

ESAA



DISTRIBUTED GENERATION

– THE ELECTRICITY SUPPLY INDUSTRY VIEW

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DISTRIBUTED GENERATION

- Distributed Generation is commonly the term given to generation connected to a distribution system.

The technologies thought to be most significant in this classification include: cogeneration, wind turbines, small hydro and fossil fuelled generators, PV systems, fuel cells and micro-generation. It is now available in smaller sizes, modular features, decreasing costs, increasing reliability.

CIGRE

- A recent CIGRE article advised that as well as offering environmental benefits, these technologies may offer possibilities to improve power quality supply security. (Electra, No 199, Dec 2001). They also are a limited substitute for transmission capacity.

Embedded, dispersed and distributed generation

- Whilst there remain definitional issues – embedded, dispersed and distributed generation all being used, the article goes on to report that the rate and scale of distributed generation is increasing rapidly and in some European countries has risen to 30% - 40% of installed capacity i.e. Netherlands, Denmark.

Trend

- Trend for this and renewable energy sources to increase:

Major impact

- At present – major impact is on distribution networks and efforts are underway in many countries to understand these impacts. i.e. Ofgem Report of a Working Group on Embedded Generation, January, 2001, and some responses to the initial consultation paper in late 2001.

Impacts

- Impacts include connection, technical and market issues

Technical Constraints

Technical Constraints can include:

1. Distribution network capacity limitations in rural areas i.e. voltage limitations
2. Fault level restrictions in urban areas
3. Existing network design standards – e.g. security standards, fact that to date networks generally support demand
4. Safety issues
5. Metering protocols
6. Control protocols as connection is for both supply/demand

Market challenges include:

- Information provision – timing, depth and quality
- Generator connection charges – generator DUoS
- Negotiation processes including need for transparency
- Second “comer” issues, compatibility of Tx/Dist Charges
- Zonal or “site-specific” charges, avoidance of cross-subsidies
- Treatment of existing embedded generators

Solutions - Standards

- Solutions – Standards, uniform business practices, regulation
- Solutions scenarios and studies underway including developing “Active Distribution Networks”. National guidelines proposed in USA by National Energy Marketers Assoc. (NEM)

Penetration of Distributed Generation

- In the longer term – penetration of distributed generation may extend to transmission systems. Issues will then include: Dispatch, voltage and frequency control, operation and black starts. Solutions here are less obvious.

Energy Storage Technologies

- Energy storage technologies once viable will increase the value and utilisation of many distributed generation schemes. More work is required here.

Finally closer to home - Australian comments include:

- From a network and customer value perspective embedded/distributed generators tend to overstate the advantages of their generation and understate the impacts, particularly on system security and the network ability to deal with high levels of distributed generation.

Australian comments include: cont'd..

- There are real costs to network owners in connecting and maintaining high levels of co-generation and in many cases the co-generator is not prepared to pay them. This issue is particularly real for privatised but highly regulated networks and it will become a key issue in Victoria.