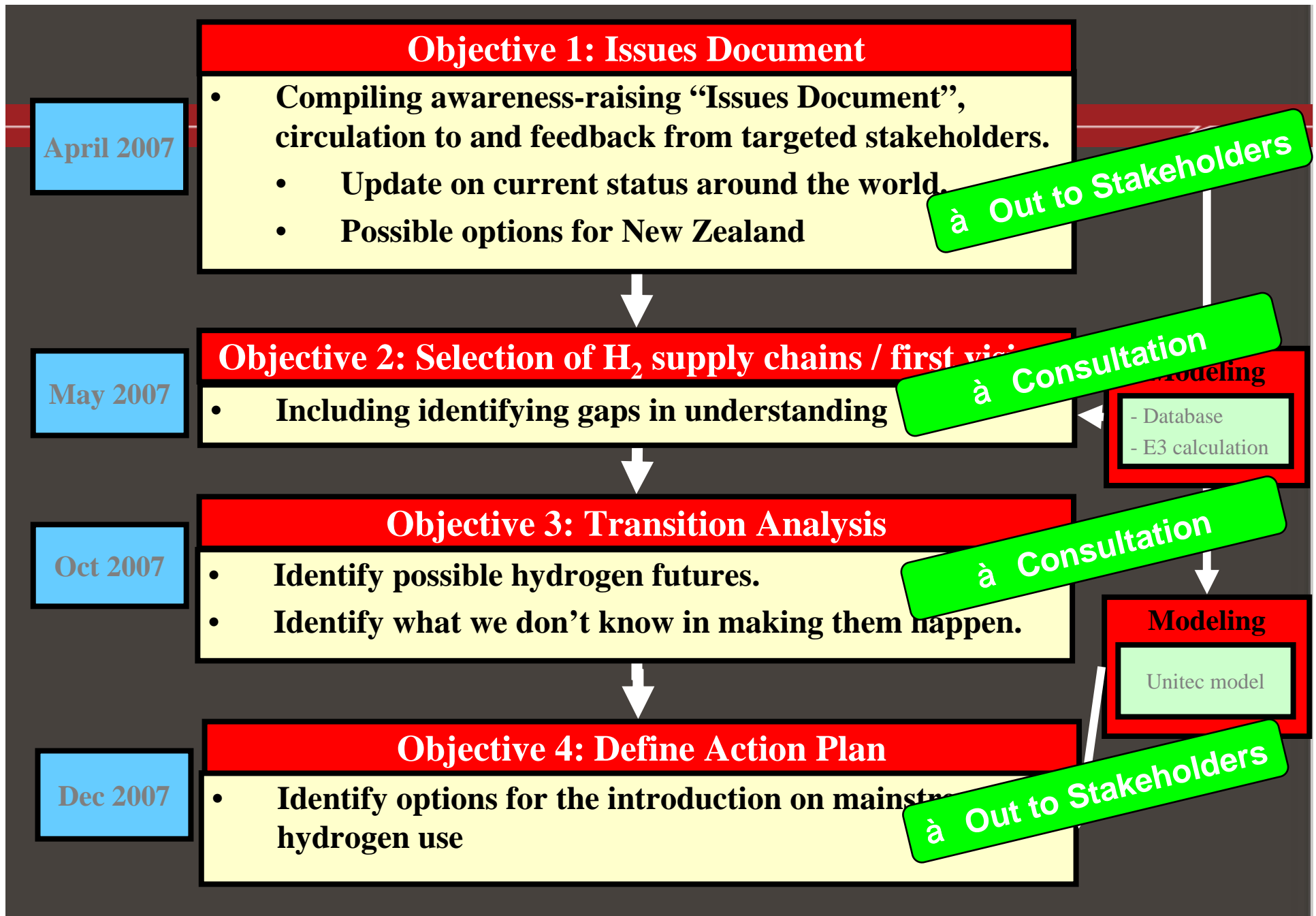
✓ 2050

- **Extremely flexible**
 - Can be sourced from a wide range of energy resources.
 - Can be stored easily anywhere along the “energy chain” à **flexibility beyond our current mindset.**



New Zealand's EnergyScape





Robust process ...

2000

2005

2030

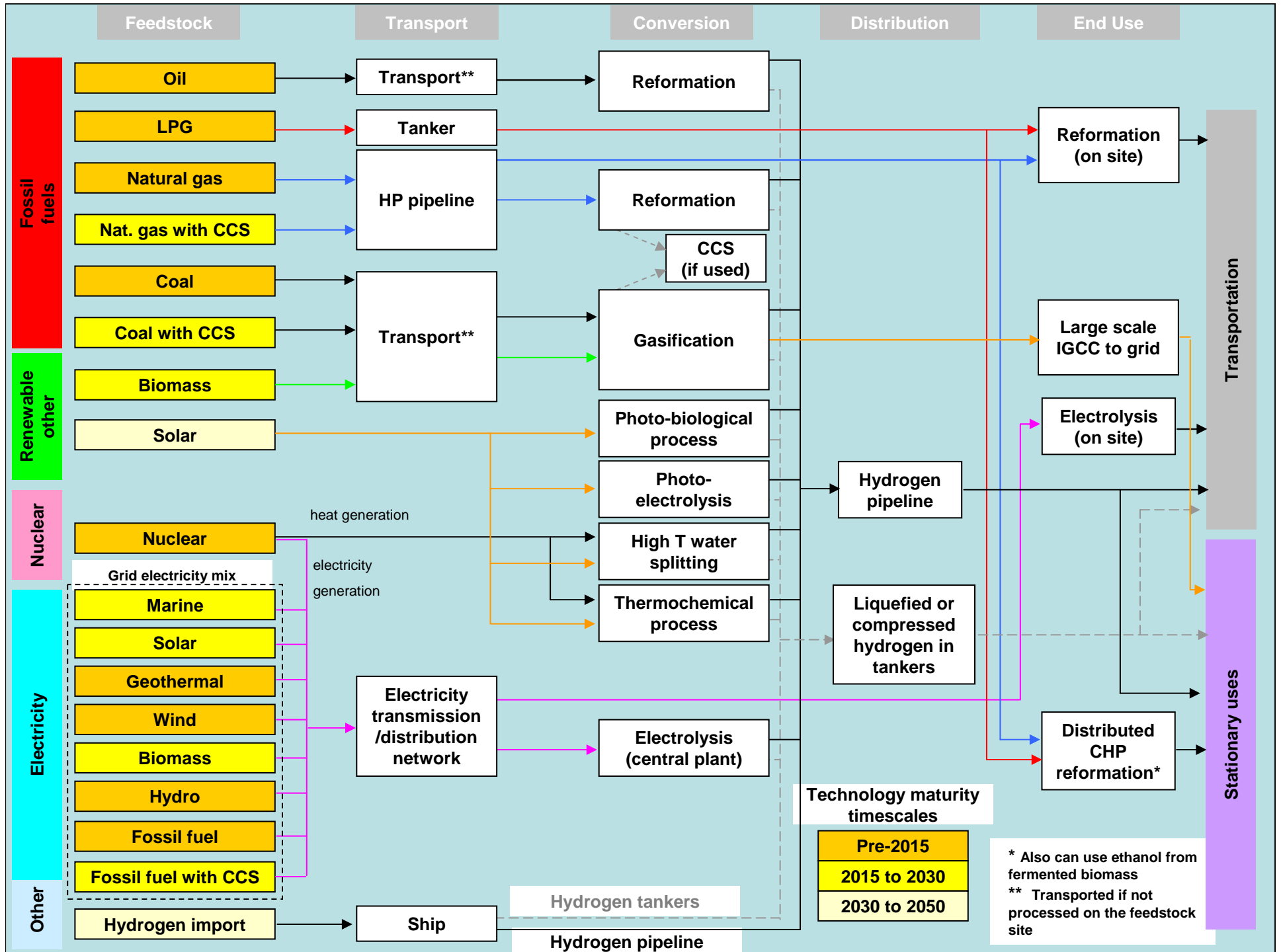
2050

- **Based on EU “HyWays” process:**
 - **Process used in the EU for 300 million people, 12 countries.**
 - **Customised for New Zealand situation.**

Current Status

2000 2005 2030 2050

- “Issues Document” providing background on energy pathways has been produced and issued.
- Considered:
 - **Feedstocks:** natural gas; coal; biomass; wind; “grid”; LPG; and ethanol.
 - **Conversion processes:** reformation; gasification; electrolysis; integrated gasification combined cycle; and fuel cell CHP.
 - **Distribution:** pipeline; compressed; and liquid tanker.
 - **End use:** Fuel cell vehicle; ICE vehicle; small scale fuel cell CHP; distributed generation fuel cell; and steam turbine.
 - **Worldwide hydrogen research.**



Big Issues Identified

2000 2005 2030 2050

- Hydrogen Production
- Hydrogen Storage
- Hydrogen Delivery
- Hydrogen Utilisation
- Education and Public Outreach
- Regulations and Codes
- Cross Cutting
 - Stranded Assets
 - Competing technologies
 - Competition for resources

Where to from here ...

2000

2005

2030

2050

- Energy, Economics and Emissions modelling of preferred chains to identify best options.
- Integrated modelling and scenario analysis.
- à Identifying the gaps in knowledge.
- Integrate with overall Energyscape framework.

thank you