



## Workshop on Distributed Generation Network Issues UNSW, 27 May 2002



# Overview of Issues & Workshop Program

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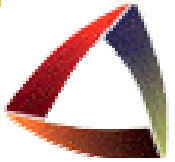


# Outline

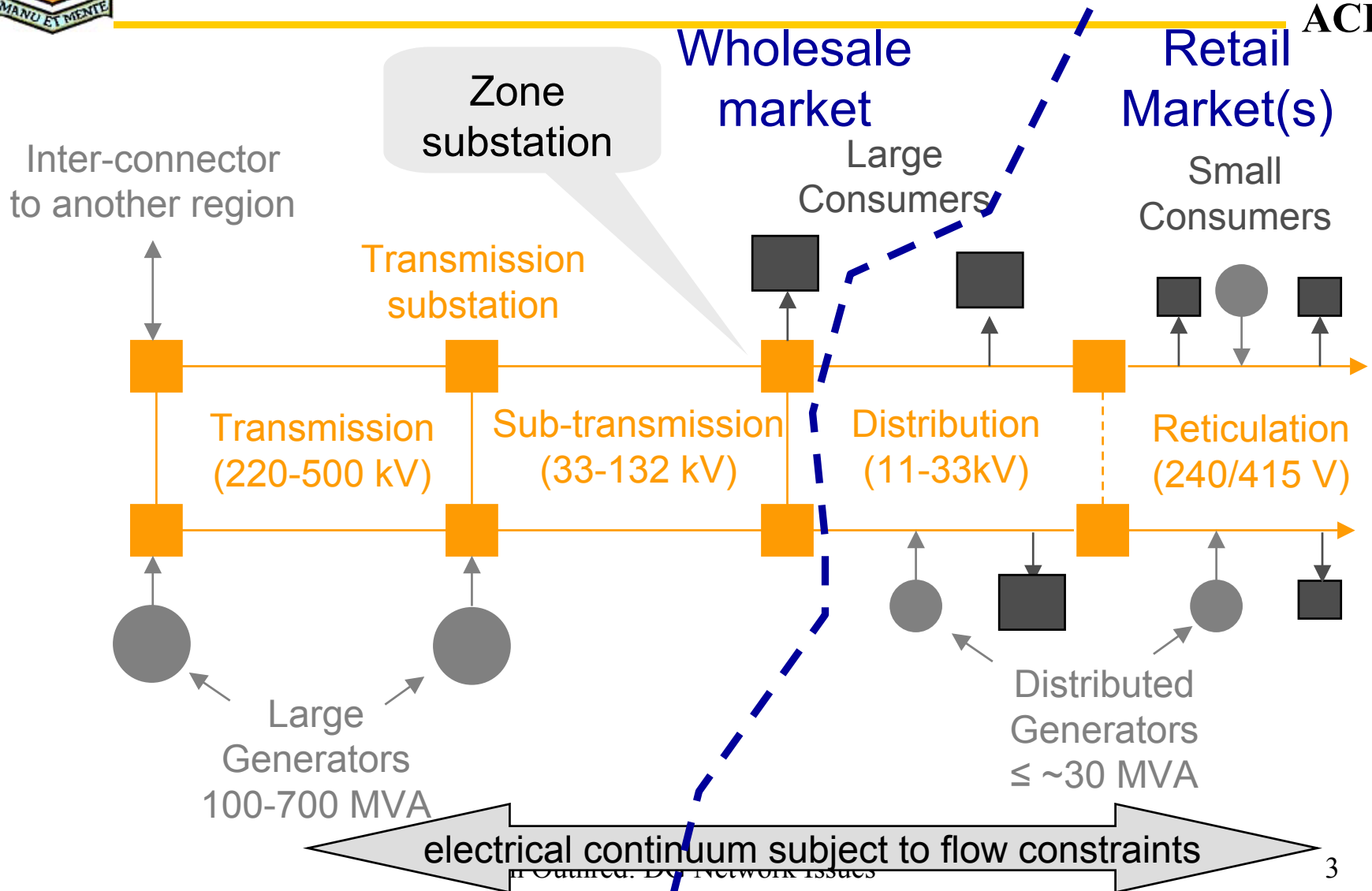
- A definition of distributed generation (DG)
- Physical issues:
  - Ancillary service design
  - Importance of investment decisions
- Commercial issues
  - Contract & market design
- Legal accountability issues
- Workshop objectives & program



# DG in a restructured electricity industry

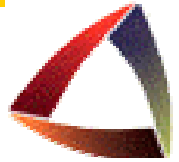


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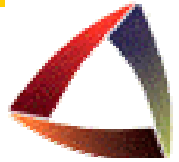


# Roles of physical industry participants



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<b>Participant Category</b>	<b>Electrical Energy (EE)</b>	<b>Ancillary Services (AS)</b>
<b>Generator (G)</b>	Inject EE at network connection point	Provide or use AS at network connection point
<b>Network element (N)</b>	Convey EE from G's to U's	Provide or convey AS
<b>End-use equipment (U)</b>	Absorb EE at network connection point	Provide or use AS at network connection point



# Physical issues

- Continuous, shared energy flow from power stations to end-use equipment via network:
  - *to provide end-use energy services*
- Shared accountability for availability & quality
  - Instantaneously variable with time & location
    - *Potential for rapid deterioration biases risks*
  - Managed collectively by *ancillary services (AS)*:
    - Related to frequency, voltage, availability & safety (including security and fault detection & clearance)
  - *Difficult to manage in distribution networks*



# Commercial issues

- Retail market design immature & lacks:
  - Appropriate commercial instruments for:
    - Distribution network AS, spot & forward energy
  - Clear accountabilities for all participants
  - Interval metering - energy & AS for all participants
- Need far greater support for end-users:
  - “end-use facilitators” to support small consumers
  - Innovative end-use service technology & control
  - Physical & financial risk management



# Accountability issues

- Physical accountability:
  - Death, injury, damage to equipment
  - Non-delivery of end-use service(s):
    - May be due to either availability or quality problems
- Commercial & legal accountability:
  - Causer accountability hard to implement
  - Legal context needs clarification
- *The legal & regulatory issues associated with DG need to be managed well*



# Summary of DG-network issues



- Physical issues:
  - Complexity; importance of extreme events
- Commercial issues:
  - Dysfunctional retail markets, regulated NSPs, importance of ancillary services:
    - Greatest need in distribution networks
    - Only some DG can provide valued AS
- Accountability issues:
  - Shared physical responsibility
  - legal & commercial ambiguity



# Workshop objectives



- Discuss DG-network issues
- Identify barriers to efficient outcomes
- Consider options for future work:
  - For example, workshops on:
    - Connection standards & contracts
    - Network planning tools
    - Retail ancillary service & energy market design
    - Legal liability issues
    - Institutional factors



# Workshop program



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<u>0900</u>	Ted Spooner	Technical issues & standards
<u>0930</u>	Ron Stillman	Legal liability issues
<u>1000</u>	Eric Groom	Regulator's perspective
<u>1100</u>	Patrick McMullan	Supply industry perspective
<u>1130</u>	Ric Brazzale	Distributed generator perspective
<u>1200</u>	Alex Baitch	Distribution planning issues
<u>1400</u>	Guy Grunwald	Protection issues
<u>1430</u>	Leith Elder	Distribution planning tools
<u>1530</u>	Alister Gardiner	ACRE-IRL DG projects
<u>1600</u>	Gerard Ledwich	DG in weak rural networks
<u>1630</u>	Hugh Outhred	Discussion



# Discussion session

- Specific questions for speakers
- Further work:
  - For example, workshops on:
    - Connection standards & contracts
    - Network planning tools
    - Retail ancillary service & energy market design
    - Legal liability issues
    - Institutional factors
  - Other suggestions