

# **Distributed Generation Market Potential**

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# DG is Driven by Local /Consumer Needs

- Distributed generation is local generation to meet capacity, reliability, and security requirements
- DG has national and local benefits but driven by local needs
  - Embedded has less complexity
  - Difficulty of finding a purchaser for energy
- Distributed generation allows paradigm shifts in thinking about solutions for meeting consumer energy capacity and reliability requirements.



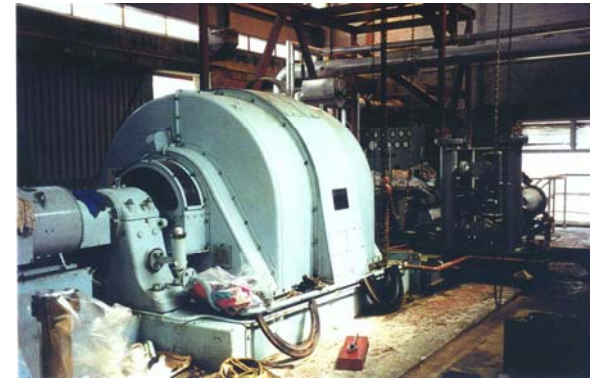
# The Boundaries for DG

- DG covers
  - Distributed electricity production
  - Utilisation of distributed energy resources
- May be off-grid
  - standby generators
  - isolated rural off-grid generation
- Could be synchronised for grid connection
- No size limits apply
- Can be part of a demand management package
- Technology understanding is a key driver



# Why are we currently interested in DG?

- Spot pricing is incentivising users to think about energy costs
- Free and open energy market
  - Encouragement of entry as a player
  - Competition gets us thinking
  - Integration of gas and electricity markets
  - Reorganisation of wholesale and retail markets
- Technology developments
- Maturity of the energy market
  - Move from being a commodity
  - Customers considering total energy solutions
  - Niche products and services
- Aging and constrained infrastructure
- Optimisation of asset values
- Commercial incentives rather than national security
  - Established national infrastructure
  - Focus on cost of energy rather than development



# DG Market Segments

- **Network companies**

- Use of DG to avoid transmission upgrades
- Allows network optimisation
- Allows reduction in n-1 network security constraints
- Multiple DG contracts minimises risk and increases reliability
- Flexibility of DG to meet security, reliability and capacity
- Value of reliable quick / must start generation
- Short term and long term technology solutions
- Total energy solutions to meet network requirements
  - (gas, diesel, wind, hydro, solar, transmission, demand management)
- Encourages relationships between market players - discouraged by current market structure
- Value of non-grid connected DG



# DG Market Segments

- **Off grid generation**
  - Local DG to avoid high cost transmission line
  - May be the only source of energy
- **Local Communities**
  - High benefits to adjacent community – voltage support, price
  - High free rider benefits to wider community
  - Can provide solution to network issues
  - Energy clusters based on embedded DG
  - Renewable energy
    - Increased value if fluctuating supply can be firmed
    - Need for explicit and helpful network connection policies
    - Cost of embedded new technologies vs wholesale supply
    - Net metering
    - Feel good factor



# DG Market Segments

- **Industrial**
  - Pursuit of DG through initiatives for CHP, embedded generation, renewable generation
  - Significance recognition that many DG technologies relate to heat supply with large efficiency benefits
  - Growth of importance of reliability and quality integration of DG with industrial operations
  - Management of transmission connection costs
  - Value of relationship with Network company
  - Value of demand management
  - Waste disposal



# Comparison Between Overseas and NZ

- **Overseas**

- Emphasis on fuel cells, wind, microturbines and photovoltaics
- Small on-site generation (backup, security)
- Driving to DG for its own sake (eg renewables policy)
- Supported by government subsidies
- Outage avoidance

- **New Zealand**

- Total energy solutions
- Traditional technologies
- Integration of transmission and energy costs
- Embedded generation
- Commercial decision making





# Economic Drivers

- **Embedded generation / cogeneration to lower cost of energy**
- **Peak demand reduction**
- **Reduction of connection charges**
- **Managing spot price exposure**
- **Avoidance of network upgrade costs**
  - interconnection technical issues
  - connection charges
  - transparent connection and payment structures
  - asset value optimisation
- **Businesses aiming for 99.9999% reliability**  
(30 secs of outage per year)
- **Benefits of installation in a new building**
- **Embedded energy supply clusters**
- **Export of surplus electricity,**



# Growth Barriers

- Obtaining energy sales contracts
- Complexity of relationships between energy and network companies
- Net metering policies
- Negotiation of connection benefits
- Lack of real time communication links / management
- Adoption of energy management by industry
- Lack of knowledge and experience, role models
- Traditional thinking



# Market Potential

- Already very large DG market using traditional technologies
- This winter probably about 80 MW of (new) DG contracted to retailers
- Large number of standby generators for essential services
  - Possible to gain additional value by contracting to retailers and network companies
  - Owners recognising other financial benefits than just standby
- DG integrated solutions for networks
- Waste disposal → energy → embedding (1-2 MW / site)
- Embedded energy clusters



# The Customer for DG

