From: s 9(2)(a)
To:
Subject: RE: [UNCLASSIFIED] CCC input into deadline paper
Date: Friday, 3 April 2020 7:18:16 pm
Attachments: image001.png

H s 9(2)(a), I have some catch-up to do myself over the weekend. I'll give you a call on Monday am 11.45 looks like the earliest I can do though.

s 9(2)(a)

From: s 9(2)(a) @climatecommission.govt.nz>
Sent: Friday, 3 April 2020 4:55 PM
To: s 9(2)(a) @mfe.govt.nz>
Subject: [UNCLASSIFIED] CCC input into deadline paper

[UNCLASSIFIED]

Kia ora s 9(2)(a)

I've left a message, but just to let you know I'm your CCC contact for the work I think you are leading on potential deadline changes. Please could you give me a call when you have a moment? I don't mind if its this evening (if you're still working) or first thing Monday. It would be great to get some info on the task!

Ngā mihi,

s 9(2)(a)

s 9(2)(a)

W climatecommission.govt.nz

[UNCLASSIFIED]

****

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****

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From: s 9(2)(a)
To:
Subject: FW: Material from the CCC on CCRA deadlines
Date: Monday, 6 April 2020 3:08:00 pm
Attachments: image001.png
Paper on revising the Feb 2021 deadline.v3.docx

[UNCLASSIFIED]

Hiya,
Attached is the draft paper. Scream if you have thoughts.

Ngā mihi
s 9(2)(a)

s 9(2)(a)
W climatecommission.govt.nz

[UNCLASSIFIED]

From: s 9(2)(a)
Sent: Monday, 6 April 2020 1:10 pm
To: s 9(2)(a) @mfe.govt.nz>
Cc: Jo Hendy s 9(2)(a) @climatecommission.govt.nz>
Subject: Material from the CCC on CCRA deadlines

[UNCLASSIFIED]

Kia ora s 9(2)(a)
Please find attached a paper from the CCC on the options for amending the CCRA deadlines. I haven't had a chance to speak to you since we heard about this late Friday so I'm not clear on the context and purpose. Would be helpful to have that chat and we (CCC) can refine in light of that – happy to speak anytime.
The note has not been reviewed by our Board, given the timeframes, so comes with the caveat that it does not represent their views and does not have Board approval. We are seeking this urgently. This is therefore a draft position.

Ngā mihi
s 9(2)(a)

s 9(2)(a)
W climatecommission.govt.nz

[UNCLASSIFIED]

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Advice to Minister Shaw on options for amending the CCRA deadline for delivery of emissions budgets

Background

The Climate Change Commission is required by the CCRA to provide to Government (the Climate Change Minister) with its advice on the first three emissions budgets and an emissions reduction plan by 1 February 2021. The Government is required to set the first three budgets by 31 December 2021.

This note considers whether, in light of the Covid-19 crisis, any amendment should be made to the February 2019 deadline, or to the requirements made in the Act for deliverables.

As has been previously noted the timelines for delivery are constricted (see Interim Climate Change Commission submission to the Select Committee[1] and final report to the Minister). The Commission acknowledges that the Covid-19 crisis will be causing disruption across Government and that work is being delivered to short deadlines. It also is aware that the Government is keen to ensure that climate change work continues to progress.

Existing timelines

Under previous plans, the Commission had intended to:

1. conduct in-depth technical evidence gathering with stakeholders to August 2020.
2. produce a draft report for release in October 2020 for formal consultation for 6 weeks.
3. re-drafting over the holiday period, for submission to the Minister in February 2021.

Given the additional uncertainty introduced by Covid-19 for both stakeholders and the Commission, as well as the constraints this is placing on stakeholder engagement, these plans appear untenable.

Considerations for amending the deadline

The ability of the Commission to carry out legally required engagement is restricted

Publication of a draft report will be the basis on which the Commission undertakes formal public consultation. Both early informal engagement and the formal consultation are required for the Commission to adequately fulfil the requirements in the Act. The current situation limits the Commissions ability to deliver both.

The Commission faces several challenges in conducting its engagement.

Some of those we seek to engage are occupied with more immediate concerns (rightly so) and there is significant uncertainty over how long this situation will last. This means that the Commission is unable to approach businesses to understand what their plans are for the long-term transition to the low emissions economy because they do not have the capacity to answer this question in the current climate, or the uncertainty means they cannot answer it accurately at this time.

The Commission is adapting to using technology to reach audiences. However, not all audiences we need to hear from may be able to use these. It is critical that voices not be omitted from this debate

[1] https://www.iccc.mfe.govt.nz/assets/PDF_Library/97bfb1f821/Interim-Climate-Change-Committee-submission-to-Environment-Select-Committee.pdf

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and that may mean we need to wait until we are once more able to physically meet people to hear and engage.

The uncertainty of Covid-19 means that more unknows have been introduced into the work the Commission is undertaking

The economic shock currently unfolding as a result of the Covid-19 crisis will continue for some time and will have broad and potentially lasting consequences. These will affect the work the Commission is conducting, potentially quite significantly. It could, for example, reduce the GDP we include in the baselines, affect the demand for energy, change immigration trends. All of these will impact emissions. The crisis introduces not only domestic changes to the trajectory, but uncertainty from a global perspective that affects our work. These include the mitigation options that the Commission may have available to it. For example, the impact of Covid-19 on manufacturing of electric vehicles and therefore potential for New Zealand uptake. If the Commission fails to take these into account sufficiently this could mean stakeholders and future Governments dismiss the Budgets as inaccurate.

Further uncertainty exists in the form of the stimulus packages proposed by Government and the potential these have to shape the future emissions profile of New Zealand.

Whilst there is more certainty about the longer-term trends, our primary focus is on the first three budgets – which are the ones most likely to be affected by these short-term shocks. Factoring this into our modelling and analysis is challenging over the next few months when the trend is still emerging. The Commission can include bounds of uncertainty in the modelling by broadening the outer edges of the pathway, but at some point it becomes so broad as to make it redundant in terms of the insights it brings.

A number of practical considerations limit the ability of the Commission to deliver the work to the timeframes or scope originally envisaged

The Commission faces some limitations in its ability to access the resources it needs to successfully carry out its work. Specifically, access to the Stats New Zealand data lab is curtailed, meaning that modelling to understand the distributional impacts of proposed budgets cannot be analysed. This is a key part of the modelling, particularly in light of the current crisis. It will provide insights into where impacts will be felt, by region, sector etc. with information on the ability to transfer between different types of jobs of different pathways. Having this will be critical to the Commission's engagement with the public and advice to Government on recommendations.

Whilst the Commission is re-designing its engagement programme to take place online this takes time. It also may differentiate between those who are able to rapidly pick up on it – generally companies who have high resourcing in terms of IT, people capability, access to high speed internet etc. and those who are less able to engage. It may come with its own equity challenges and whilst we are thinking these through we may not be able to overcome all barriers.

The engagement the Commission has done to date will need to be re-visited in light of the crisis. Whilst this doesn't re-set all of the work, it does mean that the Commission will need to repeat some of its work programme. The evidence gathered to date around stakeholders' economics situation and transition plans (including the Call for Evidence undertaken by the Interim Climate Change Committee) may now be obsolete for the first and second budget period. This may also be true for the information on technical mitigation options data gathered for the first and second budget periods.

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The success of the Commission rests on the credibility of its advice. The uncertainty of Covid-19 means that if it is pushed to produce early advice there is a risk to the credibility

The credibility of the Commission's advice rests on its ability to gather evidence of technical mitigation potential for the sectors in the economy. For the proposed budgets to be as accurate as possible, and for the Government to receive evidence-based advice on which to make its decision, the Commission needs to have been able to conduct extensive engagement.

The credibility of the Commission's advice is key for ensuring that its enduing reputation is set up well. The Commission is aware that our analysis and modelling will need to be re-set to reflect this new economic reality, which may be accompanied by some changes in the way our society operates.

This has implications for the timeframes for the delivery of our work and the accompanying credibility of the advice that we deliver. If the Commission were to fail to take this crisis into account, our advice would be derided. But to understand what it means requires some time for it to unfold, to see the shape of the recession and recovery, in New Zealand and overseas.

In this information void, making assumptions around technological deployment will be largely arbitrary for the short-term and likely to change rapidly. Which means analytical assumptions that have to be made now, so that we can produce a consultation document for October, are likely to be obsolete by February 2021. Given a few more months, evidence will start to emerge about the shape of the recovery, and the Commission will be in a better position.

Proposed alternative options

Option A – current plans remain

This option is not recommended

Outcome: the Commission would present the first three budgets, acknowledging the limitations of the advice given the crisis.

Risks: This option carries all of the risks outlined above.

Mitigations: highlight subsequent emissions budgets as an opportunity to update the evidence and revise the pathways. The Commission would make best endeavors to engage at a technical level with stakeholders as and when they were able. If stakeholders were unable to engage the Commission would make assumptions about transition pathways to 2050 and for the first three carbon budgets based on best available evidence, testing with others where possible. For wider stakeholder engagement this would be conducted through online means and fora.

Option B – Amend CCRA to remove the requirement to consult from the Climate Change Commission for the first set of Emissions Budgets

This option is not recommended

Outcome: Allow more time for the Commission to conduct its analytical work programme. Draft Emissions Budgets and Advice provided in February 2021 to Minister for Climate Change, Ministry for the Environment to lead the public consultation exercise. This would be a compromise position as it would allow more time for the economic consequences of Covid-19 to be understood and incorporated into the modelling.

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Risks: However, the outcome under this option would be the Commission providing technical advice on the budgets and pathway, but without being able to fully address the trade-off requirements made by the CCRA. This is because the Commission would not have engaged as fully as required to

Mitigations: Technical and informal engagement delivered by the Commission along the way. This would be sub-optimal.

Option C – Revise the CCRA and extend the deadline for the Commission to provide its advice to May 2021

This is the preferred option

Outcome: the advice to Government (Minister for Climate Change) would be delayed, but it would not delay the 31 December 2021 deadline for the Government to set the Emissions Budgets.

Proposed revised timelines

1. Conduct technical stakeholder engagement as and where possible to October 2020 through socially distanced means
2. Write a draft report based on analysis and modelling that takes into account the impact of Covid-19 as far as possible
3. Mid-Jan 2021 - release a draft report for public consultation
4. May 2021 – provide advice to the Minister for Climate Change
5. December 2021 – the Government releases the final Emissions Budgets

Commission would extend the time it had available to engage with stakeholders and gather credible, technical evidence as well as take New Zealanders with it on a journey through what emissions budgets could mean for New Zealand.

Risks: Businesses, iwi/Māori and households would have less time to understand what the potential emissions budgets would mean for them before the start of the emissions budget period. Certainty over direction of travel on climate policy and related ETS settings would be delayed

Mitigations: Commission to conduct open and transparent engagement.

This timeline would allow for stakeholders and Treaty partners to understand the impacts of Covid-19 in more detail, to consider the immediate implications and reflect on what the interaction with longer-term objectives and climate change could mean. This would allow them to engage with us in a more meaningful way and enable us to provide the Government with more credible and supported advice.

The extended deadline would also allow the Commission to blend remote and (provided Covid-19 restrictions have been lifted) targeted in-person interactions, meeting the requirements in the Act to consider a broad range of trade-offs and to consult in a meaningful way. It would also enable, if not updated official statistics, then at least a more considered understanding of the impacts Covid-19 seems likely to have on the economy and social fabric.

Other work programmes

The Minister will have recently received a letter offering the assistance of the Commission with regard to the stimulus package. The Commission is keen to ensure that it is focused on ensuring it is

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contributing to where its efforts are most needed in the current crisis. It is possible that greater emissions reductions will be delivered through assisting with a green stimulus than will be lost in a few months delay of the emissions budgeting process.

The Minister has requested two additional work programmes from the Commission; advice on the Nationally Determined Contribution and potential reductions in biogenic methane. The date for delivery of this advice is currently also 1 February 2021. The Commission recommends that this be extended to May 2021, under the same rationale as set out above. This will allow for the work to be undertaken on these additional tasks, which have resource and budget implications that are currently unresolved.

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From: s 9(2)(a)
To:
Cc:
Subject: RE: [UNCLASSIFIED] RE: Material from the CCC on CCRA deadlines
Date: Tuesday, 7 April 2020 1:01:33 pm
Attachments: image001.png
image002.png

H s 9(2)(a) thanks for keeping us posted.
I've copied in s 9(2)(a) to cover all bases.

s 9(2)(a)
Ministry for the Environment – Manatū Mō Te Taiao
s 9(2)(a) @mfe.govt.nz Website: www.mfe.govt.nz
23 Kate Sheppard Place, Thorndon, Wellington 6143

cid:image002.png@01D2E37C.0F6FA2F0

greenribbonawards.org.nz | Follow us on Facebook

From: s 9(2)(a) @climatecommission.govt.nz>
Sent: Tuesday, 7 April 2020 12:31 PM
To: s 9(2)(a) @mfe.govt.nz>
Cc: Jo Hendy; s 9(2)(a) @climatecommission.govt.nz>
Subject: [UNCLASSIFIED] RE: Material from the CCC on CCRA deadlines

[UNCLASSIFIED]

Kia ora s 9(2)(a)
Update for you: I spoke to our Chair last night. Following our conversation we would like to revise our view of what an achievable deadline is to 30 July 2021 please. I'm happy to talk you or s 9(2)(a) through the rationale.
The Chair is also intending to write to Minister Shaw on this separately. Grateful to be involved in the advice to the Minister through yourselves, but keen to have a direct line to the Minister too given our role as an independent organisation. I'll make sure we copy it to you. I'm working to the same deadline for the letter as you are on the advice and will be using the paper as the material for it so expect it will be broadly aligned.
If I could have s 9(2)(a) contact details that would be great. Cheers!

Ngā mihi,

s 9(2)(a)
s 9(2)(a)
W climatecommission.govt.nz

[UNCLASSIFIED]

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From: s 9(2)(a)
Sent: Monday, 6 April 2020 1:10 pm
To: s 9(2)(a) @mfe.govt.nz>
Cc: s 9(2)(a) @climatecommission.govt.nz>
Subject: Material from the CCC on CCRA deadlines

[UNCLASSIFIED]

Kia ora s 9(2)(a)

Please find attached a paper from the CCC on the options for amending the CCRA deadlines. I haven't had a chance to speak to you since we heard about this late Friday so I'm not clear on the context and purpose. Would be helpful to have that chat and we (CCC) can refine in light of that – happy to speak anytime.

The note has not been reviewed by our Board, given the timeframes, so comes with the caveat that it does not represent their views and does not have Board approval. We are seeking this urgently. This is therefore a draft position.

Ngā mihi,

s 9(2)(a)
s 9(2)(a)
W climatecommission.govt.nz

[UNCLASSIFIED]

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From: s 9(2)(a)
To:
Subject: RE: [UNCLASSIFIED] Just checking in...
Date: Wednesday, 8 April 2020 11:59:00 am
Attachments: image001.png

[UNCLASSIFIED]

OK, phew. That makes things easier.
On the letter, the Chair is having a look at the moment. I think we are aiming to get it over to the Minister's office once it is ready, but will pass it along to you and others too.

Ngā mihi,
s 9(2)(a)

s 9(2)(a)
W climatecommission.govt.nz

[UNCLASSIFIED]

From: s 9(2)(a) @mfe.govt.nz>
Sent: Wednesday, 8 April 2020 10:08 am
To: s 9(2)(a) @climatecommission.govt.nz>
Subject: Re: [UNCLASSIFIED] Just checking in...

How about the letter from the Chair?
Cheers,
s 9(2)(a)

From: s 9(2)(a) @mfe.govt.nz>
Sent: 08 April 2020 10:07
To: s 9(2)(a) @climatecommission.govt.nz>
Subject: Re: [UNCLASSIFIED] Just checking in...

Hi s 9(2)(a)
We're aiming for 2pm tomorrow :)
Thanks,
s 9(2)(a)

From: s 9(2)(a) @climatecommission.govt.nz>
Sent: 08 April 2020 09:39
To: s 9(2)(a) @mfe.govt.nz>
Subject: RE: [UNCLASSIFIED] Just checking in...

[UNCLASSIFIED]

OK, can I check on the timelines? Are you aiming for a 2pm bag today or tomorrow? Cheers.

Ngā mihi,
s 9(2)(a)

s 9(2)(a)
W climatecommission.govt.nz

[UNCLASSIFIED]

From: s 9(2)(a) @mfe.govt.nz>
Sent: Wednesday, 8 April 2020 9:34 am
To: s 9(2)(a) @climatecommission.govt.nz>

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Subject: Re: [UNCLASSIFIED] Just checking in...

Hi s 9(2)(a)

Apologies for not getting in touch last night. Our directors were keen to review the draft advice before sending it on. I'll get it to you as soon as I can, but it could be around 1-2pm.

Sorry again,

s 9(2)(a)

From: s 9(2)(a) @climatecommission.govt.nz>
Sent: 08 April 2020 09:13
To: s 9(2)(a) @mfe.govt.nz>
Subject: [UNCLASSIFIED] Just checking in...

[UNCLASSIFIED]

Hiya,

Do you have an ETA for when you think I might be able to see the paper? I have a few things on today so might need to shift things around.

Cheers!

Ngā mihi,

s 9(2)(a)

s 9(2)(a)

W climatecommission.govt.nz

[UNCLASSIFIED]

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From: s 9(2)(a)
To:
Subject: RE: Update on Commission modelling
Date: Wednesday, 30 September 2020 1:45:42 pm

Kia ora kōrua

And thanks again for talking us through your approach to scenario modelling last week. Needless to say, we're very keen to keep in touch on this work as it develops/gets refined.

On a (slightly) related issue, we have fielded an inquiry/commentary on s 9(2)(a) MfE-published MACC curves, and intend to draw the respondent's attention to the Commission's draft report and consultation process as the best next 'venue' for participating in the debate around abatement opportunities, costs and practical/policy implications. I would just like to check in on our messaging about how MACCs feed into your work.

For example, we could say something like "The Climate Change Commission is using the MACCs as an input into their analytical work to recommend emissions budgets, and has done additional work to develop these further since the MfE publication."

And can I ask if s 9(2)(a) is involved in any of your challenge and review groups or has engaged with any of your other processes to date?

By phone if quicker/easier

cheers
s 9(2)(a)

-----Original Appointment-----
From: s 9(2)(a) @climatecommission.govt.nz>
Sent: Thursday, 24 September 2020 12:41 PM
To s 9(2)(a)
Cc
Subject: Update on Commission modelling
When: Friday, 25 September 2020 2:00 PM-3:00 PM (UTC+12:00) Auckland, Wellington.
Where: Microsoft Teams Meeting

All, s 9(2)(a) tells me you don't work Fridays but we can catch up separately if you are interested)

When we spoke a couple of weeks ago we suggested a follow up meeting to discuss the early results we are starting to get from our models.

Apologies for the short notice, but with school holidays just around the corner I was keen to find time before people are out of the office.

Thanks,

s 9(2)(a)

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From: s 9(2)(a)
To:
Subject: Re: MFE-CCC Waste Projections
Date: Thursday, 15 October 2020 9:39:18 pm

Hi all,

Yep - pretty much agree.

Cheers,
s 9(2)(a)

From: s 9(2)(a) @climatecommission.govt.nz>
Sent: Thursday, 15 October 2020 9:33 PM
To: s 9(2)(a) @mfe.govt.nz>; s 9(2)(a)
s 9(2)(a) @climatecommission.govt.nz>
Subject: RE: MFE-CCC Waste Projections

Hi s 9(2)(a)

From my perspective I think the high/low scenarios are a nice to have but not essential. The base case/WEM is the key thing so given the time and workload pressures you're under, seems appropriate to focus on that rather than dilute your efforts.

s 9(2)(a) – chime in if you disagree.

Cheers,
s 9(2)(a)

From: s 9(2)(a) @mfe.govt.nz>
Sent: Thursday, 15 October 2020 5:16 pm
To: s 9(2)(a) @climatecommission.govt.nz>
Cc: s 9(2)(a) @climatecommission.govt.nz>
Subject: RE: MFE-CCC Waste Projections

Hi both

For the waste projections, I've encountered some issues that are going to prevent a proper high/low scenario for non-MSW landfills and farm fills. I am wondering whether the CCC actually requires high/low scenarios? Because it might be better for us to deliver the base case/with existing measures case only, and not provide high/low scearions if they aren't going to add much value.

Cheers

s 9(2)(a)
Mobile: s 9(2)(a) Team phone: s 9(2)(a)

Fact: NZ's average annual increases in gross emissions since 1990 were similar in magnitude to average

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annual decreases, but increases occurred twice as often.

From: s 9(2)(a)
Sent: Tuesday, 13 October 2020 2:21 PM
To: s 9(2)(a) @climatecommission.govt.nz>
Cc: s 9(2)(a) @climatecommission.govt.nz)
s 9(2)(a) @climatecommission.govt.nz>
Subject: RE: MFE-CCC Waste Projections

Hi guys

Memo attached. Please treat in confidence, and don't quote any numbers yet since they're not final. I forgot to mention that while the memo contains provisional emissions for the 2021 inventory, we won't be publishing the revised historical estimates with projections (but projections will be using updated models). So there will be a jump in the time series between the historical data (based on 2020 inventory) and the projections.

Cheers

s 9(2)(a)
Mobile: s 9(2)(a) Team phone: s 9(2)(a)

Fact: NZ's average annual increases in gross emissions since 1990 were similar in magnitude to average annual decreases, but increases occurred twice as often.

-----Original Appointment-----
From: s 9(2)(a) @climatecommission.govt.nz>
Sent: Tuesday, 14 July 2020 12:48 PM
To: s 9(2)(a)
Subject: MFE-CCC Waste Projections
When: Tuesday, 13 October 2020 1:30 PM-2:30 PM (UTC+12:00) Auckland, Wellington.
Where: Microsoft Teams Meeting

Remaking this invite to be recurring every 4 weeks as we agreed during the meeting.

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Memo

To:	Reporting Governance Group (RGG)
From:	s 9(2)(a) (MfE)
Date:	18 September 2020
Subject:	**Improvements to the Waste sector planned for the 2021 GHG inventory submission**

Purpose	The purpose of this memo is to seek approval from RGG to implement improvements for the Greenhouse Gas Inventory for the 2021~~0~~ submission in the Waste sector.

Summary of the Waste sector

1. The key changes proposed for the waste sector are a combination of improvements to activity data and implementing the results of the Eunomia (2020) consultant's report which is about to be completed. The Eunomia 2020 report outlines refinements to the methodology for managed landfills and non-municipal landfills. Overall these changes give a reduction in waste emissions, and changes in the sizes (and thus importance) of some categories.
2. The combined effect of these changes (based on initial estimates, subject to change) is to increase emissions in 1990 by about 70 kt CO_2-e (2%) and reduce emissions in 2018 by about 450 kt CO_2-e (11%).
3. As well as improving the GHG inventory, pending RRG approval these changes will also be applied to projections due in October 2020 to give the best quality data for the Emissions Reduction Plan being prepared by the government.

Summary of improvements for consideration: Managed landfills

The change proposal

Managed landfills

4. Several aspects of the methodology for managed landfills are being refined, based on the Eunomia 2020 report commissioned by MfE.
5. The most significant change proposed by the Eunomia 2020 report is to reduce landfill gas recovery rates by 8% on average (thus increasing emissions, all else equal). This is due to successive concerns from ERTs and others about the lack of evidence for the current modelled and reported efficiencies of up to 90% (W.4, W.10 and W.20 from the 2019 ARR). Landfill operators do not currently provide data to the government on the basis of commercial confidentiality.
6. The increase in emissions resulting from reduced recovery rate is more than offset by changes to other parameters which have a net reduction to emissions. The changes are:
   a. Revise the rate of degradation based on waste type. This has an overall effect of speeding up the rate of degradation for all waste types (especially food and wood) which results in emissions accelerating faster since 1950 and results in 1990 being higher than previous estimates. The increased degradation rates also reveal the underlying fluctuations in waste volumes, thus emissions in 2019 are lower than previous estimates.

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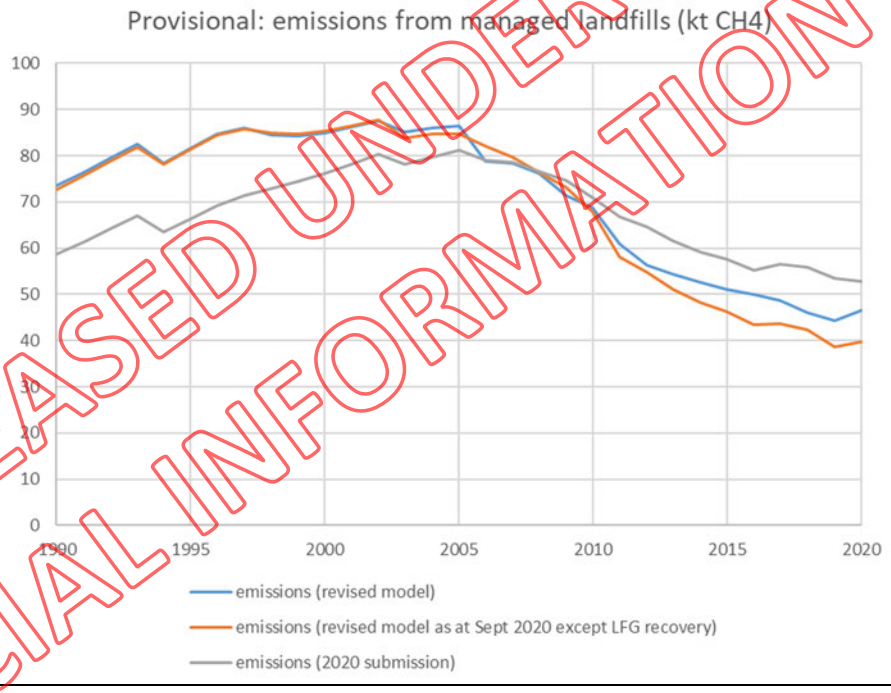
	b. Revise the amount of carbon that degrades based on waste type, including the 2019 refinement to IPCC guidelines that reduces degradation for wood from 50% to 10% and increases for food from 50% to 70%, impacting emissions proportionately from those waste types but largely cancelling out. c. To provide an estimate of the composition of waste disposed to managed landfills for 2018 (the previous composition estimate is for 2012). This is mandated by an ERT recommendation (W.17 2019 ARR). Notably there is a greater proportion of inert materials (up from around 45 to 60 per cent). d. Increase the amount of methane in landfill gas from 50% to 57% as per detailed UK-based research.
Impact of the change	7. Provisional estimates from these changes (from paragraphs 54 and 65) show that emissions are about 25% greater in 1990 (371 kt CO_2-e), and 17% lower in 2019 (279 kt CO_2-e) compared to the 2020 submission. The impact of the reduction to landfill gas capture rate is also shown, which acts to mediate the other methodological changes towards the end of the time series. 
Risks and mitigation	8. The revised parameters are based on significant research in the UK and other countries produced since the 2006 IPCC guidelines, and are an improvement to existing data, so the risks are low. 9. The reduction in landfill gas recovery rate is at risk of being criticised by landfill operators who believe their recovery rates are higher, noting the inventory previously adopted that view. Successive recommendations by ERTs to better justify high recovery rates, and other criticism show that the onus lies on landfill operators to demonstrate their high rates are valid (though the ETS doesn't automatically adopt inventory parameters). This potential tension creates an opportunity to improve transparency by highlighting the need for more data from landfill operators and ultimately improve the inventory further.
Peer-review	10. The work prepared by Eunomia is a contracted piece of work and has been peer reviewed internally as well as by MfE. Further, individual peer review will be carried out on the NZ models to validate the changes. The final implementation of the changes will be dependent on these peer reviews.

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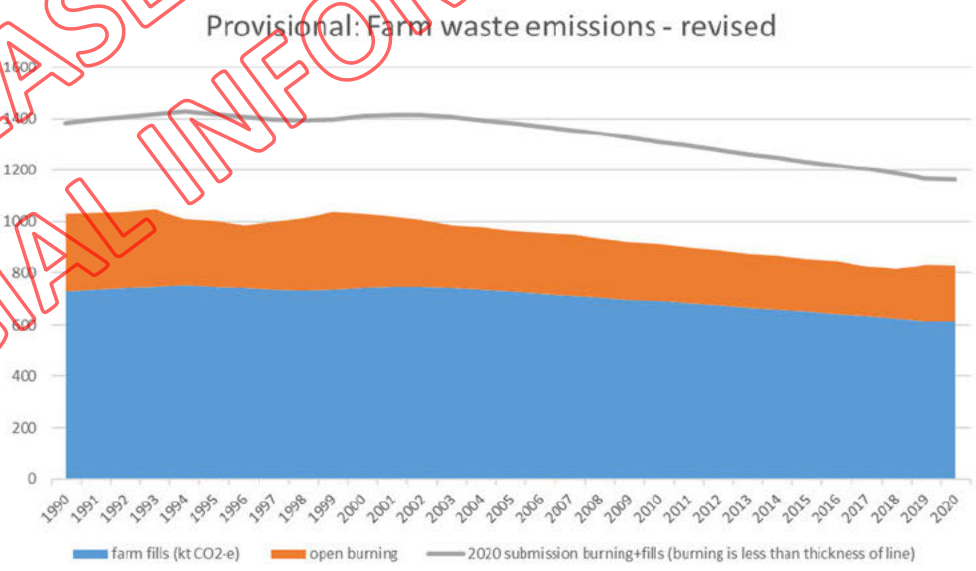
Summary of improvements for consideration: Other significant changes	
The change proposal	**Other significant changes in waste** 11. The CCC brought evidence to MfE's attention that the ratio of farm waste that is buried (92%) vs burned (2%) is incorrect, because according to expert opinion, burning actually occurs a lot more of the time, including burning the pits that would otherwise be a farm fill. Given the overall lack of quantitative information, and that the original estimate was anecdotal, a conservative revision is that 47% is burned and 47% is buried (keeping the remaining 6% other as-is). This means there will still be considerable emissions from burying, and the burning of materials containing fossil CO_2 that would otherwise be inert in a landfill will partially offset the significant reduction in landfill emissions. 12. Volumes of waste composted are currently based on anecdotal estimates (by me). Further evidence is available[1] that suggests composted volumes are up to 5-6 times greater than current estimates, which will increase emissions proportionately. This will mean emissions from composting are comparable to those from wastewater. 13. Further changes are proposed in the Eunomia 2020 report to the composition of waste in non-municipal landfills, however more information is needed before these changes can be applied, so no changes to models are proposed at this time.
Impact of the change	14. From paragraph 1149, emissions from farm waste are reduced by about 26% in 1990 and by 29% in 2019. The conservative assumptions reduced the size of the change compared to if less conservative assumptions were used.  15. From paragraph 1241, emissions from composting in 2018 were 35 kt CO_2-e, 1% of waste sector for the 2020 submission, which will increase up to around 200 kt CO_2-e in 2019 (with a smaller increase for 1990), which is around 6% of the waste sector for the 2021 submission. This is the only significant *increase* for waste, which partially offsets the reductions in other categories.

[1] https://eunomia.co.nz/wp-content/uploads/2017/06/WDL-Final-Report-30-05-17.pdf (putrescibles, table 1-8)

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Risks and mitigation	16. There is a risk that the proposed changes to farm waste and composting which are based on limited information could be worsening accuracy instead of improving it. However, this is still an improvement over the information used for informing previous estimates. Consultation with experts was made where possible. Conservative decisions have been taken that result in smaller overall changes to emissions than might have otherwise been based on the limited information. It is likely that as more information becomes available in the future, that these estimates will be further revised accordingly. 17. No changes to non-municipal landfills are being proposed at this stage due to insufficient information (the ultimate conservative strategy). 18. Further mitigation could be achieved by commissioning research into these areas, however this will depend on future budget priorities.
Peer-review	19. The farm waste disposal assumptions are undergoing discussion with Waikato Regional Council and Environment Canterbury who have commissioned farm waste surveys in their regions, and the changes will be made only with their support. 20. Further, individual peer review will be carried out on the NZ models to validate the changes. The final implementation of the changes will be dependent on these peer reviews.
Summary of improvements for consideration: miscellaneous changes	
The change proposal	**Miscellaneous changes** 21. Several minor changes are included as part of the changes. Collectively these have a small impact on emissions. a. Updating estimations of historic GDP for non-municipal landfills using the most recently available long term data b. Correct an error in farm fills (DOC values for Arable farm type) c. Correct another error in farm fills: tonnage per site calculation for livestock farm type (Waikato data)
Impact of the change	22. The impact of these changes is small
Risks and mitigation	23. None
Peer-review	24. These smaller changes do not meet any threshold required for peer review

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Recommendations

a. **Note** that the planned improvements are consistent with IPCC guidelines and UNFCCC decisions.

b. **Agree** to the planned improvements outlined above being included in the 2021 inventory submission **and** 2020 projections that form the baseline for the waste sector emissions reductions plan.

Managed landfills	**YES / NO**
Other significant changes in waste	**YES / NO**
Miscellaneous changes	**YES / NO**

Approved by

…… Date: ……
RGG Chair & manager IPPU and Waste sectors, Ministry for the Environment.

…… Date: ……
RGG Manager – Energy sector, Ministry of Business, Innovation and Employment

…… Date: ……
RGG Manager - Registry, Environmental Protection Agency

…… Date: ……
RGG Manager – Agriculture sector, Ministry for Primary Industries

…… Date: ……
RGG Manager – LULUCF and KP-LULUCF sectors, Ministry for the Environment

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From: s 9(2)(a)
To:
Cc:
Subject: [UNCLASSIFIED] RE: October 2020 update - IPPU GHG emissions projections
Date: Tuesday, 27 October 2020 6:24:58 pm
Attachments: image001.jpg
image002.png
image003.png
image004.png

[UNCLASSIFIED]

Hi s 9(2)(a)

Thanks for passing this on.

Cheers
s 9(2)(a)

[UNCLASSIFIED]

From: s 9(2)(a) @mfe.govt.nz>
Sent: Tuesday, 27 October 2020 2:29 pm
To: s 9(2)(a) @climatecommission.govt.nz>; s 9(2)(a) @climatecommission.govt.nz>; s 9(2)(a) @climatecommission.govt.nz>
Cc: s 9(2)(a) @mfe.govt.nz>; s 9(2)(a) @mfe.govt.nz>; s 9(2)(a) @mfe.govt.nz>; s 9(2)(a) @mfe.govt.nz>
Subject: October 2020 update - IPPU GHG emissions projections

Kia ora s 9(2)(a)

Hope you all had a good long weekend.

Please see attached for the October 2020 update of the GHG emissions projections for IPPU.

Notes

- Confidential activity data (clinker produced, steel production, chemical methanol produced) have been removed from key assumptions and activity data sheet
- HFC emissions projections
    - Base and high emissions scenarios → As per Scenario F from Verum Group analysis
    - Low emissions scenario → Enhanced Scenario F (1% lower emissions in 2021, 2% lower emissions in 2022… 30% lower in 2050). Approximately halfway between scenario F and scenario B.
- Aluminium production
    - High emissions scenario → Tiwai assumed to remain at 100% production until 2050
    - Base emissions scenario → Tiwai has a soft exit and is closed by 1 Jan 2025 consistent with MBIE
    - Low emissions scenario → Tiwai has a hard exist and closes in August 2021
- Methanex output / decommissioning schedule is the same in all scenarios (and consistent

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with MBIE)

- Clinker production kept constant at 2018 levels with a continuation of efficiency gains in the base scenario
- Steel production
    - High emissions scenario → Remains at 100% production until 2050
    - Base and low emissions scenario → 90% output from 2020 (consistent with MBIE)
- Ammonia production
    - Related to MPI high, base and low scenarios for the projected use of urea

If you have any questions please feel free to get in touch.

Cheers,
s 9(2)(a)

s 9(2)(a) **Analyst, Climate Change Analysis**
Ministry for the Environment – Manatū Mō Te Taiao
Email: s 9(2)(a) @mfe.govt.nz Website: www.mfe.govt.nz
23 Kate Sheppard Place, PO Box 10362, Wellington 6143

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Instructions for using this emissions projections template

Projected and historical IPPU emissions data (27 October 2020)

List of the tabs in this template and the key tasks

Tab	Key tasks	Main driver of data
Summary of emissions projections	(none - this is automated)	(none)
Key variables and assumptions	Enter key input data	ERP / CCC
With measures	Enter emissions data (kt gas)	ERP / CCC
Low and high scenarios	Enter high and low scenarios (kt gas), enter the list of key variables that have been used	ERP / CCC

Pro tips

If in doubt, ask the MfE projections lead.

Use chemical formulae (eg CH4, not "methane") in the gas column for formulas to work.

Key tasks are written in this heading font

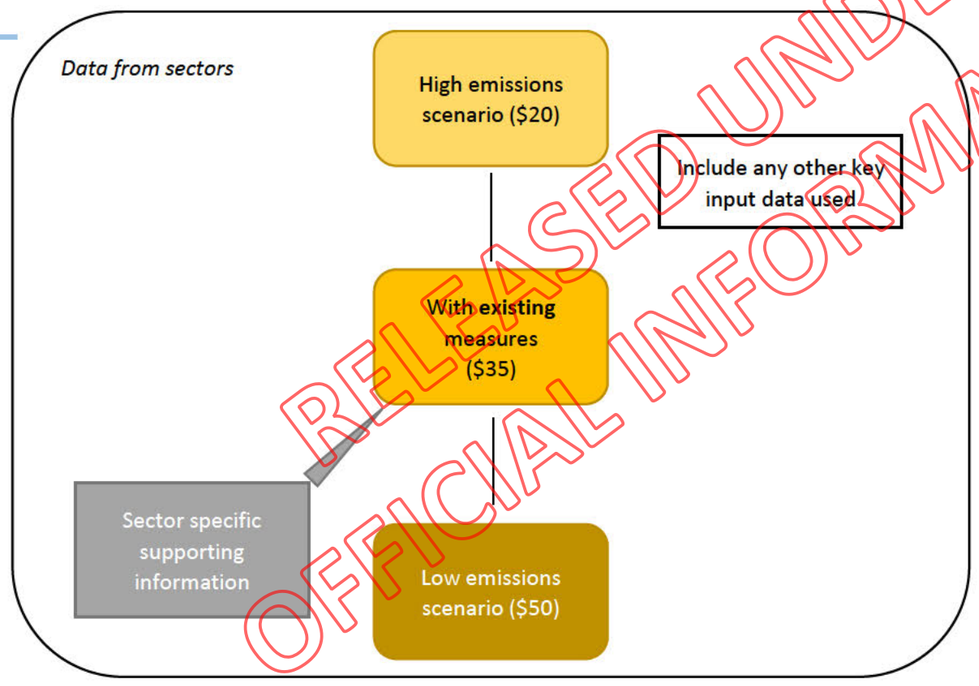
Explanatory text is in black

Grey cells contain formulas - please leave

Thick black borders and [square brackets] indicate where your data are to be entered

Note: some calculation cells are hidden as they don't require any user input. Here's what the icon looks like to show the hidden rows:

Schematic of scenarios



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Key variables and assumptions

Projected and historical IPPU emissions data (27 October 2020)

Key input data goes here (gdp, population, carbon price, sector specific variables etc) to be clear about what was actually used. This is because it may not be possible for all sectors to use the MfE-provided data.
Feel free to add more rows as required
Please seek approval from the MfE projections compiler if input variables and assumptions differ to those agreed in discussions.

Enter data for key input variables and assumptions

Sector	Scenario / senstivity	Variable	Units	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
All sectors	Base case ('with existing m	Population	million	3.459	3.495	3.532	3.572	3.620	3.673	3.732	3.781	3.815	3.835	3.858	3.881	3.949	4.027	4.088	4.134	4.189	4.230	4.268	4.312	4.356	4.389	4.416	4.455	4.519	4.602
All sectors	Base case ('with existing m	GDP	real 09/10 $NZ billion	112.678	111.194	111.970	117.824	124.402	130.492	135.803	139.138	139.555	145.915	152.128	156.027	163.406	170.360	178.493	184.130	189.540	195.807	195.809	193.373	196.697	200.309	205.394	209.966	217.627	225.749
All sectors	Base case ('with existing m	Effective carbon price	real 2020 $NZ tonne CO2-e																					4.91	7.27	2.65	0.21	0.19	3.37
All sectors	Low emissions scenario	Population	million	3.459	3.495	3.532	3.572	3.620	3.673	3.732	3.781	3.815	3.835	3.858	3.881	3.949	4.027	4.088	4.134	4.189	4.230	4.268	4.312	4.356	4.389	4.416	4.455	4.519	4.602
All sectors	Low emissions scenario	GDP	real 09/10 $NZ billion	112.678	111.194	111.970	117.824	124.402	130.492	135.803	139.138	139.555	145.915	152.128	156.027	163.406	170.360	178.493	184.130	189.540	195.807	195.809	193.373	196.697	200.309	205.394	209.966	217.627	225.749
All sectors	Low emissions scenario	Effective carbon price	real 2020 $NZ tonne CO2-e																					4.91	7.27	2.65	0.21	0.19	3.37
All sectors	High emissions scenario	Population	million	3.459	3.495	3.532	3.572	3.620	3.673	3.732	3.781	3.815	3.835	3.858	3.881	3.949	4.027	4.088	4.134	4.189	4.230	4.268	4.312	4.356	4.389	4.416	4.455	4.519	4.602
All sectors	High emissions scenario	GDP	real 09/10 $NZ billion	112.678	111.194	111.970	117.824	124.402	130.492	135.803	139.138	139.555	145.915	152.128	156.027	163.406	170.360	178.493	184.130	189.540	195.807	195.809	193.373	196.697	200.309	205.394	209.966	217.627	225.749
All sectors	High emissions scenario	Effective carbon price	real 2020 $NZ tonne CO2-e																					4.91	7.27	2.65	0.21	0.19	3.37
IPPU	Base case ('with existing m	Clinker produced {CONFIDENTIAL DATA}	kt																										
	Base case ('with existing m	Burnt lime produced	kt	113.5	130.5	132.3	128.1	110.2	115.0	108.7	132.6	132.6	163.0	153.0	144.2	142.6	143.4	157.2	166.1	162.3	164.0	154.1	156.1	158.1	163.5	153.9	182.1	219.7	267.8
	Base case ('with existing m	Kaolin clay used	kt	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0
	Base case ('with existing m	Soda ash used	kt	14.1	14.1	14.2	14.8	15.5	16.3	17.4	18.3	18.8	17.9	19.1	18.1	17.4	14.9	15.2	13.5	11.3	12.0	11.6	12.3	15.6	18.6	20.4	19.0	19.0	17.9
	Base case ('with existing m	Limestone used	kt	56.0	77.1	157.3	132.1	95.2	103.4	112.6	133.7	131.3	159.6	155.8	158.5	102.5	119.8	132.9	120.8	117.4	113.4	116.1	107.8	139.5	132.0	142.9	108.4	109.1	131.1
	Base case ('with existing m	Total USE of urea (from MPI) - Base Scenario	kg	24585917.0	32520868.2	32071302.3	44218216.7	57420470.5	85796762.7	88972714.3	80158542.1	102800654.7	139015833.3	143358866.1	187451505.0	244835137.6	272303014.6	285437170.0	286410270.3	264869515.0	286221405.5	276208078.3	234542989.1	281871446.9	311755951.0	310020373.5	326297077.3	320356500.0	381526980.0
	Base case ('with existing m	Ammonia produced	kt	98.1	98.1	84.3	95.1	98.8	97.9	83.3	96.2	115.2	134.8	130.2	143.7	134.4	154.5	150.8	135.0	153.2	135.0	126.1	149.0	144.3	94.0	113.6	129.3	155.6	137.1
	Base case ('with existing m	Calcium carbide imported	kt	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
	Base case ('with existing m	Chemical methanol produced {CONFIDENTIAL D	kt																										
	Base case ('with existing m	Hydrogen produced	kt	21.4	23.8	22.8	24.5	28.2	23.3	24.6	24.8	27.4	27.3	28.4	29.9	29.6	28.3	27.2	35.5	35.1	35.8	40.2	39.5	39.6	41.6	41.4	40.1	36.4	39.7
	Base case ('with existing m	Superphosphate produced	kt	894.0	994.0	1178.0	1317.0	1456.0	1266.0	1263.0	1260.0	1258.0	2192.6	2192.6	2192.6	2125.2	2125.1	2085.0	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6
	Base case ('with existing m	Formaldehyde produced	kt	30.5	32.8	33.8	35.6	40.5	40.6	37.3	40.5	36.5	43.5	49.3	49.5	51.0	52.1	56.6	56.5	36.2	36.0	34.0	31.1	31.6	32.3	32.3	32.3	32.3	32.3
	Base case ('with existing m	Ethanol produced	kt	3.9	3.9	10.4	12.1	10.4	8.8	8.9	590.0	604.8	622.8	640.1	643.9	116.2	10.3	14.5	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2
	Base case ('with existing m	Total steel production {CONFIDENTIAL DATA}	kt																										
	Base case ('with existing m	Production of primary aluminium	kt	264.1	262.4	244.4	269.5	270.4	271.5	284.6	310.6	320.3	328.0	329.2	324.1	333.5	333.6	347.0	348.2	335.3	353.0	315.7	270.8	344.0	356.8	324.7	324.4	327.1	333.3
	Base case ('with existing m	Recycled lead	kt	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
	Base case ('with existing m	Lubricant imported	kt	38.3	38.2	39.9	41.9	45.0	47.9	48.5	49.7	50.7	52.0	54.4	54.8	56.9	59.2	60.6	61.0	61.6	62.2	62.2	61.4	62.1	62.1	61.0	62.0	62.3	64.8
	Base case ('with existing m	Paraffin wax imported	kt	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
	Base case ('with existing m	Asphalt used for road paving	kt	107.4	84.0	144.6	114.7	121.3	109.3	110.8	140.0	140.0	140.0	150.0	150.0	150.0	150.0	156.6	163.1	166.4	170.3	174.2	178.1	182.0	185.9	189.7	193.6	197.5	201.4
	Base case ('with existing m	Asphalt used for roofing	kt	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	Base case ('with existing m	Paint used	kt	44.2	45.9	47.4	49.0	50.6	52.2	53.8	55.0	56.6	58.2	56.9	57.2	59.0	59.9	60.6	61.1	63.7	64.8	65.9	67.0	68.1	69.2	70.3	71.4	72.5	73.7
	Base case ('with existing m	Solvent used for degreasing and drycleaning	kt	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
	Base case ('with existing m	Printing ink used	kt	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	Base case ('with existing m	Urea catlyst used	kt	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	1.1	2.2	3.3	4.4	5.5	6.6	7.7	8.8
	Base case ('with existing m	Total production of food and drink	kt	2625.7	2695.1	2764.4	2833.7	2903.0	2972.4	3041.7	3111.0	3180.3	3360.0	3219.9	3363.6	3419.9	3527.2	3649.7	3632.3	3727.7	3796.3	3865.0	3933.6	4002.2	4070.8	4139.4	4208.1	4276.7	4345.3
	Base case ('with existing m	Pulp produced	kt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Base case ('with existing m	Fibreboard produced	kt	442.6	463.2	513.9	543.7	553.7	690.2	632.0	536.8	579.8	710.4	794.6	819.5	880.3	868.5	873.4	861.0	882.0	764.3	668.5	652.1	665.8	706.2	720.6	702.8	692.9	726.7
	Base case ('with existing m	Particleboard produced	kt	171.6	159.9	155.4	164.9	175.8	176.0	159.1	234.0	165.1	176.5	212.3	191.2	204.7	221.9	243.8	237.8	241.8	256.3	226.5	155.3	141.4	155.3	163.7	172.1	151.9	149.1
	Base case ('with existing m	**NET IMPORTS NEW BULK HFC COMPONENTS**																											
	Base case ('with existing m	HFC-32	tonnes																						73.1	113.0	31.9	59.8	68.5
	Base case ('with existing m	HFC-125	tonnes																						181.0	270.1	67.2	102.8	107.0
	Base case ('with existing m	HFC-134a	tonnes																						646.2	271.5	104.2	244.5	63.5
	Base case ('with existing m	HFC-143a	tonnes																						115.5	172.0	36.9	46.5	39.9
	Base case ('with existing m	HFC-227ea	tonnes																						5.6	1.5	3.8	0.8	2.8
	Base case ('with existing m	HFC-245fa	tonnes																						2.5	2.7	2.7	5.1	3.4
	Base case ('with existing m	HFC-365mfc	tonnes																						5.1	5.8	6.5	7.1	6.6
	Base case ('with existing m	**HFC CONSUMPTION NEW HFCs ONLY**	kt CO2-e																						2147.6	2190.7	590.6	971.1	707.6
	Base case ('with existing m	**HFC CONSUMPTION BUDGET (OLPA Regs 10/1**	kt CO2-e																										
	Base case ('with existing m	**NET IMPORTS REUSED BULK HFC COMPONENTS (no previous NZ use)**																											
	Base case ('with existing m	HFC-32	tonnes																										
	Base case ('with existing m	HFC-125	tonnes																										
	Base case ('with existing m	HFC-134a	tonnes																										
	Base case ('with existing m	HFC-143a	tonnes																										
	Base case ('with existing m	HFC-227ea	tonnes																										
	Base case ('with existing m	HFC-245fa	tonnes																										
	Base case ('with existing m	HFC-365mfc	tonnes																										
	Base case ('with existing m	**NET IMPORTS EQUIPMENT (OVERSEAS MANUFACTURED) HFC COMPONENTS**																											
	Base case ('with existing m	HFC-32 tonnes	tonnes																						81.8	85.1	67.6	70.9	64.8
	Base case ('with existing m	HFC-125 tonnes	tonnes																						85.9	87.8	72.7	73.1	65.3
	Base case ('with existing m	HFC-134a tonnes	tonnes																						175.1	184.3	216.2	255.7	242.7
	Base case ('with existing m	HFC-143a tonnes	tonnes																						4.9	3.2	6.4	3.5	2.4
	Base case ('with existing m	HFC-227ea tonnes	tonnes																						2.6	2.6	2.6	2.7	2.7
	Base case ('with existing m	**MANUFACTURING/NEW INSTALLATION EQUIPMENT FOR NZ HFC COMPONENTS**																											
	Base case ('with existing m	HFC-32 tonnes	tonnes																						3.5	5.5	10.8	12.3	11.5
	Base case ('with existing m	HFC-125 tonnes	tonnes																						17.7	19.9	28.8	34.5	25.8
	Base case ('with existing m	HFC-134a tonnes	tonnes																						51.8	86.9	99.1	78.6	83.3
	Base case ('with existing m	HFC-143a tonnes	tonnes																						12.4	12.4	17.0	21.9	14.7
	Base case ('with existing m	**MANUFACTURING EQUIPMENT FOR EXPORT - HFC COMPONENTS**																											
	Base case ('with existing m	HFC-32 tonnes	tonnes																						27.0	26.9	25.4	23.3	26.1
	Base case ('with existing m	HFC-125 tonnes	tonnes																						28.2	27.6	26.3	23.7	26.4
	Base case ('with existing m	HFC-134a tonnes	tonnes																						26.7	28.0	12.4	10.3	8.2
	Base case ('with existing m	HFC-143a tonnes	tonnes																						1.5	0.8	1.1	0.5	0.4
	Base case ('with existing m	**HFCs COLLECTED FOR DESTRUCTION**																											
	Base case ('with existing m	HFC-32	tonnes																						4.1	5.8	4.4	4.2	4.7
	Base case ('with existing m	proportion of total retired HFC	%																						0.4	0.6	0.3	0.2	0.2
	Base case ('with existing m	HFC-125	tonnes																						8.3	9.4	5.5	4.8	5.8
	Base case ('with existing m	proportion of total retired HFC	%																						0.4	0.5	0.2	0.1	0.1
	Base case ('with existing m	HFC-134a	tonnes																						5.4	7.2	7.0	10.4	7.1
	Base case ('with existing m	proportion of total retired HFC	%																						0.1	0.1	0.1	0.1	0.1
	Base case ('with existing m	HFC-143a	tonnes																						4.9	4.3	5.5	6.7	5.6
	Base case ('with existing m	proportion of total retired HFC	%																						0.5	0.4	0.3	0.3	0.2
	Base case ('with existing m	TOTAL HFCs	tonnes																						22.6	26.7	22.4	26.1	23.1
	Low emissions scenario	Clinker produced {CONFIDENTIAL DATA}	kt																										
	Low emissions scenario	Total USE of urea (from MPI) - Low emissions sc	kg	24585917	32520868	32071302	44218217	57420471	85796763	88972714	80158542	102800655	139015833	143358866	187451505	244835138	272303015	285437170	286410270	264869515	286221406	276208078	234542989	281871447	311755951	310020373	326297077	320356500	381526980
	Low emissions scenario	Ammonia produced	kt	98.1	98.1	84.3	95.1	98.8	97.9	83.3	96.2	115.2	134.8	130.2	143.7	134.4	154.5	150.8	135.0	153.2	135.0	126.1	149.0	144.3	94.0	113.6	129.3	155.6	137.1
	Low emissions scenario	Chemical methanol produced {CONFIDENTIAL D	kt																										
	Low emissions scenario	Hydrogen produced	kt	21.4	23.8	22.8	24.5	28.2	23.3	24.6	24.8	27.4	27.3	28.4	29.9	29.6	28.3	27.2	35.5	35.1	35.8	40.2	39.5	39.6	41.6	41.4	40.1	36.4	39.7
	Low emissions scenario	Total steel production {CONFIDENTIAL DATA}	kt																										
	Low emissions scenario	Production of primary aluminium	kt	264.1	262.4	244.4	269.5	270.4	271.5	284.6	310.6	320.3	328.0	329.2	324.1	333.5	333.6	347.0	348.2	335.3	353.0	315.7	270.8	344.0	356.8	324.7	324.4	327.1	333.3
	High emissions scenario	Clinker produced {CONFIDENTIAL DATA}	kt																										
	High emissions scenario	Total USE of urea (from MPI) - High emissions sc	kg	24585917	32520868	32071302	44218217	57420471	85796763	88972714	80158542	102800655	139015833	143358866	187451505	244835138	272303015	285437170	286410270	264869515	286221406	276208078	234542989	281871447	311755951	310020373	326297077	320356500	381526980
	High emissions scenario	Ammonia produced	kt	98.1	98.1	84.3	95.1	98.8	97.9	83.3	96.2	115.2	134.8	130.2	143.7	134.4	154.5	150.8	135.0	153.2	135.0	126.1	149.0	144.3	94.0	113.6	129.3	155.6	137.1
	High emissions scenario	Chemical methanol produced {CONFIDENTIAL D	kt																										
	High emissions scenario	Hydrogen produced	kt	21.4	23.8	22.8	24.5	28.2	23.3	24.6	24.8	27.4	27.3	28.4	29.9	29.6	28.3	27.2	35.5	35.1	35.8	40.2	39.5	39.6	41.6	41.4	40.1	36.4	39.7
	High emissions scenario	Total steel production {CONFIDENTIAL DATA}	kt																										
	High emissions scenario	Production of primary aluminium	kt	264.1	262.4	244.4	269.5	270.4	271.5	284.6	310.6	320.3	328.0	329.2	324.1	333.5	333.6	347.0	348.2	335.3	353.0	315.7	270.8	344.0	356.8	324.7	324.4	327.1	333.3

RELEASED UNDER THE OFFICIAL INFORMATION ACT

Pro-rate based PREFU FSM population based on 10th and 90th percentiles in StatsNZ projections as per BR4

Below					1.0000	1.0000	1.0000	1.0000	0.9952	0.9905	0.9860	0.9820	0.9779	0.9742	0.9703	0.9659	0.9617	0.9575	0.9534	0.9494	0.9456	0.9421	0.9385	0.9351	0.9313	0.9277	0.9239	0.9202	0.9162	0.9121	0.9081	0.9042	0.9004
Above					1.0000	1.0000	1.0000	1.0000	1.0045	1.0088	1.0134	1.0179	1.0223	1.0263	1.0305	1.0347	1.0394	1.0437	1.0479	1.0522	1.0563	1.0598	1.0632	1.0666	1.0701	1.0737	1.0771	1.0805	1.0841	1.0876	1.0907	1.0942	1.0978
2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048
4.691	4.776	4.854	4.942	5.020	5.067	5.111	5.165	5.228	5.295	5.359	5.420	5.478	5.533	5.585	5.633	5.678	5.720	5.759	5.795	5.829	5.862	5.895	5.927	5.958	5.988	6.018	6.047	6.075	6.103	6.130	6.156	6.183
233.789	241.494	248.758	248.327	243.796	247.601	256.925	267.266	276.533	284.216	291.888	299.511	306.957	313.544	319.357	325.046	330.637	336.142	341.583	346.992	352.438	357.977	363.599	369.315	375.133	381.034	387.018	393.063	399.140	405.258	411.393	417.493	423.549
7.45	11.88	19.69	24.82	29.79	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
4.691	4.776	4.854	4.942	5.020	5.067	5.111	5.165	5.203	5.244	5.284	5.322	5.357	5.390	5.419	5.441	5.461	5.477	5.490	5.501	5.512	5.523	5.532	5.542	5.549	5.555	5.560	5.564	5.566	5.566	5.566	5.567	5.567
233.789	241.494	248.758	248.327	243.796	247.601	256.925	267.266	276.005	282.578	289.057	295.432	301.577	306.831	311.282	315.572	319.729	323.766	327.704	331.574	335.445	339.367	343.332	347.348	351.422	355.537	359.690	363.862	368.024	372.186	376.323	380.391	384.380
7.45	11.88	19.69	24.82	29.79	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
4.691	4.776	4.854	4.942	5.020	5.067	5.111	5.165	5.252	5.341	5.431	5.517	5.600	5.679	5.755	5.829	5.902	5.970	6.034	6.097	6.157	6.213	6.267	6.321	6.375	6.429	6.482	6.534	6.586	6.637	6.686	6.736	6.787
233.789	241.494	248.758	248.327	243.796	247.601	256.925	267.266	276.533	284.473	292.966	301.778	310.504	318.422	325.610	332.722	339.785	346.811	353.820	360.846	367.961	375.224	382.627	390.181	397.897	405.757	413.761	421.888	430.108	438.430	446.829	455.250	463.683
7.45	11.88	19.69	24.82	29.79	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
238.5	188.4	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6	149.6
27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0
14.3	17.2	15.7	15.7	13.5	14.3	13.8	14.5	17.8	20.8	22.6	21.3	21.3	20.1	16.5	19.4	18.0	18.0	15.8	16.5	16.0	16.8	20.0	23.1	24.8	23.5	23.5	22.3	18.8	21.6	20.2	20.2	18.0
133.0	181.7	184.3	165.7	167.1	168.4	169.8	171.2	172.6	173.9	175.3	176.7	178.1	179.4	180.8	182.2	183.6	184.9	186.3	187.7	189.1	190.4	191.8	193.2	194.6	195.9	197.3	198.7	200.1	201.4	202.8	204.2	205.6
360300000.0	369000000.0	381500000.0	358000000.0	377025484.8	375419460.8	373310703.8	371708898.0	369795699.4	367777024.1	366746748.7	365560730.1	364400672.0	363268908.6	361839439.5	361037354.5	359825960.6	358689162.9	357653057	356365758	355235193	353971959	353014004	351666307	350681262	349570527	348239329	347276440	346039651	344818269	343529062	342368075	341111816
126.2	147.8	154.5	138.7	140.9	140.7	140.4	140.2	140.0	139.8	139.7	139.5	139.4	139.3	139.1	139.0	138.9	138.7	138.6	138.5	138.3	138.2	138.1	137.9	137.8	137.7	137.5	137.4	137.3	137.1	137.0	136.9	136.7
1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
29.0	30.8	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7
1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6	1917.6
32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3	32.3
132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2	132.2
338.6	336.7	340.7	331.2	298.0	331.2	331.2	331.2	331.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
66.1	70.2	73.5	74.1	75.7	77.2	78.6	80.0	81.4	82.8	84.1	85.4	86.7	88.0	89.3	90.6	91.9	93.2	94.5	95.9	97.3	98.7	100.1	101.6	103.1	104.6	106.1	107.6	109.2	110.8	112.4	114.0	115.6
3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
213.1	209.2	213.1	217.1	221.0	225.0	228.9	232.8	236.8	240.7	244.7	248.6	252.6	256.5	260.4	264.4	268.3	272.3	276.2	280.2	284.1	288.0	292.0	295.9	299.9	303.8	307.8	311.7	315.6	319.6	323.5	327.5	331.4
0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
74.8	75.9	77.0	78.1	79.2	80.3	81.4	82.5	83.7	84.8	85.9	87.0	88.1	89.2	90.3	91.4	92.5	93.7	94.8	95.9	97.0	98.1	99.2	100.3	101.4	102.5	103.6	104.8	105.9	107.0	108.1	109.2	110.3
0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
9.9	11.0	12.1	13.1	14.2	15.3	16.4	17.5	18.6	19.7	20.8	21.9	23.0	24.1	25.2	26.3	27.4	28.5	29.6	30.7	31.8	32.9	34.0	35.1	36.2	37.3	38.3	39.4	40.5	41.6	42.7	43.8	44.9
4413.9	4482.5	4551.2	4620.5	4689.9	4759.3	4828.7	4898.1	4967.5	5036.9	5106.3	5175.6	5245.0	5314.4	5383.8	5453.2	5522.6	5592.0	5661.3	5730.7	5800.1	5869.5	5938.9	6008.3	6077.7	6147.1	6216.4	6285.8	6355.2	6424.6	6494.0	6563.4	6632.8
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7	726.7
149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1	149.1
124.3	161.3	126.9	166.4	183.7	187.3	199.2	201.9	236.5	237.9	252.4	228.2	230.9	195.3	207.9	144.9	144.9	144.8	88.2	88.1	53.1	55.4	57.9	60.7	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2
251.4	238.9	182.9	201.6	203.1	184.4	174.1	144.1	141.7	115.7	114.5	88.4	89.9	67.5	63.2	60.5	59.5	58.5	46.6	46.0	33.3	33.0	32.8	32.6	32.6	32.6	32.6	32.6	32.6	32.6	32.6	32.6	32.6
324.9	223.1	161.1	224.9	236.3	216.3	204.6	184.0	188.5	156.0	159.6	128.4	128.6	93.5	102.1	89.2	90.4	92.2	77.5	80.2	67.0	67.3	67.3	67.3	67.7	67.7	67.7	67.7	67.7	67.7	67.7	67.7	67.7
140.9	89.0	74.2	59.3	52.7	37.5	30.0	24.0	19.2	14.5	12.3	10.5	8.9	7.1	6.4	5.7	4.6	3.4	2.4	1.8	1.3	1.0	0.8	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.2	0.3	0.1	0.6	0.6	0.6	0.6	0.6	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.0	6.6	6.5	5.9	4.7	3.8	3.0	2.4	1.9	1.5	1.2	1.0	0.8	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.5	6.6	5.2	6.0	4.8	3.8	3.1	2.4	2.0	1.6	1.3	1.0	0.8	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2087.7	1674.8	1299.3	1417.5	1418.9	1257.5	1177.8	1017.2	1016.3	856.2	856.5	695.6	695.5	534.6	535.9	462.8	455.8	449.8	344.5	343.2	254.1	253.5	253.4	254.1	254.3	254.3	254.3	254.3	254.3	254.3	254.3	254.3	254.3
				1418.3	1257.7	1177.7	1017.1	1017.1	856.5	856.5	695.9	695.9	535.3	535.3	441.7	441.7	441.7	348	348	254.3	254.3	254.3	254.3	254.3	254.3	254.3	254.3	254.3	254.3	254.3	254.3	254.3	254.3	254.3
				-4.8	3.1	9.8	23.5	17.7	175.1	22.2	38.8	45.9	73.5	228.8	125.3	144.6	160.0	197.9	208.0	233.9	242.1	251.0	251.0	250.3	258.3	266.5	274.8	283.9	293.2	299.7	307.1	315.1
				-0.6	9.4	14.2	28.8	30.2	194.6	42.3	52.5	49.1	57.5	207.6	58.3	60.2	62.2	69.8	72.2	78.7	79.5	80.8	82.2	83.2	85.5	87.9	90.3	93.2	96.2	96.3	96.9	98.1
				-4.7	12.1	23.5	39.9	44.6	65.8	67.4	86.7	88.5	108.1	160.6	118.0	117.6	117.3	125.7	127.9	136.5	135.7	135.1	134.4	133.5	130.6	129.9	130.4	130.1	130.0	128.3	127.1	127.4
				2.6	7.3	7.2	6.0	5.0	5.2	4.4	3.7	3.1	2.4	1.9	1.5	1.2	0.9	0.6	0.5	0.4	0.3	0.2	0.2	0.4	0.3	0.2	0.2	0.1	0.1	0.1	0.0	0.0
96.3	94.9	95.2	80.4	71.4	64.3	57.9	44.6	38.0	37.8	34.2	31.2	28.3	27.3	26.8	26.6	26.9	27.3	27.8	28.3	27.7	28.4	29.0	29.7	30.4	31.1	31.8	32.6	33.4	34.2	35.0	35.9	36.7
94.6	93.4	87.6	68.0	55.2	44.0	33.1	17.1	9.0	7.2	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
249.4	265.3	247.8	251.9	256.5	262.4	267.4	271.3	273.7	272.6	248.6	221.1	210.9	191.7	156.9	119.1	95.5	76.6	61.5	49.4	34.1	23.9	16.8	11.8	8.3	4.2	2.2	1.2	0.6	0.6	0.6	0.6	0.6
2.1	3.8	2.8	2.8	1.7	1.0	0.6	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.6	2.5	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17.8	10.4	14.2	23.3	48.1	51.5	55.0	58.2	61.1	58.7	59.3	60.0	60.4	61.4	61.4	62.2	63.4	64.6	65.8	67.0	68.2	69.4	70.6	71.8	53.1	54.5	55.9	57.5	59.1	60.8	62.7	64.6	66.6
36.3	14.7	18.1	23.5	25.0	27.4	29.6	32.0	34.5	31.8	32.0	32.3	32.6	33.3	32.8	33.0	33.9	34.9	35.8	36.7	37.6	38.4	39.3	40.2	41.1	42.1	43.2	44.4	45.7	47.0	48.5	50.0	51.6
39.9	13.2	16.8	35.4	37.8	40.8	43.7	46.6	49.5	46.6	46.3	45.6	45.0	45.1	40.8	38.8	38.4	38.1	38.0	37.9	38.0	38.0	38.2	38.3	35.9	36.7	37.5	38.4	39.4	40.5	41.6	42.9	44.2
19.6	5.0	4.1	2.0	1.7	1.3	1.1	0.9	0.8	0.7	0.5	0.5	0.5	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26.0	27.4	26.5	27.0	27.0	27.0	27.0	21.6	10.8	5.4	5.4	5.4	5.4	5.4	5.4																		
26.4	27.8	27.0	27.5	27.4	27.3	27.2	21.8	11.0	5.5	5.4	5.4	5.4	5.4	5.4																
5.5	1.4	1.1	1.1	0.9	0.7	0.6	0.5	0.4	0.2	0.0	0.0	0.0	0.0	0.0																
0.5	0.5	0.6	0.6	0.5	0.4	0.3	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0																
7.7	5.5	3.6	10.9	6.1	6.9	7.7	8.5	9.6	10.6	11.9	13.1	14.5	16.3	18.5	20.7	22.8	25.1	27.1	28.5	29.6	30.8	31.5	31.8	31.8	31.6	31.1	30.6	30.0	29.4	29.1	29.1	29.2
0.3	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
7.2	5.5	3.4	10.4	8.9	9.7	10.4	11.1	11.7	12.1	12.5	12.3	12.0	11.7	11.3	10.8	10.2	9.4	8.6	7.8	6.9	6.3	5.8	5.3	4.9	4.6	4.4	4.4	4.3	4.4	4.4	4.5	4.6
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
9.0	8.2	6.2	19.7	15.4	15.8	16.5	17.5	18.9	20.1	20.8	21.2	21.7	22.3	22.6	22.5	22.0	21.1	20.4	19.5	19.2	19.0	18.7	18.1	17.5	16.9	16.2	15.6	14.9	14.3	13.7	13.2	12.8
0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
6.7	6.1	2.9	9.0	3.2	3.2	3.1	3.0	2.8	2.5	2.3	2.2	1.9	1.7	1.6	1.4	1.3	1.0	0.7	0.6	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
0.3	0.2	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
30.6	25.3	16.0	50.0	33.7	35.7	37.8	40.2	43.1	45.2	47.5	48.8	50.1	52.1	53.9	55.4	56.3	56.6	56.8	56.4	55.9	56.3	56.1	55.3	54.3	53.2	51.9	50.6	49.3	48.1	47.3	46.8	46.5
360300000	369000000	381500000	358000000	377519857	375534354	373209742	371531514	369649811	367709636	366558533	365283922	363580100	362199775	361026216	360020566	358390434	357110736	355991619	354293424	352926452	351306906	350031444	348589181	346855139	345301367	343543878	341860520	340408216	338362836	336519816	334802014	333200237
126.2	147.8	154.5	138.7	140.9	140.7	140.4	140.2	140.0	139.8	139.6	139.5	139.3	139.1	139.0	138.9	138.7	138.6	138.4	138.2	138.1	137.9	137.7	137.6	137.4	137.2	137.0	136.8	136.6	136.4	136.2	136.0	135.8
29.0	30.8	26.7	26.7	26.7	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.9	17.0	16.1	15.2	14.3	13.4	12.5	11.6	10.7	9.8	8.9	8.0	7.2	6.3	5.4	4.5	3.6	2.7	1.8
338.6	336.7	340.7	331.2	298.0	198.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
360300000	369000000	381500000	358000000	377371645	375982374	373967073	372100576	370183258	368426250	367561059	366840646	365707128	364481434	363582622	362893133	362146210	361496032	360775727	359874948	358980833	358075478	357296625	356353520	355598568	355014606	354255812	353532493	352639676	352003153	351218207	350697603	349853095
126.2	147.8	154.5	138.7	140.9	140.7	140.5	140.3	140.1	139.9	139.8	139.7	139.5	139.4	139.3	139.2	139.1	139.1	139.0	138.9	138.8	138.7	138.6	138.5	138.4	138.3	138.2	138.1	138.0	138.0	137.9	137.8	137.7
29.0	30.8	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7
338.6	336.7	340.7	331.2	298.0	331.2	331.2	331.2	331.2	331.2	331.2	331.2	331.2	331.2	331.2	331.2	331.2	331.2	331.2	331.2	331.2	331.2	331.2	331.2	331.2	331.2	331.2	331.2	331.2	331.2	331.2	331.2	331.2

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0.8971	0.8937
1.1016	1.1052
2049	2050
6.208	6.233
429.547	435.466
35	35
5.569	5.570
388.280	392.072
50	50
6.839	6.889
472.111	480.513
20	20
149.6	149.6
27.0	27.0
18.7	18.2
206.9	208.3
339611851	338316544
136.5	136.4
1.3	1.3
26.7	26.7
1917.6	1917.6
32.3	32.3
132.2	132.2
0.0	0.0
NO	NO
117.1	118.7
3.8	3.8
335.4	339.3
0.3	0.3
111.4	112.5
0.7	0.7
3.1	3.1
46.0	47.1
6702.2	6771.5
NA	NA
726.7	726.7
149.1	149.1
64.2	64.2
32.6	32.6
67.7	67.7
0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
254.3	254.3
254.3	254.3
0.0	0.0
254.3	254.3
254.3	254.3
323.8	333.3
99.8	101.9
128.2	130.5
0.0	0.0
37.6	38.6
6.0	6.0
0.6	0.6
0.0	0.0
0.0	0.0
68.8	71.1
53.3	55.2
45.6	47.1
0.0	0.0
29.4	29.8
0.1	0.1
4.7	4.8
0.1	0.1
12.2	11.8
0.1	0.1
0.0	0.0
0.1	0.1
46.3	46.3
331276351	329442534
135.6	135.4
0.9	0.0
0.0	0.0
348778913	347833191
137.6	137.5
26.7	26.7
331.2	331.2

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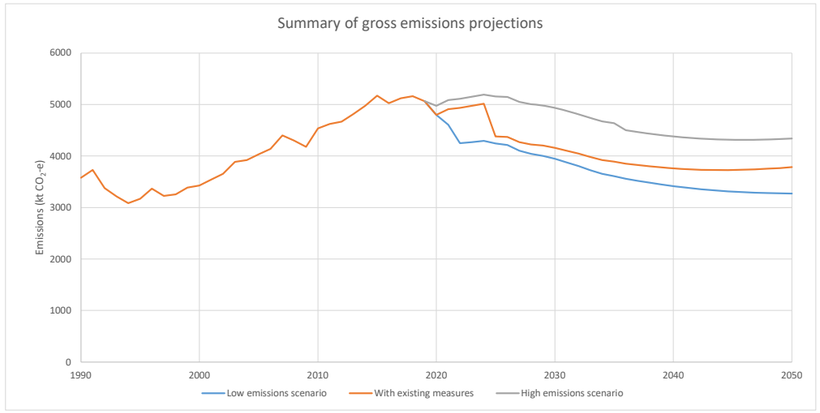
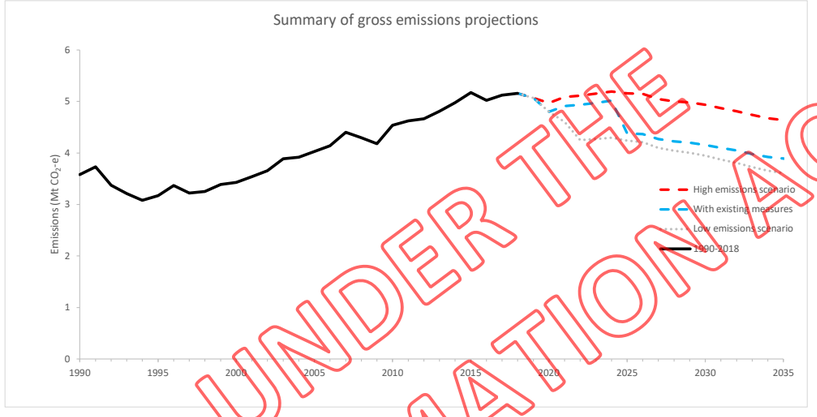
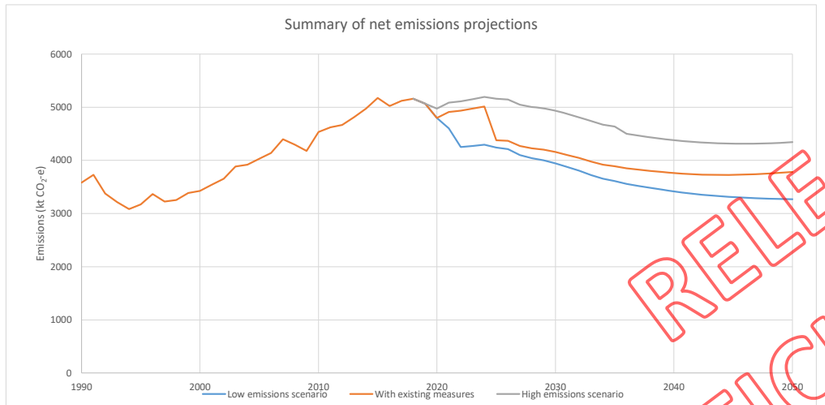
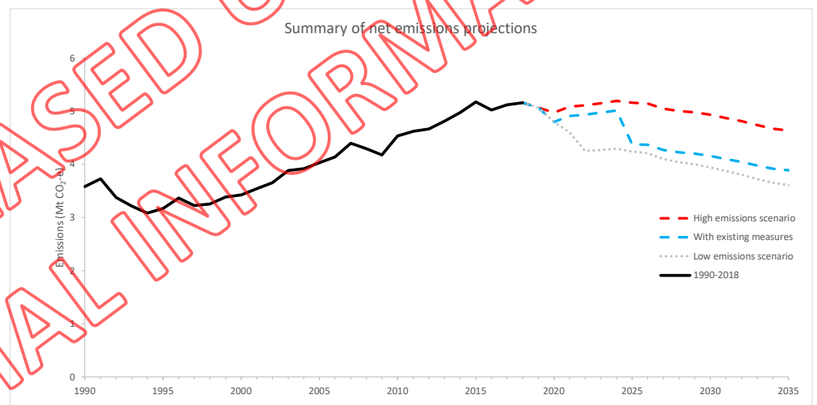
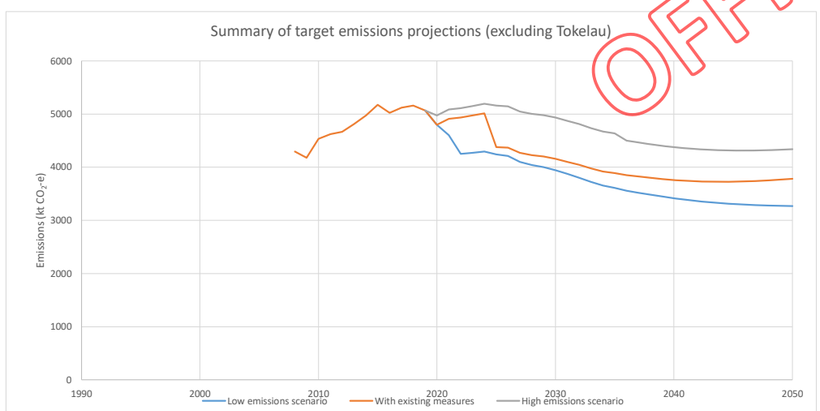
TARGET (e	With existing measures	3579.866	3728.554	3374.032	3213.401	3082.737	3169.851	3365.226	3223.398	3252.861	3388.052	3426.147	3540.266	3654.44	3885.619	3918.349	4029.665	4139.344	4398.846	4296.796	4177.2	4536.009	4620.343	4665.112	4811.64	4974.71	5172.343	5022.014	5121.349	5158.125	5064.385	4797.298	4909.666	4932.978	4971.547	5013.653	4379.462	4367.159	4270.284	4224.348
	High emissions scenario	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	5066.817	4972.725	5086.043	5110.151	5149.513	5192.413	5157.252	5144.995	5048.16	5002.257
	1990-2018	3579.866	3728.554	3374.032	3213.401	3082.737	3169.851	3365.226	3223.398	3252.861	3388.052	3426.147	3540.266	3654.44	3885.619	3918.349	4029.665	4139.344	4398.846	4296.796	4177.2	4536.009	4620.343	4665.112	4811.64	4974.71	5172.343	5022.014	5121.349	5158.125										
	WEM																													5158.125	5064.385	4797.298	4909.666	4932.978	4971.547	5013.653	4379.462	4367.159	4270.284	4224.348
	High																													5158.125	5066.817	4972.725	5086.043	5110.151	5149.513	5192.413	5157.252	5144.995	5048.16	5002.257
	Low																													5158.125	5064.385	4797.305	4603.767	4249.287	4269.696	4292.948	4241.22	4211.734	4100.699	4041.141
	1990-2018	3579.866	3728.554	3374.032	3213.401	3082.737	3169.851	3365.226	3223.398	3252.861	3388.052	3426.147	3540.266	3654.44	3885.619	3918.349	4029.665	4139.344	4398.846	4296.796	4177.2	4536.009	4620.343	4665.112	4811.64	4974.71	5172.343	5022.014	5121.349	5158.125										
	WEM																													5158.125	5064.385	4797.298	4909.666	4932.978	4971.547	5013.653	4379.462	4367.159	4270.284	4224.348
	High																													5158.125	5066.817	4972.725	5086.043	5110.151	5149.513	5192.413	5157.252	5144.995	5048.16	5002.257
	Low																													5158.125	5064.385	4797.305	4603.767	4249.287	4269.696	4292.948	4241.22	4211.734	4100.699	4041.141
	1990-2018	3579.866	3728.554	3374.032	3213.401	3082.737	3169.851	3365.226	3223.398	3252.861	3388.052	3426.147	3540.266	3654.44	3885.619	3918.349	4029.665	4139.344	4398.846	4296.796	4177.2	4536.009	4620.343	4665.112	4811.64	4974.71	5172.343	5022.014	5121.349	5158.125										
	WEM																													5158.125	5064.385	4797.298	4909.666	4932.978	4971.547	5013.653	4379.462	4367.159	4270.284	4224.348
	High																													#N/A	5066.817	4972.725	5086.043	5110.151	5149.513	5192.413	5157.252	5144.995	5048.16	5002.257
	Low																													#N/A	5064.385	4797.305	4603.767	4249.287	4269.696	4292.948	4241.22	4211.734	4100.699	4041.141

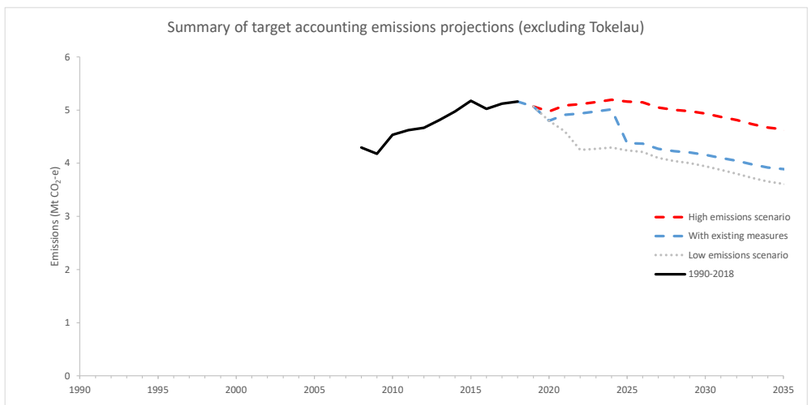












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4201.396	4156.295	4100.925	4045.996	3978.934	3920.217	3890.869	3850.602	3823.938	3800.695	3779.81	3760.994	3745.583	3733.991	3727.646	3724.361	3726.776	3731.467	3740.928	3751.994	3765.718	3782.623
4979.343	4934.277	4872.068	4810.387	4736.661	4671.361	4635.518	4499.048	4465.148	4433.697	4404.796	4378.583	4357.125	4339.029	4326.741	4318.604	4313.585	4312.694	4316.072	4322.059	4329.584	4340.858

4201.396	4156.295	4100.925	4045.996	3978.934	3920.217	3890.869	3850.602	3823.938	3800.695	3779.81	3760.994	3745.583	3733.991	3727.646	3724.361	3726.776	3731.467	3740.928	3751.994	3765.718	3782.623
4979.343	4934.277	4872.068	4810.387	4736.661	4671.361	4635.518	4499.048	4465.148	4433.697	4404.796	4378.583	4357.125	4339.029	4326.741	4318.604	4313.585	4312.694	4316.072	4322.059	4329.584	4340.858
4003.389	3945.088	3874.038	3804.165	3724.776	3653.651	3610.168	3558.101	3518.281	3482.069	3448.313	3416.614	3387.806	3362.467	3341.36	3322.535	3308.753	3296.247	3287.346	3279.23	3273.179	3269.01

4201.396	4156.295	4100.925	4045.996	3978.934	3920.217	3890.869	3850.602	3823.938	3800.695	3779.81	3760.994	3745.583	3733.991	3727.646	3724.361	3726.776	3731.467	3740.928	3751.994	3765.718	3782.623
4979.343	4934.277	4872.068	4810.387	4736.661	4671.361	4635.518	4499.048	4465.148	4433.697	4404.796	4378.583	4357.125	4339.029	4326.741	4318.604	4313.585	4312.694	4316.072	4322.059	4329.584	4340.858
4003.389	3945.088	3874.038	3804.165	3724.776	3653.651	3610.168	3558.101	3518.281	3482.069	3448.313	3416.614	3387.806	3362.467	3341.36	3322.535	3308.753	3296.247	3287.346	3279.23	3273.179	3269.01

4201.396	4156.295	4100.925	4045.996	3978.934	3920.217	3890.869	3850.602	3823.938	3800.695	3779.81	3760.994	3745.583	3733.991	3727.646	3724.361	3726.776	3731.467	3740.928	3751.994	3765.718	3782.623
4979.343	4934.277	4872.068	4810.387	4736.661	4671.361	4635.518	4499.048	4465.148	4433.697	4404.796	4378.583	4357.125	4339.029	4326.741	4318.604	4313.585	4312.694	4316.072	4322.059	4329.584	4340.858
4003.389	3945.088	3874.038	3804.165	3724.776	3653.651	3610.168	3558.101	3518.281	3482.069	3448.313	3416.614	3387.806	3362.467	3341.36	3322.535	3308.753	3296.247	3287.346	3279.23	3273.179	3269.01

RELEASED UNDER THE
OFFICIAL INFORMATION ACT

With measures

A 'w th measu es' p ojec on shall encompass cu ently mplemented and adopted pol c es and measu es. (pa a 26, page 9 of FCCC/SB/2016/L.22)

- H sto cal P o ected ->

P ojected and h sto cal (PPU) em ss ons data (27 October 2020)

Th measu es ncludes mplemented, adopted a nop ed Pol c es and Measu es (PaMs) as at 31 July 2020.

Gross totals (automatic)	All gases (kt CO_2e)	3579.866363	3728.5535	3374.0325	3213.4011	3082.7366	3169.8508	3365.2257	3223.398	3252.8615	3388.0519	3426.147	3540.2659	3654.4397	3885.6185	3918.3488	4029.6655	4139.3444	4398.8459	4296.7957	4177.1996	4536.0092	4620.3431	4665.1116	4811.6399	4974.71	5172.343	5022.0142	5121.3487	5158.1248	5064.8848	4797.2983	4909.6662	4932.978	4971.5469	5013.6529	4379.4617	4367.1591	4270.2836	4224.3478	4201.3963	4156.2949	4100.9251	4045.9961	3978.9342	3920.2172	3890.6887	3850.6015	3823.9378	3800.6949	3779.8096	3760.9945	3745.5831	3733.9913	3727.6461	3724.3613	3726.7763	3731.4674	3740.9275	3751.9945	3765.718	3782.6233
GWP	Gas																																																							
1	$CO2$	Total kt CO_2	2519.898786	2659.4285	2757.5429	2847.5099	2725.5484	2813.7615	2826.0128	2732.1181	2792.1558	2944.209	2922.401	2986.8148	2984.7228	3152.8734	3131.396	3208.5435	3180.7882	3376.7731	3158.8977	3022.2862	3318.5837	3293.9717	3254.5772	3319.4915	3396.0241	3509.38	3213.5753	3213.8812	3081.1509	3085.4906	2857.7449	2911.0765	2910.0584	2909.5356	2910.0495	2376.1908	2376.7912	2376.1077	2375.959	2375.3314	2373.6971	2374.7383	2374.0123	2373.88	2372.846	2373.0291	2372.7415	2372.9682	2374.2651	2375.4685	2376.1568	2375.591	2375.5804	2375.1091	2373.6391	2374.8436	2374.2857	2374.3131	2373.4222	2373.7323	2373.5527
25	$CH4$	Total kt CH_4	1.104	1.886	1.585	1.794	2.2494	3.1649932	4.2472927	4.3812746	4.1248361	4.7440306	5.5445272	4.9043567	5.2471694	2.2257491	2.5019607	0.7893945	0.9298363	0.9997663	1.3117314	1.8914428	1.9061802	1.9159529	2.5473926	3.2659701	0.5925594	4.2680433	5.011108	4.4807197	3.6906674	4.75755	3.330285	4.4121659	4.0667841	3.7214	3.7214	3.7214	1.9619	1.9619	1.9619	1.56952	1.17714	0.78476	0.39238	0	0	0

Low and high emissions scenarios

Projected and historical IPPU emissions data (27 October 2020)

<- Historical | Projected ->

		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Net Emissions With existing measures (automatic)																																																																							
	All gases (kt CO_2-e)	3579 866	3728 554	3374 032	3213.401	3082.737	3169 851	3365 226	3223 398	3252 861	3388 052	3426.147	3540 266	3654.44	3885.619	3918 349	4029.665	4139 344	4398 846	4296.796	4177.2	4536 009	4620 343	4665.112	4811.64	4974.71	5172 343	5022 014	5121 349	5158.125	5064.385	4797.298	4909.666	4932.978	4971.547	5013.653	4379.462	4367.159	4270.284	4224.348	4201.396	4156.295	4100.925	4045.996	3978.934	3920.217	3890.869	3850.602	3823.938	3800.695	3779.81	3760.994	3745.583	3733.991	3727.646	3724.361	3726.776	3731.467	3740.928	3751.994	3765.718	3782.623
GWP																																																																							
1	Total kt CO_2	3449.821	3584.08	3241.613	3080.717	2943 059	3011.456	3183.737	3042 325	3081.776	3204 885	3226.196	3359 386	3467 903	3777 825	3807 375	3965.38	4075.425	4329.748	4211 256	4076.721	4434 864	4519.102	4545.85	4670 242	4789.82	5005 535	4837.747	4947.54	4984.176	4881.542	4649.08	4733.343	4764.233	4810.379	4851.428	4216.18	4202.82	4148.875	4101.882	4077.873	4041.524	3994.907	3948.73	3890.421	3840.456	3810.051	3768.727	3741.006	3716.706	3694.763	3674.891	3658.423	3645.774	3638.372	3634.03	3635.388	3639.022	3647.425	3657.434	3670.101	3685.949
25	Total kt CH_4	1.104	1 886	1.5985	1.794	2.2494	3.164993	4.247293	4.381275	4.124836	4.744031	5.544527	4.904357	5.247169	2.225749	2.501961	0.789395	0.929683	0.999766	1.311731	1.891428	1.90618	1.915953	2.547393	3.26597	5.059259	4.268043	5.011108	4.48072	3.690667	4.75755	3.330285	4.412166	4.066784	3.7214	3.7214	3.7214	3.7214	1.9619	1.9619	1.9619	1.56952	1.17714	0.78476	0.39238	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
298	Total kt N_2O	0.343777	0.326588	0.310258	0.294745	0.280008	0.266008	0.252707	0.240072	0.228068	0.216665	0.205832	0.19554	0.185763	0.175	0.1625	0.1495	0.1365	0.148	0.177	0.1785	0.1795	0.179	0.1865	0.2005	0.196	0.2017	0.19795	0.20735	0.2741	0.214445	0.217992	0.221539	0.225086	0.228634	0.232181	0.235728	0.239275	0.242823	0.24637	0.249917	0.253465	0.257012	0.260559	0.264106	0.267654	0.271201	0.274748	0.278295	0.281843	0.28539	0.288937	0.292485	0.296032	0.299579	0.303126	0.306674	0.310221	0.313768	0.317315	0.320863	0.32441
Gross Emissions With existing measures (automatic)																																																																						
	All gases (kt CO_2-e)	3579 866	3728 554	3374 032	3213.401	3082.737	3169 851	3365 226	3223 398	3252 861	3388 052	3426.147	3540 266	3654.44	3885.619	3918 349	4029.665	4139 344	4398 846	4296.796	4177.2	4536 009	4620 343	4665.112	4811.64	4974.71	5172 343	5022 014	5121 349	5158.125	5064.385	4797.298	4909.666	4932.978	4971.547	5013.653	4379.462	4367.159	4270.284	4224.348	4201.396	4156.295	4100.925	4045.996	3978.934	3920.217	3890.869	3850.602	3823.938	3800.695	3779.81	3760.994	3745.583	3733.991	3727.646	3724.361	3726.776	3731.467	3740.928	3751.994	3765.718	3782.623
GWP																																																																						
1	Total kt CO_2	3449.821	3584.08	3241.613	3080.717	2943 059	3011.456	3183.737	3042 325	3081.776	3204 885	3226.196	3359 386	3467 903	3777 825	3807 375	3965.38	4075.425	4329.748	4211 256	4076.721	4434 864	4519.102	4545.85	4670 242	4789.82	5005 535	4837.747	4947.54	4984.176	4881.542	4649.08	4733.343	4764.233	4810.379	4851.428	4216.18	4202.82	4148.875	4101.882	4077.873	4041.524	3994.907	3948.73	3890.421	3840.456	3810.051	3768.727	3741.006	3716.706	3694.763	3674.891	3658.423	3645.774	3638.372	3634.03	3635.388	3639.022	3647.425	3657.434	3670.101	3685.949
25	Total kt CH_4	1.104	1 886	1.5985	1.794	2.2494	3.164993	4.247293	4.381275	4.124836	4.744031	5.544527	4.904357	5.247169	2.225749	2.501961	0.789395	0.929683	0.999766	1.311731	1.891428	1.90618	1.915953	2.547393	3.26597	5.059259	4.268043	5.011108	4.48072	3.690667	4.75755	3.330285	4.412166	4.066784	3.7214	3.7214	3.7214	3.7214	1.9619	1.9619	1.9619	1.56952	1.17714	0.78476	0.39238	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
298	Total kt N_2O	0.343777	0.326588	0.310258	0.294745	0.280008	0.266008	0.252707	0.240072	0.228068	0.216665	0.205832	0.19554	0.185763	0.175	0.1625	0.1495	0.1365	0.148	0.177	0.1785	0.1795	0.179	0.1865	0.2005	0.196	0.2017	0.19795	0.20735	0.2741	0.214445	0.217992	0.221539	0.225086	0.228634	0.232181	0.235728	0.239275	0.242823	0.24637	0.249917	0.253465	0.257012	0.260559	0.264106	0.267654	0.271201	0.274748	0.278295	0.281843	0.28539	0.288937	0.292485	0.296032	0.299579	0.303126	0.306674	0.310221	0.313768	0.317315	0.320863	0.32441
Target Accounting Emissions With existing measures (automatic)																																																																					
	All gases (kt CO_2-e)	3579 866	3728 554	3374 032	3213.401	3082.737	3169 851	3365 226	3223 398	3252 861	3388 052	3426.147	3540 266	3654.44	3885.619	3918 349	4029.665	4139 344	4398 846	4296.796	4177.2	4536 009	4620 343	4665.112	4811.64	4974.71	5172 343	5022 014	5121 349	5158.125	5064.385	4797.298	4909.666	4932.978	4971.547	5013.653	4379.462	4367.159	4270.284	4224.348	4201.396	4156.295	4100.925	4045.996	3978.934	3920.217	3890.869	3850.602	3823.938	3800.695	3779.81	3760.994	3745.583	3733.991	3727.646	3724.361	3726.776	3731.467	3740.928	3751.994	3765.718	3782.623
GWP																																																																					
1	Total kt CO_2	3449.821	3584.08	3241.613	3080.717	2943 059	3011.456	3183.737	3042 325	3081.776	3204 885	3226.196	3359 386	3467 903	3777 825	3807 375	3965.38	4075.425	4329.748	4211 256	4076.721	4434 864	4519.102	4545.85	4670 242	4789.82	5005 535	4837.747	4947.54	4984.176	4881.542	4649.08	4733.343	4764.233	4810.379	4851.428	4216.18	4202.82	4148.875	4101.882	4077.873	4041.524	3994.907	3948.73	3890.421	3840.456	3810.051	3768.727	3741.006	3716.706	3694.763	3674.891	3658.423	3645.774	3638.372	3634.03	3635.388	3639.022	3647.425	3657.434	3670.101	3685.949
25	Total kt CH_4	1.104	1 886	1.5985	1.794	2.2494	3.164993	4.247293	4.381275	4.124836	4.744031	5.544527	4.904357	5.247169	2.225749	2.501961	0.789395	0.929683	0.999766	1.311731	1.891428	1.90618	1.915953	2.547393	3.26597	5.059259	4.268043	5.011108	4.48072	3.690667	4.75755	3.330285	4.412166	4.066784	3.7214	3.7214	3.7214	3.7214	1.9619	1.9619	1.9619	1.56952	1.17714	0.78476	0.39238	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
298	Total kt N_2O	0.343777	0.326588	0.310258	0.294745	0.280008	0.266008	0.252707	0.240072	0.228068	0.216665	0.205832	0.19554	0.185763	0.175	0.1625	0.1495	0.1365	0.148	0.177	0.1785	0.1795	0.179	0.1865	0.2005	0.196	0.2017	0.19795	0.20735	0.2741	0.214445	0.217992	0.221539	0.225086	0.228634	0.232181	0.235728	0.239275	0.242823	0.24637	0.249917	0.253465	0.257012	0.260559	0.264106	0.267654	0.271201	0.274748	0.278295	0.281843	0.28539	0.288937	0.292485	0.296032	0.299579	0.303126	0.306674	0.310221	0.313768	0.317315	0.320863	0.32441

Enter high and low emissions scenarios (kt gas)

The high and low scenarios are specific variants of the 'with existing measures' scenario. Change specific variables only (as agreed with the projections lead). This information is to support policy advice.

High scenario

		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Net Total	All gases (kt CO_2-e)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	5066.817	4972.725	5086.043	5110.151	5149.513	5192.413	5157.252	5144.995	5048.16	5002.257	4979.343	4934.277	4872.068	4810.387	4736.661	4671.361	4635.518	4499.048	4465.148	4433.697	4404.796	4378.583	4357.125	4339.029	4326.741	4318.604	4313.585	4312.694	4316.072	4322.059	4329.584	4340.858
	Total kt CO_2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	4883.974	4824.507	4909.721	4941.496	4983.397	5030.186	4993.97	4980.656	4926.751	4879.792	4855.82	4819.507	4766.05	4713.121	4648.148	4591.6	4554.701	4417.173	4382.216	4349.707	4319.75	4292.48	4269.964	4250.812	4237.467	4228.272	4222.197	4220.248	4222.569	4227.499	4233.967	4244.184
	Total kt CH_4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	4.75755	3.330285	4.412166	4.066784	3.7214	3.7214	3.7214	3.7214	1.9619	1.9619	1.9619	1.56952	1.17714	0.78476	0.39238	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total kt N_2O	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0.214445	0.217992	0.221539	0.225086	0.228634	0.232181	0.235728	0.239275	0.242823	0.24637	0.249917	0.253465	0.257012	0.260559	0.264106	0.267654	0.271201	0.274748	0.278295	0.281843	0.28539	0.288937	0.292485	0.296032	0.299579	0.303126	0.306674	0.310221	0.313768	0.317315	0.320863	0.32441
Gross Total	All gases (kt CO_2-e)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	5066.817	4972.725	5086.043	5110.151	5149.513	5192.413	5157.252	5144.995	5048.16	5002.257	4979.343	4934.277	4872.068	4810.387	4736.661	4671.361	4635.518	4499.048	4465.148	4433.697	4404.796	4378.583	4357.125	4339.029	4326.741	4318.604	4313.585	4312.694	4316.072	4322.059	4329.584	4340.858
	Total kt CO_2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	4883.974	4824.507	4909.721	4941.496	4983.397	5030.186	4993.97	4980.656	4926.751	4879.792	4855.82	4819.507	4766.05	4713.121	4648.148	4591.6	4554.701	4417.173	4382.216	4349.707	4319.75	4292.48	4269.964	4250.812	4237.467	4228.272	4222.197	4220.248	4222.569	4227.499	4233.967	4244.184
	Total kt CH_4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	4.75755	3.330285	4.412166	4.066784	3.7214	3.7214	3.7214	3.7214	1.9619	1.9619	1.9619	1.56952	1.17714	0.78476	0.39238	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total kt N_2O	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0.214445	0.217992	0.221539	0.225086	0.228634	0.232181	0.235728	0.239275	0.242823	0.24637	0.249917	0.253465	0.257012	0.260559	0.264106	0.267654	0.271201	0.274748	0.278295	0.281843	0.28539	0.288937	0.292485	0.296032	0.299579	0.303126	0.306674	0.310221	0.313768	0.317315	0.320863	0.32441
Target Accour	All gases (kt CO_2-e)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	5066.817	4972.725	5086.043	5110.151	5149.513	5192.413	5157.252	5144.995	5048.16	5002.257	4979.343	4934.277	4872.068	4810.387	4736.661	4671.361	4635.518	4499.048	4465.148	4433.697	4404.796	4378.583	4357.125	4339.029	4326.741	4318.604	4313.585	4312.694	4316.072	4322.059	4329.584	4340.858
	Total kt CO_2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	4883.974	4824.507	4909.721	4941.496	4983.397	5030.186	4993.97	4980.656	4926.751	4879.792	4855.82	4819.507	4766.05	4713.121	4648.148	4591.6	4554.701	4417.173	4382.216	4349.707	4319.75	4292.48	4269.964	4250.812	4237.467	4228.272	4222.197	4220.248	4222.569	4227.499	4233.967	4244.184
	Total kt CH_4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	4.75755	3.330285	4.412166	4.066784	3.7214	3.7214	3.7214	3.7214	1.9619	1.9619	1.9619	1.56952	1.17714	0.78476	0.39238	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total kt N_2O	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0.214445	0.217992	0.221539	0.225086	0.228634	0.232181	0.235728	0.239275	0.242823	0.24637	0.249917	0.253465	0.257012	0.260559	0.264106	0.267654	0.271201	0.274748	0.278295	0.281843	0.28539	0.288937	0.292485	0.296032	0.299579	0.303126	0.306674	0.310221	0.313768	0.317315	0.320863	0.32441
Energy	All gases (kt CO_2-e)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0	0	0																																
	Total kt CO_2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A																																				
	Total kt CH_4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A																																				
	Total kt N_2O	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A																																				
Tokelau	All gases (kt CO_2-e)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0	0	0																																
	Total kt CO_2 (including F gases)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A																																				
	Total kt CH_4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A																																				
	Total kt N_2O	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A																																				
IPPU	All gases (kt CO_2-e)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	5066.817	4972.725	5086.043	5110.151	5149.513	5192.413	5157.252	5144.995	5048.16	5002.257	4979.343	4934.277	4872.068	4810.387	4736.661	4671.361	4635.518	4499.048	4465.148	4433.697	4404.796	4378.583	4357.125	4339.029	4326.741	4318.604	4313.585	4312.694	4316.072	4322.059	4329.584	4340.858
	Total kt CO_2 (including F gases)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	4883.974	4824.507	4909.721	4941.496	4983.397	5030.186	4993.97	4980.656	4926.751	4879.792	4855.82	4819.507	4766.05	4713.121	4648.148	4591.6	4554.701	4417.173	4382.216	4349.707	4319.75	4292.48	4269.964	4250.812	4237.467	4228.272	4222.197	4220.248	4222.569	4227.499	4233.967	4244.184
	Total kt CH_4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	4.75755	3.330285	4.412166	4.066784	3.7214	3.7214	3.7214	3.7214	1.9619	1.9619	1.9619	1.56952	1.17714	0.78476	0.39238	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total kt N_2O	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0.214445	0.217992	0.221539	0.225086	0.228634	0.232181	0.235728	0.239275	0.242823	0.24637	0.249917	0.253465	0.257012	0.260559	0.264106	0.267654	0.271201	0.274748	0.278295	0.281843	0.28539	0.288937	0.292485	0.296032	0.299579	0.303126	0.306674	0.310221	0.313768	0.317315	0.320863	0.32441
Waste	All gases (kt CO_2-e)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0	0	0																																
	Total kt CO_2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A																																				
	Total kt CH_4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A																																				
	Total kt N_2O	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A																																				
Agriculture	All gases (kt CO_2-e)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0	0	0																																
	Total kt CO_2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A																																				
	Total kt CH_4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A																																				
	Total kt N_2O	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A																																				
LULUCF	All gases (kt CO_2-e)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A