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Future Directions for Energy Research

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Future Directions in Energy Research

- Study commissioned by FRST in September 2004
- Review potential directions for future energy research
- Report was based on interviews with active participants in each energy sector studied
- Currently funded research was acknowledged but not necessarily used to develop future R&D themes
- Generic issues, not the details

Declaration of interest:

Power Projects is the co-recipient of a FRST grant to investigate wave energy technologies

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Energy Sectors

Supply, storage and demand

- Oil and gas
- Coal
- Hydro-electricity
- Geothermal
- Wind energy
- Solar (PV, SHW & heat pumps)
- Bio-energy
- Marine energy
- Hydrogen & fuel cells
- Energy efficiency
- Energy markets

- Industry sector interviewees chosen from commercial companies, Crown Research Institutes and industry representative associations

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Sustainable Energy Framework

- Reliable energy supply (inc. efficiency and waste avoidance)
- Resilient systems and infrastructure
- Environmental responsibility
- Fair and efficient pricing
- Contribution of energy innovation

Diverse and reliable, domestically produced environmentally sustainable energy reserves, flexible delivery infrastructure, informed markets and capable human resources

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R & D Outputs

- Intellectual property that can be commercialized
  - Technologies - *ab initio* or "*No. 8 wire*"
  - Practices
  - Knowledge
- Capability and capacity building
  - Research
  - Commercial

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Energy Supply and R & D

1. Identify, locate and measure energy resources	**LIMITED**
2. Convert resources to commercial reserves	**VERY LIMITED**
3. Develop/modify technologies & markets to utilize reserves	**IMMATURE**
4. Maintain and grow human HR base	**VERY MATURE**
5. Replace and develop HR capability	**Not being replaced**

- We need a holistic approach - develop all 5 themes
- View on benefits and role of foreign investment
- Leverage domestic investment into IP & HR exports
- Encourage inward FDI

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Related Issues

- **Access to Intellectual Property**
  - Public access to IP from both public and commercial R&D
- **National interest versus commercial interests**
  - Balancing the needs of both parties
  - Co-ordinating research investment
- **International Networks**
  - Aligning international R & D objectives
  - Co-operative developments (IPHE initiative)
- **Continuity of funding**

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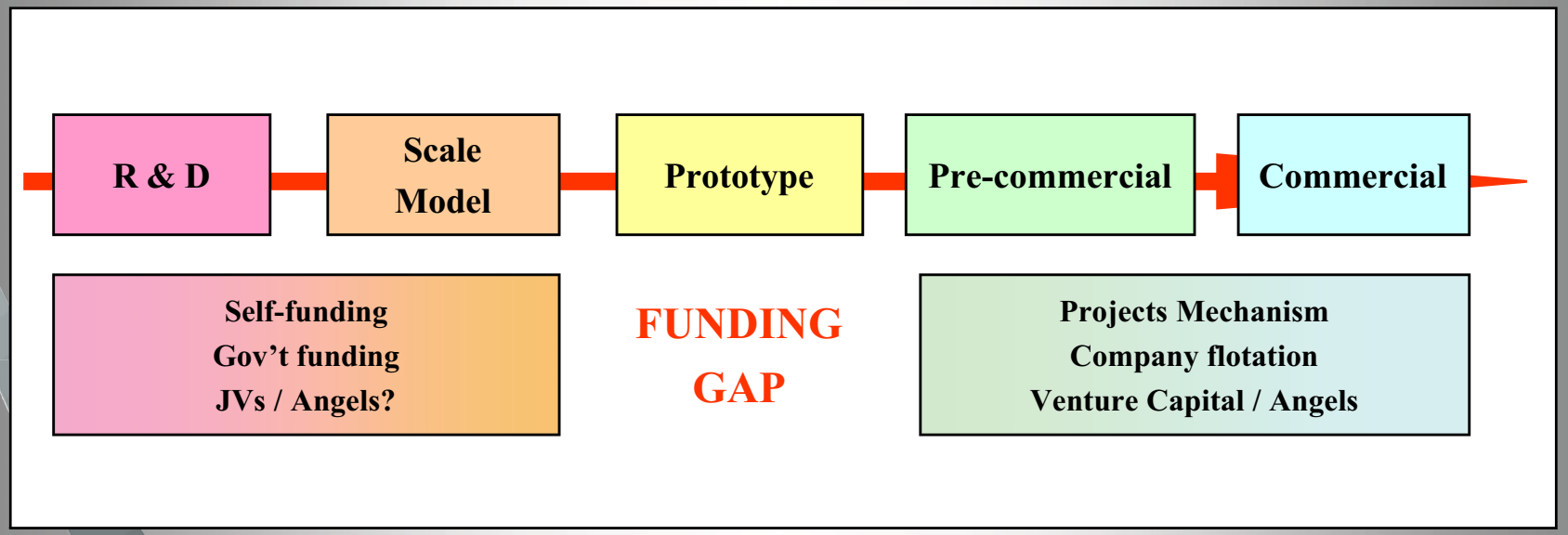
Innovation Funding Chain



- Sources of funding - public / private co-ordination
- Continuity and complementarity of funding
- Commercialization

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Wholesale versus retail

- Scale issue
- Market interventions will be different
- Wholesale supply / demand easier to influence
- Retail “domestic household” supply and demand
  - PV & SHW installations, intelligent metering
  - Distributed generation, off-grid households
- Retail supply and demand is more sensitive
  - Costs of interventions and change are higher
  - Change is slower
  - Less commercially rational
- BUT - necessary to manage demand

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Balanced Supply Portfolio

- Economic balance of reserves use
  - How does NZ decide which sources to use with a centralized market?
- Domestic energy supply and exports
  - Is it sufficient to secure domestic supply against future demand?
  - Strategic reserves of stored energy sources?
  - Can we replace our rapidly declining energy exports?
  - Worldwide LNG market: threat or opportunity?
- Scale of funding
  - Is $12.2 million on energy R&D sufficient?
  - Will it achieve the intended results?
  - How else can Government facilitate sustainable energy investment?

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