



File No. DOIA 1516-0059

14 AUG 2015

Kena Duignan
Political and Media Advisor
Green Party of Aotearoa New Zealand
kena.duignan@parliament.govt.nz

Dear Kena

Thank you for your email of 15 July 2015 requesting the following under the Official Information Act 1982 (the Act):

Please provide copies of all advice and reports provided by the Ministry of Business, Innovation and Employment to the Government regarding New Zealand's 2030 climate target.

The Ministry of Business, Innovation and Employment (the Ministry) has identified two documents in response to your request, both aides mémoire to the Minister for Economic Development, Science and Innovation, Tertiary Education, Skills and Employment, and the Minister of Energy and Resources. These are as follows:

1. 27 March 2015: *Cabinet Strategy Committee: climate change target discussion*
2. 22 June 2015: *EGI: New Zealand's intended contribution to the new global climate change agreement.*

Copies are attached. Some information has been withheld from these documents, under the following sections of the Act:

- | | |
|-------------|--|
| 9(2)(a) | To protect the privacy of natural persons, including that of deceased natural persons. |
| 9(2)(ba)(i) | To protect information which is subject to an obligation of confidence or which any person has been or could be compelled to provide under the authority of any enactment, where the making available of the information would be likely to prejudice the supply of similar information, or information from the same source, and it is in the public interest that such information should continue to be supplied. |
| 9(2)(f)(iv) | To maintain the constitutional conventions for the time being which protect the confidentiality of advice tendered by Ministers of the Crown and officials. |
| 9(2)(g)(i) | To maintain the effective conduct of public affairs through the free and frank expression of opinions by or between or to Ministers of the Crown or members of an organisation or officers and employees of any department or organisation in the course of their duty. |
| 9(2)(j) | To enable a Minister of the Crown or any department or organisation holding the information to carry on, without prejudice or disadvantage, negotiations (including commercial and industrial negotiations). |



AIDE MEMOIRE

EGI: New Zealand's intended contribution to the new global climate change agreement

Date:	22 June 2015	Priority:	High
Security Classification:	Restricted	Tracker number:	3243 14-15

Information for Minister(s)

Hon Steven Joyce Minister for Economic Development, Science and Innovation, Tertiary Education, Skills and Employment	Hon Simon Bridges Minister of Energy and Resources
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Contact for telephone discussion (if required)

Name	Position	Telephone	1st contact
Elisabeth Numan	Policy Director, Energy and Resources	04 462 4204	✓
Andrew Millar	Principal Advisor, Energy Markets Policy	04 901 1556	
s9(2)(a)	Senior Advisor, Energy Markets Policy	s9(2)(a)	

The following departments/agencies have been consulted

<input type="checkbox"/> Treasury	<input type="checkbox"/> MoJ	<input type="checkbox"/> NZTE	<input type="checkbox"/> MSD	<input type="checkbox"/> TEC	<input type="checkbox"/> MoE
<input type="checkbox"/> MFAT	<input type="checkbox"/> MPI	<input type="checkbox"/> MfE	<input type="checkbox"/> DIA	<input type="checkbox"/> TPK	<input type="checkbox"/> MoH
<input type="checkbox"/> Other:			N/A		

Minister's office to complete:

- | | |
|---|--|
| <input type="checkbox"/> Approved | <input type="checkbox"/> Declined |
| <input type="checkbox"/> Noted | <input type="checkbox"/> Needs change |
| <input type="checkbox"/> Seen | <input type="checkbox"/> Overtaken by Events |
| <input type="checkbox"/> See Minister's Notes | <input type="checkbox"/> Withdrawn |

Comments:

15. ss9(2)(ba)(i) and 9(2)(j) [redacted]
 [redacted] It is worth noting that both the United States and the European Union have indicated that they will not be using international units to meet their post-2020 targets.

16. The table below⁽¹⁾ shows the s9(2)(ba)(i) level of international purchasing for New Zealand at different target levels:

Target: 2021-2030	-5%	-6%	-10%	-15%	-20%
Total amount of CO ₂ e reductions (MT)	242	247	260	284	305
Amount of domestic reductions (MT)	s9(2)(j) [redacted]				
Amount of international purchasing (MT)					
Cost of international purchasing at \$46 tonne (billion \$)					

17. As the level of economic abatement at a given price is fixed, the higher the target New Zealand takes, the greater the cost of international purchasing.
18. The economic cost of this purchasing is significantly influenced by the price of international units. Computable general equilibrium (CGE) modelling suggests that if New Zealand was required to abate emissions domestically without access international purchasing, a much higher domestic carbon price of up to \$300 per tonne would be needed to attempt to meet a -10% target. ss9(2)(ba)(i) and 9(2)(j)

19. s9(2)(f) [redacted]

But there are domestic abatement opportunities to be explored...

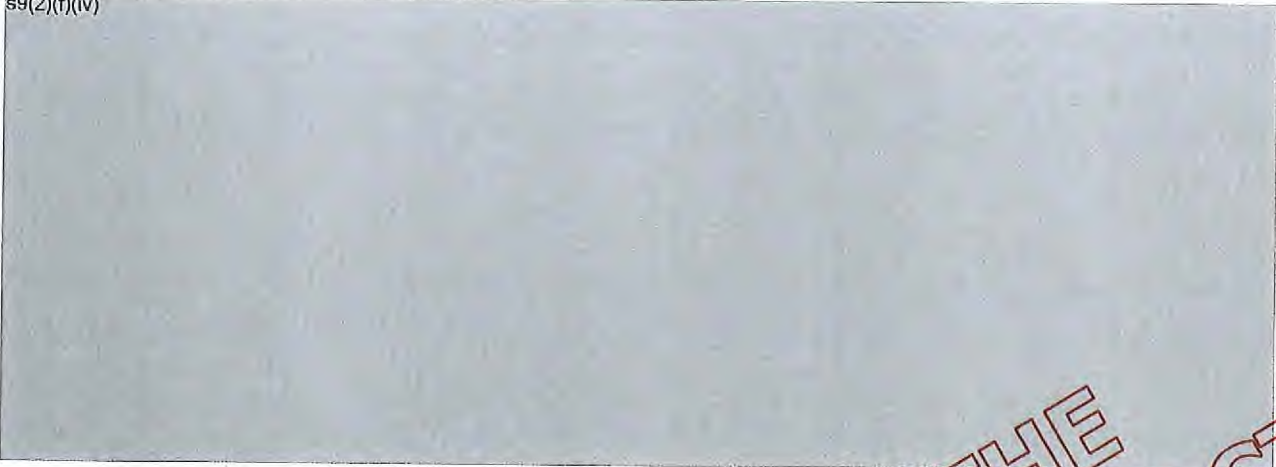
20. However, New Zealand will not be totally reliant on international purchasing as there are also domestic abatement opportunities from a transition to low emissions economic growth.

21. s9(2)(f)(iv) [redacted]

⁽¹⁾ Based on CGE modelling by Infometrics. This modelling assumes a carbon price reaching \$50 by 2030, that there is no effective way to address methane emissions from agriculture, that technological change would not allow for greater emissions reductions from the transport sector, that there would be sufficient units available to meet New Zealand's requirements and that there would be no increase in domestic afforestation from a higher carbon price. It also assumes a linear relationship between the level of target and the cost of purchasing.

This modelling should only be considered as indicative based on the assumptions used as afforestation and technological change is also likely to affect domestic abatement opportunities. It also not directly comparable to the figure in the Cabinet paper as these show the full economic cost from CGE models, which includes the impact on the economy of carbon pricing (assuming no significant technology or structural shifts) and the flow-on effects of sending money offshore to buy international units.

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OFFICIAL INFORMATION ACT



The level and form of New Zealand's INDC

28. s9(2)(ba)(i) [redacted]
[redacted] However, this should not come at the expense of incentivising a steady and predictable transition to a low emissions economy, and encouraging the nascent domestic abatement opportunity that our analysis suggests.

Target should not exceed -10%

29. Although our previous advice recommended a target of -6% on 1990 levels, our analysis suggests that s9(2)(i) [redacted]
[redacted] it would make sense to support a higher target as a risk management tool for reducing future costs.

Target should be on a whole-of-economy basis

30. As noted above, the form of New Zealand's international climate change commitment also has important implications for the speed and shape of a domestic transition. In our view, a whole-of-economy target sends a clear signal that maintaining momentum in economic growth is a priority and this means all parts of the economy need to bear the costs of the transition to a low emissions future.

31. This does not mean that all parts of the economy should bear an equal share, but that all parts of the economy have scope for emissions reduction and should play a part. Levelling the playing field across all sectors is important to ensuring that over the medium-to-long-term investment flows to the areas of highest national value. Under this approach, Government also retains flexibility in apportioning the transition costs through domestic policy settings to aid the balancing of short-term business costs and long-term incentives for innovation and productivity growth.

32. Second, it addresses the risks that the costs of meeting our climate target will be disproportionality loaded onto the energy and transport sectors - both important enablers of economic growth. Any cost increases from abatement in these sectors will be passed on through the economy. Our concern is that New Zealand may face pressure to commit to the same overall level of emission reduction, but from a narrower base (the "waterbed effect").

33. s9(2)(ba)(i) [redacted]
[redacted]



11 SEP 2015

15-D-01261

Kena Duignan
Political and Media Advisor
Green Party of Aotearoa New Zealand
kena.duignan@parliament.govt.nz

Dear Ms Duignan

Thank you for your email of 15 July 2015 requesting the following information under the Official Information Act 1982 (OIA):

'Copies of all advice and reports provided by the Ministry for the Environment to the Government regarding New Zealand's 2030 climate target'

The scope of this request has been interpreted as documents provided by the Ministry to the Government whereby its principal purpose is to advise or report on New Zealand's 2030 target. Documents drafted for other purposes but which contain some information on the target have been considered out of scope.

The attached table lists the documents falling within the scope of your request and notes any OIA provisions that have been applied.

Under section 28(3) of the OIA, you have the right to ask the Ombudsman to review my response to your request.

Yours sincerely

Bill Naik
Acting Director, Climate Change

Memo

To: Hon Tim Groser, Minister for Climate Change Issues

From: Kay Harrison, Director, Climate Change **Date:** 6 November 2014

Ref: 14-B-01799

CC: Hon Simon Bridges, Associate Minister for Climate Change Issues

Re: Options for New Zealand's contribution under the new climate change agreement

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1. On 15 September officials met with you to present and discuss initial thinking on options for New Zealand's Intended Nationally Determined Contribution (INDC) under the new global agreement on climate change.
 2. Since then we have continued to work with MFAT, MPI, Treasury, MBIE and MOT on options for New Zealand's INDC. The attached papers elaborate on and analyse the options presented on 15 September in more detail.
 3. We welcome further discussions with you on the content of the attached papers.

Attachments:

- Nationally Determined Contribution Options [*Overview paper*]
- Form A: Carbon budget for whole of economy
- Form B: Carbon budget for non-agricultural emissions plus intensity-based approach for agriculture
- Form C: Carbon budget for long-lived gases plus stabilisation target for short-lived gases

Factors over which New Zealand has less, or no control are:

- *International carbon price* – this determines the cost of purchasing international offsets, which are a major component of total costs of meeting a target;
- *Domestic actions by our trade competitors* – these affect the relative competitiveness of New Zealand’s exports;

Costing caveats

Figures presented in this and attached papers are indicative costings from initial economic modelling. These figures are likely to change as they are refined over the next few months through further rounds of modelling. Particular caveats at this stage are:

- Only the carbon budget component of costs has been calculated so far. The relative cost of the carbon budget components of Form B and Form C is sensitive to assumptions about emissions and mitigation costs for different gases.
- Figures are given to two significant figures in order to reveal the relative cost of different options, but this overstates the precision to which the numbers are reliable in absolute terms.
- The model used takes a relatively pessimistic view of improvements in technology, including greater improvements and potential new technologies in modelling would likely reduce estimated costs for a given target.
- Purchasing of international units to offset domestic emissions has ‘second-round’ economic effects which are not currently incorporated in modelling. Including these effects is likely to increase the estimated costs for a given target

Estimated cost of Forms A, B and C

The New Zealand economy is projected to grow by around 40% by 2030 (in real terms) from \$212 bn in 2012/13 to around \$320 bn (assuming a 2.4% annual compound growth rate). Economic modelling suggests that it is possible to meet a wide range of 2030 emissions reduction targets, while continuing to grow the economy. More ambitious targets mean that the economy grows marginally more slowly than under ‘business as usual’ projections due to investment in domestic abatement measures and purchasing of international offsets. The costs of targets in this paper are presented as a percentage of 2030 GDP.

Table 3 shows the estimated cost of achieving different targets at different international carbon prices. Costs have been estimated for the carbon budget component of each target only. The *agricultural intensity target* under Form B and the *short-lived gas stabilisation target* under Form C are likely to incur additional costs to those shown here associated with domestic actions to deliver the target¹².

Table 3 – Estimated cost of different targets at different carbon prices (carbon budget component only)

Estimated Cost as % 2030 GDP ¹³						
(Costs shown for Carbon budget component only)						
	Form A		Form B		Form C ¹⁴	
Carbon price (in 2030) ¹⁵ :	\$50	\$150	\$50	\$150	\$50	\$150
5% below 1990 by 2030	Withheld under s.9(2)(j)					
10% below 1990 by 2030						
20% below 1990 by 2030						
40% below 1990 by 2030						

For a given headline target number, the costs for Form B and Form C are lower than Form A. This is because the treatment of some or all agricultural emissions under Forms B and C has the effect of reducing New

¹² All target Options would also incur ETS administration costs and costs for other domestic emissions policy measures if these were implemented. These costs would depend on the details of domestic policy settings.

¹³ Costs are given to two significant figures in order to illustrate the relative costs of different target levels. However, this almost certainly overstates the precision with which these numbers can be confidently stated.

¹⁴ The similar costs of Form B and Form C are partly due to effects which coincidentally ‘offset’ each other: when compared to Form B, Form C excludes non-agricultural methane from the ‘carbon budget’ but adds in agricultural nitrous oxide to the ‘carbon budget’. These emissions vary by a relatively small amount. More detailed modelling will likely change the relative costs.

¹⁵ Carbon price path assumptions are explained at the end of this document.

Zealand's total liability under its target. This means that more ambitious headline numbers could be tabled for roughly equivalent cost. Table 4 shows some equivalent-cost targets across the three target form options.

If a Form B or C target form were maintained in New Zealand's subsequent climate change mitigation commitments, then this would also reduce costs over subsequent commitment periods versus a Form A target for a given headline number. These cost differences would be amplified if domestic emissions and carbon prices rose and emissions reductions became deeper in subsequent commitment periods.

Table 4 - Equivalent-cost targets across different target forms

	Equivalent-cost targets (Costs for Carbon budget component only)		
	Form A	Form B	Form C
Target (% change on 1990)	Withheld under s.9(2)(j)		
Cost (% 2030 GDP)			
Quantity of abatement vs BAU ¹⁶ (Mt CO ₂ e ¹⁷)			

Impact of varying base year

Changing to a more recent base year than 1990 for a target means a given amount of emissions abatement corresponds to a larger headline number. This means that it is possible to construct targets which have approximately equivalent costs and headline numbers across all target forms as shown in Table 5¹⁸.

Table 5 - Example of impact of changing base year on estimated target cost

	Form A	Form A	Form B	Form C
Headline	-20%	-20%	-20%	-20%
Base Year	1990	2005	1990	1990
Cost @\$50 (%2030 GDP)	Withheld under s.9(2)(j)			

Changing from 1990 to 2005 base year reduces cost for same headline number

Sensitivity Analysis

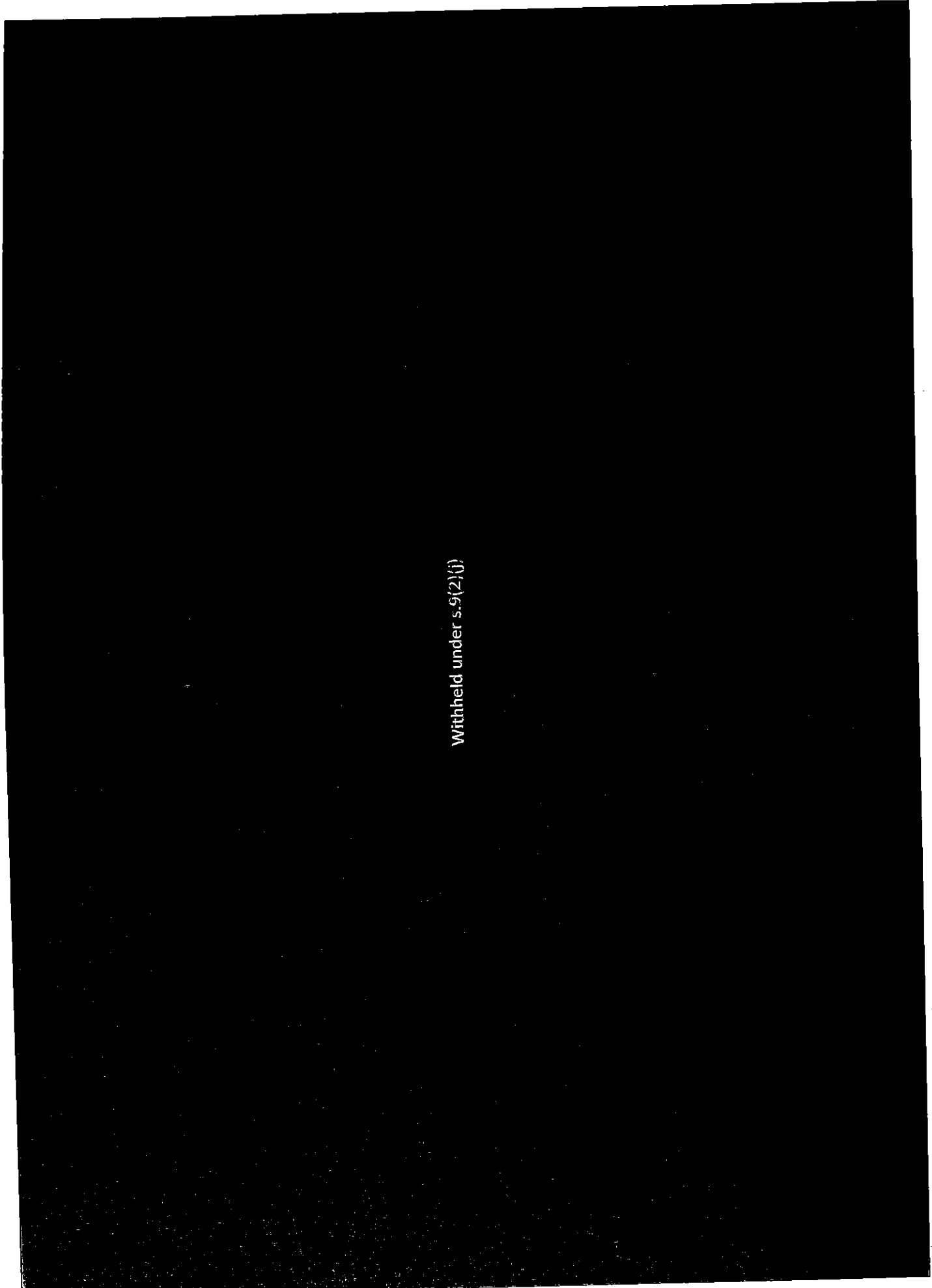
Figure 2 on the next page shows a sensitivity analysis across some of the multiple factors affecting costs. This demonstrates the relative importance of different factors for the cost of an INDC. Due to the large proportion of international purchasing required to deliver New Zealand's contribution, market access and the carbon price are by far the most significant factors, although both are outside of New Zealand's control.

¹⁶ 'BAU' = Business-as-usual

¹⁷ Megatonnes of carbon dioxide equivalent greenhouse gas emissions

¹⁸ Note the relatively small difference between the costs of the targets shown in Table 5 increases at higher carbon prices

Figure 1 - Sensitivity analysis of multiple factors on target cost



Withheld under s.9(2)(j)

Target level

Figure 2 shows the level of emissions abatement required to meet the carbon budget component of a 'headline target' of -5%, -20% or -40% on 1990 levels by 2030 across target forms A, B and C. The split between domestic emissions abatement, forestry removals and international offset purchasing is also shown. Additional abatement from 'BAU' (Business-as-usual) would be required to meet the separate agricultural intensity target (Form B) or short-lived gas stabilisation target (Form C).

International purchasing is likely to comprise the majority of emissions reductions as it is likely to be cheaper than most domestic abatement at the \$50 international carbon price assumed in these calculations.

Figure 2 - Abatement required to meet carbon budget component for different target forms and levels (assuming a \$50 2030 international carbon price)

Withheld under s.9(2)(j)

Domestic actions to be included in an INDC narrative (all target forms)

Some existing domestic actions which could be highlighted as part of a supporting narrative to the INDCs (across all form options) are:

- 70%-80% renewable electricity generation with an existing target for 90% by 2025
- Total primary energy supply 38% renewable in 2013 (also among the highest in the OECD)
- Government science funding of geothermal and industrial symbiosis projects
- Investment in research and development of agricultural emissions abatement through, for example, the Global Research Alliance, the Agricultural Greenhouse Gas Centre and the Pastoral Greenhouse Gas Research Consortium
- The government's strategic approach to encouraging and enabling Intelligent Transport System technologies (*Transport System Technology Action Plan 2014-18*, released in June 2014 by the Ministry of Transport)

[SENSITIVE]

Economic modelling for New Zealand's INDC – approach and preliminary findings

MFE, 17th Feb, 2015

Approach

Primary economic modelling:

- Modelling has been undertaken by Landcare Research and Informetrics (CGE – Computable General Equilibrium models)
- NZIER are undertaking a quality assurance process

Supporting modelling:

- Energy sector optimisation model (EECA)
- Forestry rules modelling (MPI)
- Agricultural emissions intensity improvement modelling (MPI/AgResearch)
- Comparison of mitigation costs between developed countries (MFE)

Caveats and Assumptions

- A. Results are indicative and preliminary, and are still undergoing a quality assurance process
- B. We assumed a range of carbon prices (low: \$8, medium: \$50, high: \$135 in 2030)
- C. Figures represent the costs if NZ and the globe act together (costs would be greater if NZ acted alone)
- D. Assumes [REDACTED] forestry rules [REDACTED]
- E. NZ ETS settings: no price cap; no '1-for-2'; no free allocations; agriculture emissions not priced

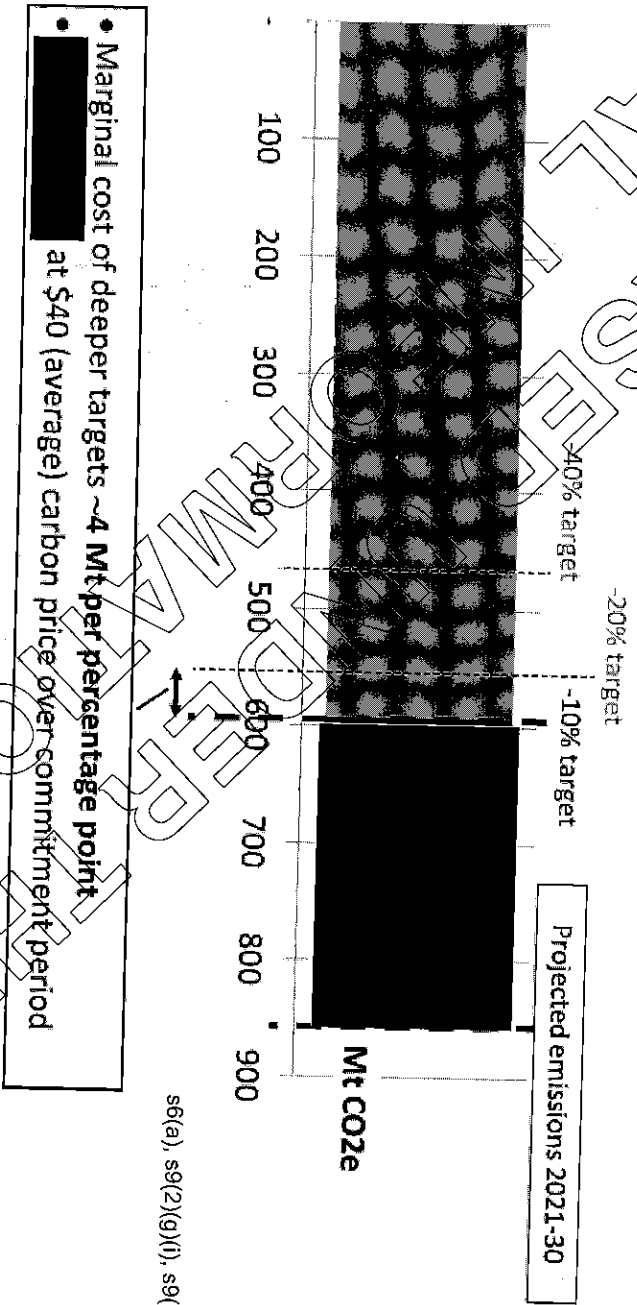
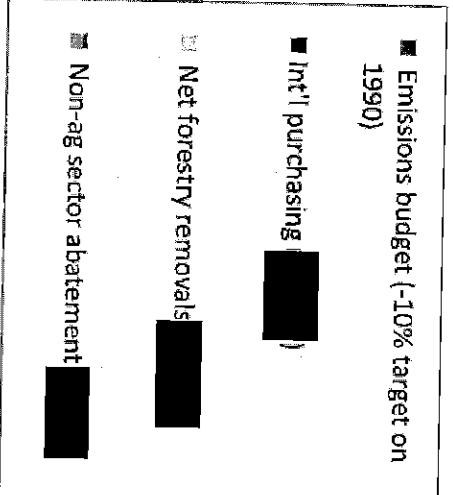
s6(a), s9(2)(g)(i), s9(2)(j)

3. Abatement: Around 260 Mt of abatement from 'BAU' emissions is required for a target of -10% on 1990 by 2030. Marginal abatement required for deeper (or shallower) targets is around 4 Mt per percentage point – equating to [redacted] direct cost of purchasing (this direct cost is less than the economic impact as it ignores flow-on effects).

s6(a), s9(2)(g)(i), s9(2)(i)

4. Where the abatement comes from: Domestic abatement (excluding agriculture) could be a substantial share of total abatement

- Rising carbon prices would drive a shift in the domestic economy more substantial than to-date
- Access to international markets is still critical to make up the shortfall for targets of this form and level



5. Forestry removals are highly uncertain:

- Forester behaviour is hard to predict; sequestration in the 2020s depends on planting decisions in the next five years

[SENSITIVE]

6. Sensitivity analysis: Cost estimates vary significantly with a number of factors:

Factor	Approximate impact on cost of -10% on 1990 target	
International carbon price	Low C price (\$8): cost decreases to [redacted]	High C price (\$135 in 2030): cost approx. doubles
No international carbon market access	Approximately doubles the cost	
NZ prices agriculture	<p>Mixed results: - Current modelling (Landcare) suggests costs <i>increase</i> with agriculture priced; - Previous modelling³ has found the opposite (i.e. that pricing agriculture <i>decreases</i> costs, even if the rest of the world is not pricing agriculture)</p>	
[redacted]	[redacted]	
Baseline emissions uncertainty	<p>A 10% error in forecasting our baseline emissions would translate to roughly 80Mt over the commitment period, corresponding to +/- 20 percentage points on the target level</p>	
Rest of world (ROW) action	Results still subject to QA	

s6(a), s9(2)(g)(i), s9(2)(j)

7. Comparability: initial analysis confirms some findings of previous analyses:

- NZ's domestic abatement potential is more limited than Australia and the US (for a given carbon price)
- **But, precise comparisons of specific target cost are very difficult, because:**
 - i. Second-order effects (from terms of trade impacts) can be as large as 'direct costs' of domestic mitigation action;
 - ii. the impacts of forestry and land use accounting rule possibilities are many and varied;
 - iii. it is hard to assess the costs of actions already taken.

³ (NZIER & Infometrics, 2011)

8. Alternate target forms:

[REDACTED]

s6(a), s9(2)(g)(i), s9(2)(f)

There might be further investment or implementation costs associated with achieving other INDC components (e.g. agricultural intensity targets would require R&D, tech. transfer policies, on-farm implementation, monitoring). However, even if New Zealand were 'responsible' for an intensity target, the cost of purchasing units would be an order of magnitude smaller than for a responsibility target under a carbon budget.

9. 'Headline numbers' can be expressed in different ways:

[REDACTED]

s6(a), s9(2)(g)(i), s9(2)(f)

Aide-mémoire

To: Hon Tim Groser

File ref: 15-B-00390

From: Kay Harrison

Date: 25th March 2015

CC: Hon Simon Bridges

Re: Strategy Cabinet Committee meeting on New Zealand's post-2020 climate change target, 30 March 2015 [RESTRICTED]

I Purpose

Strategy Cabinet Committee (STR) is meeting on March 30 to discuss approaches to setting New Zealand's post-2020 climate change target. The purpose of this aide-mémoire is to provide analysis on the **form and level**¹ of New Zealand's target through **five key strategic questions** that officials consider are important. This aide-mémoire should be read alongside the supporting A3 document 'New Zealand's post-2020 climate target' (MfE: ref.15-B-00523).

Officials seek an indication of Ministers' preferences for the form and level of New Zealand's target. Final Cabinet decisions will be sought in mid-2015, following consultation.

II Context

New Zealand needs an effective global climate change agreement to protect both our economy and our environment. A new agreement, to apply post-2020, is being negotiated under the United Nations Framework Convention on Climate Change (UNFCCC) and is due to be concluded in Paris in December 2015. For the first time, the agreement is intended to give rise to emission reduction contributions by both developed and developing countries on an equal legal footing. This is important because the agreement has a real chance of capturing meaningful participation from the world's largest emitting countries.

New Zealand needs to table a contribution to be consistent with its stated international position and those of its peers (including the US, Canada, and Australia). New Zealand, along with all Parties to the UNFCCC, is expected to announce a post-2020 target for the agreement, well in advance of the Paris meeting. Targets will be "nationally determined" but must demonstrate "progress" beyond each country's current undertakings. "Progress" has not been formally defined and countries are likely to have different interpretations on the degree of flexibility they are each afforded when setting their target form and level. It will be

¹ In this paper target **form** refers to the approach to sectors, gases and international purchasing; target **level** refers to the 'headline number' of the primary target (e.g. -5% or 10% on 1990 levels); and target **effort** refers to the overall emissions abatement delivered (a combination of these two factors).

[RESTRICTED]

If the Rest of the World imposes a carbon price, but New Zealand does not participate (scenario P1) there are small macroeconomic benefits due to a relative improvement in international competitiveness, causing RGNDI to rise by approximately 0.3% versus the baseline. Domestic emissions also rise by 4.1% over baseline.

3. Abatement needed to reach target and sources of abatement

Around 260 million tonnes of abatement from "BAU" is required over the commitment period for a target of -10% on 1990 levels by 2030. Marginal abatement required for deeper (or shallower) targets is around 40 million tonnes per 10 percentage points over the commitment period – equating to \$1.6bn international purchasing, with an estimated impact to RGNDI of roughly \$3bn.¹⁴

Domestic abatement could be a substantial share of total abatement: Rising global carbon prices would drive a shift in the domestic economy more substantial than to-date. Access to international markets is still critical to make up the shortfall for whole-economy targets.

Forestry removals are highly uncertain. **Forester behaviour is hard to predict;** sequestration in the 2020s depends on planting decisions in the next five years.

Withheld under s.9(2)(j)

Figure 2: Abatement from projected BAU emissions with different whole-economy target levels

Withheld under s.9(2)(j)

¹⁴ Estimate made using a multiplier of 1.8 times the direct cost of abatement in line with modelling by Infometrics Ltd. The magnitude of flow-on effects varies with the target level.

[RESTRICTED]

4. Alternate target forms

Target forms which exclude part of New Zealand's emissions (for example, agricultural emissions) from the carbon budget **substantially** increase the headline number for the same quantity of abatement.

Withheld under s.9(2)(j)

Withheld under s.9(2)(j)

- Rows 2 and 3 represent the effort/abatement for the primary target only.
- Additional information on the estimated effort and abatement from any additional target (e.g. Ag intensity, methane stabilisation) should be presented alongside this for a fair comparison if used internationally.

Alternatively, excluding part of New Zealand's emissions from the target allows the same headline number for reduced cost (Table 4).

Table 4: Cost in 2027 of 'Equivalent-target level' emission reduction targets

	RGNDI (Billion 2012NZ\$)	Change in RGNDI at 2027 relative to baseline RGNDI
1 Current RGNDI (2013/14)	220	-
2 2027 baseline (no ROW or New Zealand action)	299	-
3 New Zealand 10% below 1990 levels economy-wide		
4 New Zealand 10% below 1990 levels excluding agricultural emissions		Withheld under s.9(2)(j)

3a. Agricultural intensity targets

AgResearch modelling indicates that **continued emissions intensity improvements in agriculture are possible**, although the rate of improvement is likely to slow over the next few decades.

There might be **further investment or implementation costs associated with achieving other INDC components**. For example, an agricultural intensity target

[RESTRICTED]

could require research and development, technology transfer policies, on-farm implementation, and monitoring. However, even if New Zealand were 'responsible' for an intensity target, the cost of purchasing units would be an order of magnitude smaller than for a responsibility target under a carbon budget as New Zealand would not be liable in any way for its future projected production increases.

5. Sensitivity analysis

Cost estimates vary significantly with a number of factors (Figure 3):

- *Global carbon price:* Assuming New Zealand is a price-taker of global carbon prices, the global carbon price impacts the cost of New Zealand's emission reduction target. Low global carbon prices decrease the cost of New Zealand's target; high global carbon prices increase the cost of New Zealand's target.
- *Carbon markets:* Assuming global carbon prices reach \$50 by 2030, **losing access to international carbon markets could at least double the cost** of New Zealand taking a target of a 10% reduction on 1990 levels by 2030, and require domestic carbon prices reaching upwards of \$300.¹⁵

Withheld under s.9(2)(j)

- *Removing agriculture or methane:* Removing New Zealand's liability for part of its greenhouse gas emissions would reduce the economic costs of meeting a given headline target level. Removing the agricultural emissions liability from a target while maintaining its level at -10% for the rest of the economy reduces the costs by around 35%. Removing the liability for methane while maintaining its level at -10% for the rest of the economy reduces costs by around 30%.

Withheld under s.9(2)(j)

Figure 3: Sensitivity of whole-economy emission reduction target to variables affecting cost

¹⁵ While noting that this level of carbon price may be beyond what the model is able to realistically model.