MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

COVERSHEET

Minister	Hon Simeon Brown	**Portfolio**	Energy
Title of Cabinet paper	Proposals for a Regulatory Regime for Carbon Capture, Utilisation and Storage	**Date to be published**	5 September 2024

List of documents that have been proactively released		
Date	**Title**	**Author**
1 July 2024	*Proposals for Regulatory Regime for Carbon Capture, Utilisation and Storage*	*Office of the Minister for Energy*
1 July 2024	*CBC-24-MIN-0061 Minute*	*Cabinet Office*
26 June 2024	*Interim Regulatory Impact Statement: Policies for Carbon Capture, Utilisation and Storage*	*MBIE*
26 June 2024	*Interim Climate Implications of Policy Assessment Disclosure Sheet*	*MBIE*

Information redacted **YES / NO** *(please select)*

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Some information has been withheld for the reasons of Confidential advice to Government and Confidentiality

Climate Implications of Policy Assessment: Disclosure Sheet

This disclosure sheet provides the responsible department's best estimate of the greenhouse gas emissions impacts for New Zealand that would arise from the implementation of the policy proposal or option described below. It has been prepared to help inform Cabinet decisions about this policy. It is broken down by periods that align with New Zealand's future emissions budgets.

Section 1: General information

General information	
Name/title of policy proposal or policy option:	A Regulatory Regime for Carbon Capture, Utilisation and Storage (CCUS)
Agency responsible for the Cabinet paper:	Ministry of Business, Innovation and Employment
Date finalised:	*TBC as this is an interim document*
Short description of the policy proposal:	The creation of a regulatory regime for permitting and monitoring individual CCUS projects, and a framework for how emissions which are captured and permanently stored using CCUS should be treated, with respect to greenhouse gas (**GHG**) emissions pricing. More information can be found in the following interim RIS *Policies for Carbon Capture and Storage*, which has been developed alongside a consultation document seeking public feedback on these proposals.

Section 2: Greenhouse gas emission impacts

Table 1 - Emissions impact from CCUS

Sector & source	Changes in greenhouse gas emissions of carbon dioxide equivalent ($ktCO_2$-e)		
	2026–30	**2031–35**	**Cumulative impact**
Gas			
Gas production	-750	-560	**-1310**
Additional gas availability	472	975	**1447**
Electricity			
Geothermal	-526	-659	**-1185**
Industry			
Petrochemical	-543	-2714	**-3257**
Other industrial (e.g. cement)	-59	-289	**-348**
Total	**-1406**	**-3247**	**-4653**

Section 3: Additional information

Additional information

Scope of assessment

This climate implications of policy assessment (**CIPA**) for creating a CCUS regime:

- Looks at the emissions impact of the CCUS regulatory regime on the first three emission budgets (till 2035), with the policy not expected to have an impact on the first emissions budget. This CIPA does not look at emissions budgets beyond 2035 because key reports this assessment is based on focus on the period until 2035 (from Wood Beca and EY) and uncertainties inherent in making projections beyond 2035.
- Focuses on establishing a regulatory regime for CCUS. A recent CIPA for the offshore ban reversal included some CCUS figures based on CCUS happening from 2035.
- Looks at the emission impact from CCUS uptake from specific industries rather than an overall change in sector activity and associated emissions. However, this analysis does take into account the increased gas consumption enabled via CCUS, which is expected to make some gas production viable.
- Has estimated the amount of CO_2 that we expect be stored out to 2035 based on a series of assumptions. These assumptions are transparent and will be tested during consultation and revised as needed later this year. The impact of CCUS on the long-term operation of the New Zealand Emissions Trading Scheme (**ETS**) will be complex and need additional analysis to understand. For example, more analysis is needed to determine:
  - if there would be emissions impacts from gas production or use additional to those already considered, and
  - how an increase in CCUS (in combination with other actions in the second emissions reduction plan (**ERP2**) which is still being developed) could change the NZU supply and demand outlook.
- We intend to complete this analysis in conjunction with the Ministry for the Environment (**MfE**) and the Environmental Protection Authority (**EPA**) as part of the design of the regime after consultation. We will also work with MfE to incorporate our updated understanding of the potential emissions impact of CCUS into the whole-of-economy modelling.
- All emissions in the gas sector are covered by the ETS. The ETS is considered to have a "soft cap" due to there being a cap on the emissions through government provisions of units, but not a cap on the number of units able to be generated through forestry. The effect of this soft cap is any additional emissions reductions in the gas sector attributed to CCUS may not decrease emissions below the cap in the long run. However, enabling CCUS could allow earlier emission reductions (e.g. in the second emissions budget for the period 2026-2030) than would otherwise occur.

Assumptions

- CCUS is used to capture an additional 20 per cent of geothermal generation emissions from 2027 (compared with counterfactual). This is due to having certainty from the future monitoring and liability regime to incentivise investment in this technology for geothermal electricity generation.
- CCUS is commercially and technically viable from 2027 for gas production and 2030 for the petrochemical industry if a suitable regulatory regime is put in place. The commercial viability will be driven by the cost of CCUS compared to ETS carbon prices.
- CCUS will be used to capture 100 per cent of emissions from gas production from the high CO_2 Kapuni and Maui East fields based on the figures in the *Review of CCUS/CCUS Potential in New Zealand* report from Wood Beca published in March 2023. This means that the emissions associated with gas production at Maui East will be fully captured

Additional information

leading to a net zero emissions profile for Maui East production. The additional emissions from combustion of the gas from Maui East are captured in the additional gas availability line.

- CCUS will result in additional emissions from additional gas supply being unlocked. It is assumed that:
  - Maui East, which started production at the end of 2023, will produce gas that otherwise would not have been produced without CCUS.
  - For Maui East production, we have used a proxy estimate of nearly 85 petajoules (**PJ**) available (based on existing 2C volumes for Maui), with 70 per cent produced and more than half of that production consumed by 2035 (based on overall 2C production estimates from the EY supply and demand study)
  - This additional production would have the Maui Emission factor of 52,840 tonnes per PJ.
  - An emission reduction of 20 per cent on the emissions from this additional gas because a significant portion would be consumed by Methanex who use it in methanol feedstock for export. This is a conservative estimate because Methanex stated in 2023 that two thirds of the gas it consumes is used in feedstock.
- CCUS will be used to capture 35 per cent of emissions from the petrochemical industry (from the 'industry plus electricity focus' gas emissions modelling done by EY in early 2024).
- CCUS will be used to capture five per cent of emissions from other industries (e.g. cement and steel). These industries use less gas than petrochemical industries and would have higher costs for CCUS due to lower economies of scale. The emissions figures for other industries are based on the figures in the 'industry plus electricity focus' scenario in the gas emissions modelling done by EY in early 2024.
- CCUS is not likely to be used by 2035 for gas-powered electricity generation, which would involve significant capital investment to meet very high CO_2 production rates when the stations are operating, with CCUS infrastructure only being used infrequently due to gas-fired power generation only operating when needed.
- Carbon captured via CCUS will have a very low risk of leaking over the assessed time period (as per the International Energy Agency's view on the risks of leakage from CCUS) and there will be a regulatory regime in place.

Counterfactual

- The counterfactual is a regulatory regime for CCUS is not put in place.
- Under the counterfactual, CCUS is still used to capture a significant proportion of geothermal generation emissions because CCUS is likely to be easier and cheaper for geothermal than for many other emission sources. These power stations are located above geothermal reservoirs where carbon can be stored and geothermal generators are already investigating or trialling CO_2 reinjection in their operations. Also, existing regulatory settings (under the Climate Change Response Act 2002 and associated regulations) recognise CCUS activities for geothermal generation.
- Under the counterfactual, CCUS is not used beyond geothermal because a regulatory regime is needed to make CCUS feasible in other industries.

Alternative scenarios

- The emissions impact of CCUS is uncertain because this is a new technology and uptake is uncertain. Below are the:
  - assumptions for alternative scenarios of low, medium (used in section 2 above) and high uptake of CCUS if the CCUS regulatory regime is put in place (table 2)
  - emissions impacts of the lower and higher uptake scenarios for CCUS – tables 3 and 4.

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Table 2 - Assumptions across uptake scenarios

Uptake	Assumptions
Low uptake	**Geothermal**: CCUS captures an additional 15 per cent of geothermal generation emissions from 2027 compared to the counterfactual. **Gas production:** CCUS captures 100 per cent of emissions from gas production in Maui East and Kapuni from 2027. However, the use of CCUS in Maui East is not counted as emission reductions because it is assumed this gas production would not happen without CCUS. **Additional gas availability:** New field – Maui East – is produced when this otherwise would not have been. We have used a proxy estimate of nearly 85PJ available, with 70 per cent produced and more than half of that production consumed by 2035. This production would have the Maui Emission factor. We have applied a 20 per cent emissions reduction because a large portion of the extra gas would be consumed by Methanex who use it as methanol feedstock for export. **Petrochemical industry:** CCUS captures 20 per cent of emissions from the petrochemical industry from 2030. **Other industries (e.g. cement):** None.
Medium uptake (used in section 2)	**Geothermal**: CCUS captures an additional 20 per cent of geothermal generation emissions from 2027 compared to the counterfactual. **Gas production**: CCUS captures 100 per cent of emissions from gas production in Maui East and Kapuni from 2027. However, the use of CCUS in Maui East is not counted as emission reductions because it is assumed this gas production would not happen without CCUS. **Additional gas availability:** As above. **Petrochemical industry:** CCUS captures 35 per cent of emissions from the petrochemical industry from 2030. **Other industries (e.g. cement):** CCUS captures 5 per cent of emissions from 2030.
High uptake	**Geothermal**: CCUS captures an additional 25 per cent of geothermal generation emissions from 2027 compared to the counterfactual. **Gas production**: CCUS captures 100 per cent of emissions from gas production in Maui East and Kapuni from 2027. However, use of CCUS in Maui East are not counted as emission reductions because it is assumed this gas production would not happen without CCUS. **Additional gas availability:** As above. **Petrochemical industry:** CCUS captures 50 per cent of emissions from the petrochemical industry from 2030. **Other industries (e.g. cement):** CCUS captures 10 per cent of emissions from 2030.

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Table 3 – Low uptake scenario impact compared to counterfactual – High CCUS capture costs compared to carbon prices

Sector & source	Changes in greenhouse gas emissions in tonnes of carbon dioxide equivalent ($ktCO_2$-e)			
	2020–25	**2026–30**	**2031–35**	**Cumulative impact**
Gas				
Gas production	0	-750	-560	-1310
Additional gas availability	0	472	975	1447
Electricity				
Geothermal	0	-395	-494	-889
Industry				
Petrochemical	0	-310	-1551	-1861
Other industrial (e.g. cement)	0	0	0	0
Total	0	-983	-1630	-2613

Table 4 – High uptake scenario impact compared to counterfactual – Low CCUS capture costs compared to carbon prices

Sector & source	Changes in greenhouse gas emissions in tonnes of carbon dioxide equivalent ($ktCO_2$-e)			
	2020–25	**2026–30**	**2031–35**	**Cumulative impact**
Gas				
Gas production	0	-750	-560	-1310
Additional gas availability	0	472	975	1447
Electricity				
Geothermal	0	-658	-824	-1482
Industry				
Petrochemical	0	-775	-3877	-4652
Other industrial (e.g. cement)	0	-118	-577	-695
Total	0	-1829	-4863	-6692

Additional information

Section 4: Quality assurance

Quality assurance

The Climate Implications of Policy Assessment (CIPA) team has been consulted and confirms that the CIPA requirements apply as reducing emissions is a key objective of this proposal.

The CIPA team has reviewed draft estimates and finds the proposal's modelling to be sound and based on reasonable assumptions.

It should be noted that the modelling is only draft at this stage and a full CIPA assessment is not required until later this year. As a result, the modelling and subsequent emissions estimates may change as this work progresses and assumptions are tested through consultation.

Given this modelling is still in draft form, the CIPA team will conduct a full assessment and reevaluate the final modelling and emissions estimates once the results are available later in the year. MBIE will work with the CIPA team to disclose the emissions impacts of proposals in advance of final decisions as appropriate.