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|  | Policy | D6.2.5 Generation Congestion Management Policy | |
| | Top Energy <input checked="" type="checkbox"/> | | Ngawha <input checked="" type="checkbox"/> |

1 BACKGROUND TO THE POLICY

This Policy supports the Top Energy Generation Policy and provides for all generators connecting to the Top Energy Network to comply with Top Energy operating requirements. This is to ensure the security, stability and capacity of the distribution network and the transmission grid supplying Top Energy is not compromised nor exceeded.

This Policy is aligned to the Electricity Authority statutory objective, which is **to promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers.**

This Policy is based on the following set of principles:

1. Maintain system security
2. Economic and efficient supply
3. Ensure inflexible plant can continue to operate
4. Fairness across equal classes of Distributed Generator connected

This Policy acknowledges that there is a growing number of types of Distributed Generation which are broadly classified into the following three classifications:

1. Inflexible – geothermal and in some cases hydro
2. Flexible (peakers) - gas, diesel, batteries and in some cases hydro
3. Intermittent/interruptible – wind, solar and in some cases hydro


2 POLICY STATEMENT

The following controls will be implemented in support of the Policy:

Top Energy may interrupt the connection of any Distributed Generation to the Network, or curtail either the operation or output of Distributed Generation, or both, and may temporarily disconnect the Distributed Generation from the Network in any one or more of the following cases:

1. If Top Energy considers it reasonably necessary for planned maintenance, construction or repairs on the Network.
2. In an emergency or for the purpose of protecting or preventing danger, or damage to persons or property.
3. If the Customer modifies its Distributed Generation without obtaining prior authorisation from Top Energy, in such a way that the modification has a material effect on the injection of electricity from the Distributed Generation into the Network.
4. As a consequence of obligations that may be imposed on Top Energy which, in Top Energy's opinion, could affect the operation of the Distributed Generation. These obligations include:

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- a. obligations imposed by Transpower New Zealand Limited both as owner of the National Grid and as the System Operator, or
 - b. obligations to an electricity retailer, or
 - c. obligations arising in respect of other distribution networks, or
 - d. imposed by law, including the Electricity Industry Participation Code 2010.
5. In the case of a prevalence or saturation of Distributed Generation installations on any part of Top Energy’s Network leading to operational issues, including (but not restricted to):
- a. excessive voltage,
 - b. excessive reactive power,
 - c. excessive harmonics,
 - d. the compromising of Network protection equipment or settings.

3 TYPES OF DISTRIBUTED GENERATION


The following describes the characteristics of the different types of Distributed Generation:

1. Geothermal delivers a constant/firm/predictable generation. The vast majority of Geothermal plants are base loaded and not are designed to change output levels. The ability to change a Geothermal plant’s output (i.e. “load follow”) needs to be implemented at the design stage. Furthermore, the steam fields of most Geothermal plants are designed to maintain a steady and constant flow of fluids and changes in the plant output have the potential to disrupt the steam field operation.
2. Hydro plants deliver firm/predictable generation. Assuming there is sufficient water reserves, the majority of hydro plants provide a reliably stable supply of generation and can change their output quickly.
3. Diesel plants deliver firm/predictable generation. Assuming that there is sufficient diesel storage, diesel generators are reliable, stable, and can change their output quickly.
4. Gas turbines deliver firm/predictable generation. Assuming that there is sufficient gas supply, gas turbines are generally reliable, stable and can change their output quickly.
5. Wind and solar plants do not deliver a firm source of generation; output can change relatively quickly and is difficult to predict in advance (intermittent generators).

4 CONSTRAINT PRIORITY

In order to maintain the Network within its operating capability (i.e. voltage, capacity, and stability limits), Top Energy reserves the right to interrupt or curtail the operation and/or output of Distributed Generation.

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Under constraint conditions, the Network is being operated at the limits of its capability, in terms of voltage, current or dynamic stability and the introduction of significant levels of uncertain generation injection (i.e. sudden changes in cloud cover over a large solar farm) has the potential to require urgent intervention and/or result in equipment tripping due to overvoltage or current, and therefore loss of consumer supply.

Therefore, when requiring a reduction or the cessation of Distributed Generation, in the most efficient manner and in order to maintain network security and continuous electrical supply to consumers, Top Energy, having regard to the technical attributes of the Distributed Generation, will request generation reductions in the following order:


1. Flexible plant interrupted first (e.g. peakers or a battery)
2. Intermittent/interruptible plant second (e.g. wind or solar)
3. Inflexible plant third (e.g. geothermal)

When applying the above order, Top Energy will consider the economic costs incurred by each plant for constraint priority and shall use best endeavours to ensure that any required reduction in Distributed Generation is proportionate to the share of total Distribution Generation output at the time the constraint is identified (based on capacity installed).

5 EXPORT CONGESTION

Locations of any congestion on the Top Energy Network will be identified and published on the website under the section “Export Congestion”.

<https://topenergy.co.nz/i-want-to/get-connected/distributed-generation-solar>

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6 POLICY IMPLEMENTATION

| | | Competence and Interface |
|-------------------------------------|----------|------------------------------------|
| Implementation of the Policy | G | Board of Directors |
| | A | Chief Executive Officer |
| | R | General Manager Finance |
| | R | General Manager Generation |
| | R | General Manager Network |
| | R | General Manager Contracting |
| | R | General Manager Corporate Services |
| | R | Chief Information Officer |

Legend: **G** – Governance; **A** - Accountability; **R** - Responsibility; **C** - Co-operation.

7 REFERENCES

The following references should be considered in support of this Policy:

| Ref. Number | Name |
|--------------------|--|
| D6.2.3 | Generation Connection Policy |
| | Connection Agreement For Distributed Generation |
| ST-B1-1-001 | Distribution Generation DG Connection Standard |
| ST-C1.1-001 | Distribution Generation – DG 10kW -1000kW Standard |
| | Electricity Industry Participants Code 2010 |

The following procedural arrangements are implemented in support of this Policy:

| Ref. Number | Name |
|-------------|------|
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