

Title	Demonstrate knowledge of the national electricity grid		
Level	4	Credits	5

Purpose	People credited with this unit standard are able to: demonstrate knowledge of the New Zealand electricity generation, transmission and distribution system; describe the roles and responsibilities of the key national electricity grid coordinators; and describe the requirements to maintain grid security and quality of supply; and the national electricity grid operation.
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Classification	Electricity Supply > Electricity Supply - Power System Management
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Available grade	Achieved
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Guidance Information

- 1 Evidence presented for assessment against this unit standard must be consistent with safe working practices and be in accordance with applicable legislative and industry requirements.
- 2 Legislation, regulations and/or industry standards relevant to this unit standard include but are not limited to:
 - Health and Safety at Work Act 2015;
 - Electricity Act 1992;
 - Electricity (Safety) Regulations 2010;
 - Electricity supply industry codes of practice and documented enterprise procedures, including *Safety Manual – Electricity Industry* (SM-EI) and relevant EEA guides available from www.eea.co.nz; and any subsequent amendments and replacements.
- 3 Definitions
Asset owner refers to a participant who owns or operates assets used for generating or conveying electricity.
Industry requirements include all asset owner requirements and standards; manufacturers’ specifications; and enterprise requirements which cover the documented workplace policies, procedures, specifications, business, and quality management requirements relevant to the workplace in which assessment is carried out.
- 4 The following abbreviations relate to this unit standard:
EGR – Electricity Governance Regulations
HVDC – high voltage, direct current.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of the New Zealand electricity generation, transmission and distribution system.

Range may include but is not limited to – electricity power stations, main power transmission and distribution lines, major substations and the HVDC inter island power link and cable.

Performance criteria

- 1.1 The key system components in the electricity supply system are described.
- 1.2 Voltage levels in electricity generation, transmission and distribution systems are explained.
- 1.3 Line diagrams of a simplified New Zealand electricity supply system are drawn and explained.
- 1.4 The purpose and function of the HVDC link is explained.
- 1.5 Major components and structure of the national electricity grid are identified.

Range includes but is not limited to – transmission lines, circuit breakers, transformers, bus-work, switchyards, protection, nodes, interconnected, electrical integrity.
- 1.6 Common overhead power line and power cable configurations are described.

Range single-phase and three-phase conductors' configuration, star and delta configurations, bundle conductors, insulators, towers, poles, cross-arms, earthing conductors, laid-up conductors in cables, sheaths, armouring, serving.

Outcome 2

Describe the roles and responsibilities of the key national electricity grid coordinators.

Performance criteria

- 2.1 The energy coordinator role and responsibilities are described in terms of dispatch schedule implementation, real-time frequency and voltage monitoring, and event management.
- 2.2 The security coordinator role and responsibilities are described in terms of grid security management, market schedule production, and outage management.
- 2.3 The planning coordinator role and responsibilities are described in terms of long-term outage and grid planning, and contingency analysis.

- 2.4 The relationships and interactions between the key national electricity grid coordinators are described.

Outcome 3

Describe the requirements to maintain grid security and quality of supply.

Range includes but is not limited to – grid system security objectives, frequency and voltage objectives, electrical loading objectives, stability objectives, frequency management, voltage management, equipment loading management, stability management, obligations and actions when grid emergencies occur, communications between parties.

Performance criteria

- 3.1 The purpose of grid security maintenance is described.
- 3.2 The purpose of quality of supply maintenance is described.
- 3.3 The purpose of the EGR is described.

Outcome 4

Describe the national electricity grid operation.

Performance criteria

- 4.1 Frequency and frequency management are described in terms of purpose, supply and demand, frequency keeping, and compliance requirements.
- 4.2 Voltage and voltage management are described in terms of purpose, supply and demand, and compliance requirements.
- 4.3 Transmission circuit and plant loading limits are described in terms of purpose, management, constraint applications and compliance requirements.
- 4.4 Electricity generators are described in terms of location, type of generation, capacity, fuel resources, constraints, and market position.
- 4.5 Electricity distributors are described in terms of location, electricity demand requirements, and market position.
- 4.6 Wholesale electricity market interaction is described in terms of offers, bids, schedules, and dispatch implementation.

Planned review date	31 December 2026
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	24 July 2002	31 December 2018
Revision	2	11 February 2004	31 December 2018
Revision	3	20 June 2006	31 December 2018
Review	4	19 November 2010	31 December 2019
Review	5	16 March 2017	31 December 2023
Review	6	30 September 2021	N/A

Consent and Moderation Requirements (CMR) reference

0120

This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

Comments on this unit standard

Please contact Connexis - Infrastructure Industry Training Organisation qualifications@connexis.org.nz if you wish to suggest changes to the content of this unit standard.