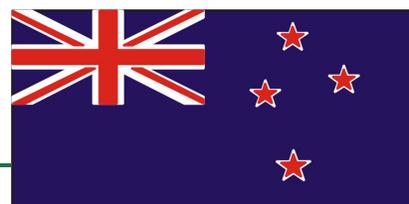


23 New Zealand



23.1 Summary of Coal Industry

23.1.1 ROLE OF COAL IN NEW ZEALAND

Coal is New Zealand's most abundant fossil fuel and has been an important energy source since the late nineteenth century. Today, the majority of New Zealand's coal is used for electricity generation (40 percent) and industrial processes (33 percent), with dairy and non-metallic mineral product manufacturing (cement, lime, and plaster) being the largest industrial consumers of coal (MBIE, 2013). In 2013, New Zealand consumed approximately 2.9 million tonnes (Mmt) of coal, with a significant portion used to generate electricity at Huntly, New Zealand's only coal-fired power station (MBIE, 2013; Coal Association, 2012). Further, exportation of New Zealand's premium bituminous coal has been a major growth area since about 1990 and is likely to continue being a good prospect for the future as their coal is valued internationally for its low ash, sulfur content, and other characteristics that allow blending with other coals for use in the steel industry (MBIE, 2013).

Table 23-1 indicates New Zealand's recoverable coal reserves to be about 570 Mmt. The resource itself is far more extensive and may offer greater recovery, ultimately. The total known in-ground resource is estimated to exceed 15 billion tonnes, of which more than half is potentially recoverable (MBIE, 2013).

Table 23-1. New Zealand's Coal Reserves and Production

Indicator	Anthracite & Bituminous (million tonnes)	Sub-bituminous & Lignite (million tonnes)	Total (million tonnes)	Global Rank (# and %)
Estimated Proved Coal Reserves (2011)	33.0	538.0	571.0	31 (0.064%)
Annual Coal Production (2012)	4.6	0.33	4.93	33 (0.06%)

Source: EIA (2014)

New Zealand is divided up into North Island and South Island (Figure 23-1). Coal is found in the Northland, Waikato, and Taranaki Coal Regions of the North Island. On the South Island, coal is found in the Nelson, West Coast, Canterbury, Otago, and Southland Coal Regions (USGS, 2004). At least 6.2 billion tonnes of lignite is technically and economically recoverable in 10 major deposits in the South Island regions of Otago and Southland (P&M, 2014). The North Island in-ground resource is about 2.4 billion tonnes and consists of almost entirely sub-bituminous coal (P&M, 2014).

Figure 23-1. New Zealand's Coal Fields



Source: MOED (2010)

23.1.2 STAKEHOLDERS

Only a handful of companies operate coal mines in New Zealand. Most of New Zealand's coal is produced by Solid Energy NZ Limited (P&M, 2014).

Key stakeholders involved in New Zealand's coal and the coal mine methane (CMM) development industries are outlined in Table 23-2.

Table 23-2. Key Stakeholders in New Zealand's CMM Industry

Stakeholder Category	Stakeholder	Role
Mining Companies	<ul style="list-style-type: none"> ▪ Birchfield Coal ▪ Canterbury Coal ▪ Cascade Coal ▪ Crusader Coal ▪ Francis Mining ▪ Glencoal ▪ Harliwich Carrying Co. ▪ Heaphy Mining ▪ Kai Point Coal ▪ New Creek Mining ▪ O'Reilly's Opencast ▪ Puke Coal ▪ RJ Banks ▪ Rockies Mining ▪ Solid Energy ▪ Takitimu Coal 	Project hosts
Developers	<ul style="list-style-type: none"> ▪ See http://www.epa.gov/coalbed/networkcontacts.html 	Project opportunity identification and planning
Universities and Research Centers	<ul style="list-style-type: none"> ▪ Commonwealth Scientific and Industrial Research Organisation (CSIRO) ▪ University of Auckland 	Technical assistance
Government Groups	<ul style="list-style-type: none"> ▪ Ministry of Commerce – Energy and Resources Division 	Licensing

Source: P&M (2014)

23.1.3 STATUS OF COAL AND THE COAL MINING INDUSTRY

New Zealand's coal industry is vested in 22 surface and underground mines. Roughly 60 percent of national production was from two large opencast operations, located at Rotowaro and Stockton (P&M, 2014). Coal production statistics for 2012 by mine type are presented in Table 23-3. The total number of mines has steadily decreased, and surface mining methods have become more popular.

Table 23-3. New Zealand's Production and Mine Statistics (million tonnes)

Type of Mine	2012 Production	Number of Mines
Underground (active)	0.60	4
Surface (active)	4.33	18
Total	4.93	22

Sources: MBIE (2013); P&M (2014)

Despite increasing competition from hydroelectric power and from imported oil, annual coal production has been sustained at or above the 1.8 Mmt level since 1907. Production has exceeded 3 Mmt since 1992, and it reached a peak of almost 5.7 Mmt in 2006 (MBIE, 2013).

Table 23-4 lists all major coal mines in operation in New Zealand.

Table 23-4. New Zealand's Major Operating Coal Mines

Coal Field	Mine	Coal Rank	Mine Type
Waikato			
▪ Huntly	▪ Huntly East	sub-bituminous	underground
	▪ O'Reilly's	sub-bituminous	surface
▪ Maramarua	▪ Kopako	sub-bituminous	surface
▪ Rotowaro	▪ Awaroa	sub-bituminous	surface
	▪ Pukemiro	sub-bituminous	surface
West Coast			
▪ Buller	▪ Stockton	bituminous	surface
	▪ Cascade	bituminous	surface
	▪ New Creek	bituminous	surface
	▪ Rockies	bituminous	surface
▪ Garvey Creek	▪ Echo	bituminous	surface
▪ Greymouth	▪ Roa	bituminous	underground
	▪ Strongman	bituminous	surface
▪ Inangahua	▪ Berlins Creek	sub-bituminous	surface
	▪ Giles Creek	sub-bituminous	surface
▪ Reefton	▪ Burkes Creek	sub-bituminous	underground
	▪ Reddale Valley	sub-bituminous	surface
	▪ Terrace	sub-bituminous	underground
▪ Canterbury			
▪ Canterbury	▪ Malvern Hills	sub-bituminous	surface
Otago			
▪ Kaitangata	▪ Castle Hill	sub-bituminous	surface
▪ Roxburgh	▪ Harliwich	lignite	surface
Southland			
▪ Ohai	▪ Takitimu	sub-bituminous	surface
▪ Waimumu	▪ Newvale	lignite	surface

Source: P&M (2014)

Currently, little exploration for new reserves is taking place, and the industry is concentrating on improving knowledge of reserves within the existing license areas. New Zealand's coal exports will continue to grow—although there has been demand for premium-quality bituminous coal, there is

also a growing international market for thermal coals, such as New Zealand's lower-grade bituminous and sub-bituminous coals (USGS, 2004).

23.2 Overview of CMM Emissions and Development Potential

The Global Methane Initiative (GMI) International CMM Projects Database currently identifies no CMM recovery projects for New Zealand, in operation or under development (GMI, 2014). Updates on future CMM projects in New Zealand can be found at <https://www.globalmethane.org/coal-mines/cmm/index.aspx>.

23.2.1 CMM EMISSIONS FROM OPERATING MINES

Most New Zealand coal production is from surface mines producing low rank coals at shallow depths with low methane concentrations. Methane emissions from these coals are vented. The few deep underground mines have high methane concentrations and are generally degasified with ventilation and surface gob wells. To date, no current projects have been identified in surface or underground mines where captured gas is utilized or marketed rather than vented.

Methane emissions in New Zealand totaled 23.8 million cubic meters (m³) in 2000, but are expected to increase to 29.4 million m³ by 2015, and then anticipated to further increase to 36.4 million m³ by 2030 (see Table 23-5).

Table 23-5. New Zealand's CMM Emissions (million cubic meters)

Emissions	2000	2005	2010	2015 (projected)
Total CH ₄ Emitted	23.8	23.1	27.3	29.4

Source: USEPA (2012)

23.2.2 CMM EMISSIONS FROM ABANDONED COAL MINES

No data about methane emissions from abandoned mines in New Zealand are available at this time.

23.2.3 CBM FROM VIRGIN COAL SEAMS

Estimates indicate New Zealand has a total of more than 2,000 petajoules or 53 billion m³ of CBM reserves (Clark, 2008). No commercial wells are in production, but numerous exploratory and test wells have been drilled.

At least 16 licenses had been issued for exploratory drilling and development of coal seam gas in New Zealand (L&M, 2009), but as of 2014, the permits had either been surrendered or were about to expire (SourceWatch, 2014). L&M Coal Seam Gas Ltd. (L&M CSG) previously held numerous licenses, which covered coal resources ranging in rank from lignite to bituminous, with the bulk being in the low rank coals. L&M CSG had drilled 52 exploratory wells and started their first pilot project. In 2009, L&M estimated they had about 1,500 petajoules (40 billion m³) of CBM reserves (L&M, 2009). However, in 2012, the Director's report stated that although work had continued on

the Ohai CSG pilot project, the results had been “disappointing” and commercial gas flow rates had not been achieved (SourceWatch, 2014).

Other CSG explorers/permit holders include Solid Energy (and its U.S. CSG developer partner, Resource Development Technology) and Macdonald-Chartwell, as well as Bridge Petroleum Ltd in partnership with Transworld Exploration Ltd and Westech Energy, (Clark, 2008; RigZone, 2004).

23.3 Opportunities and Challenges to Greater CMM Recovery and Use

As reflected in Table 23-6, New Zealand is a signatory to both the UNFCCC and the Kyoto Protocol. New Zealand is an Annex I Party, and its emissions target under the Kyoto Protocol is to achieve 1990 levels by 2010.

Table 23-6. New Zealand’s Climate Change Mitigation Commitment

Agreement	Signature	Ratification
UNFCCC	June 4, 1992	September 16, 1993
Kyoto Protocol	May 22, 1998	December 19, 2002

Source: UNFCCC (2014)

In 2013, the Government announced three national targets for reducing New Zealand’s greenhouse gas (GHG) emissions that cover both the medium and long term:

- An unconditional target of 5percent below 1990 GHG emissions levels by 2020.
- A conditional target range of 10 to 20 percent below 1990 GHG emissions levels by 2020, if there is a comprehensive global agreement (e.g., post-Kyoto).
- A long-term target of 50 percent below 1990 GHG emissions levels by 2050 (MFE, 2014).

New Zealand also has an Emission Trading Scheme (ETS), which places a price on GHG emissions (including methane) to provide an incentive to reduce emissions, invest in clean technology and renewable power generation, and plant forests to absorb carbon dioxide. The stationary energy sector (e.g., coal, natural gas, geothermal energy), for example, has obligations to report their methane emissions, then acquire and surrender New Zealand Units (NZUs) or equivalent overseas emission to offset these emissions.

23.3.1 MARKET AND INFRASTRUCTURE FACTORS

New Zealand gas demand is projected to continue to increase significantly as domestic conventional gas supplies decline more rapidly than expected. New domestic production from CBM/CMM is therefore encouraged. New Zealand has considered imposing a carbon tax, however, in 2005, the government decided to abandon their plans because emission savings were not justified by the cost.

CMM and CBM infrastructure in New Zealand is not well developed; gas gathering, compression, and transmission infrastructure will require significant investments.

Any methane recovered in the future could be utilized by the power generation, heating, and transportation sectors, as well as by the industrial sector for boilers, but it would have to compete against gas suppliers and importers. The University of Auckland, the Commonwealth Scientific and Industrial Research Organization (CSIRO), and other technology organizations are helping to address technology issues associated with recovery of CMM and CBM resources.

23.3.2 REGULATORY INFORMATION

The New Zealand coal mining industry has undergone major changes over the last 25 years. State-owned coal mines were converted into a government-owned corporation. Natural gas regulations are governed by the “Gas Act,” which can be found at www.legislation.govt.nz.

23.4 Profiles of Individual Mines

See P&M (2014) for links to available mine production data. Updates on future CMM projects in New Zealand can be found at <http://www.globalmethane.org/coal-mines/cmm.index.aspx>.

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