

# Community resilience and energy security research at GNS Science



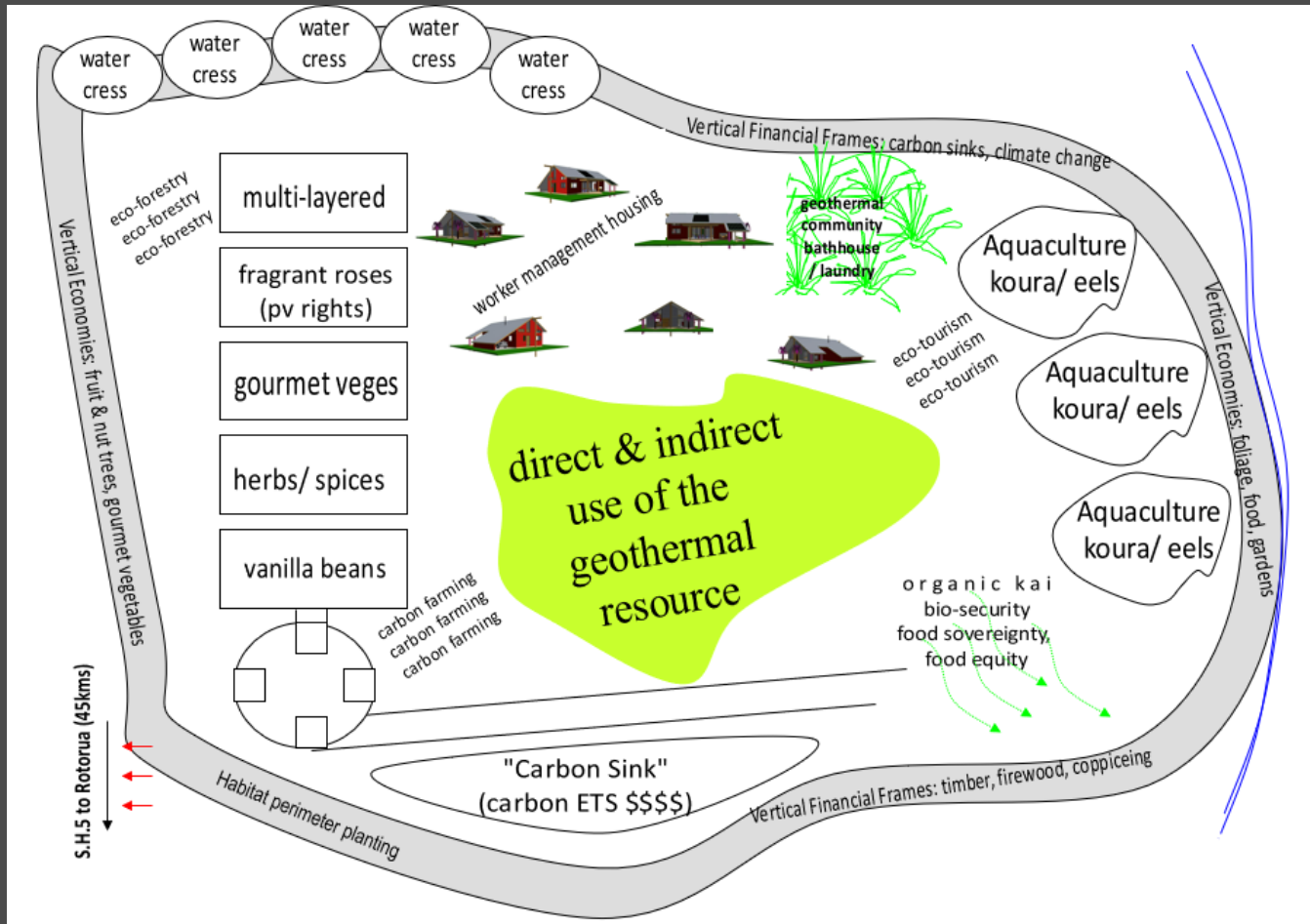
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# Te Ahi Tipua ki Tahorakuri A130: Hapū economic aspirations in degraded geothermal land

(a.seward@gns.cri.nz)



Self sufficient, self determined, self managed

Smart efficient housing



Geothermal heated glass houses



Aquaponics



# How can we enable resilient energy systems?

- **What**
  - Assess/Evaluate the energy systems resilience from three perspectives/angles (known as the *energy trilemma*):
    - Energy security
    - Accessibility (affordability)
    - Sustainability (low or no emissions)
- **Why**
  - Need to assess, measure, monitor and thus improve the resilience of energy systems serving communities.
- **How**
  - I. Formulate a framework based on international and national references
  - II. Develop
    - Quantitative metrics/indicators
    - Qualitative descriptors
  - ... to *characterize and evaluate* the resilience profile of energy systems to inform regulator, policy makers and energy providers/distributors
  - III. Validate the framework by implementing it in a defined community



Energy Trilemma

Source: Gas Vision 2050/Energy Networks Australia

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# Hydrogen Pilots

Hydrogen pilot projects allow us to demonstrate the possibilities, performance and safety of hydrogen in New Zealand.

Our goal is to develop a network of hydrogen pilot projects underway in New Zealand and develop GNS Sciences contribution to this:

- **NZ Hydrogen Pilots:** Hydrogen is taking off in New Zealand with a range of developments underway. We want to connect all of the current and future projects to make sure they are visible and understood. We also want to develop a critical mass in hydrogen utility vehicles demand to enable large orders. Currently working with Hiringa and Department of Conservation.
- **GNS Hydrogen Pilot:** At GNS Science we want to “walk the talk”. We are leading hydrogen research but we are also an end user of technology. We want to incorporate hydrogen generation and storage into redevelopment of our Gracefield site and add hydrogen vehicles to our fleet.

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