

---

Report for the Ministry for the Environment

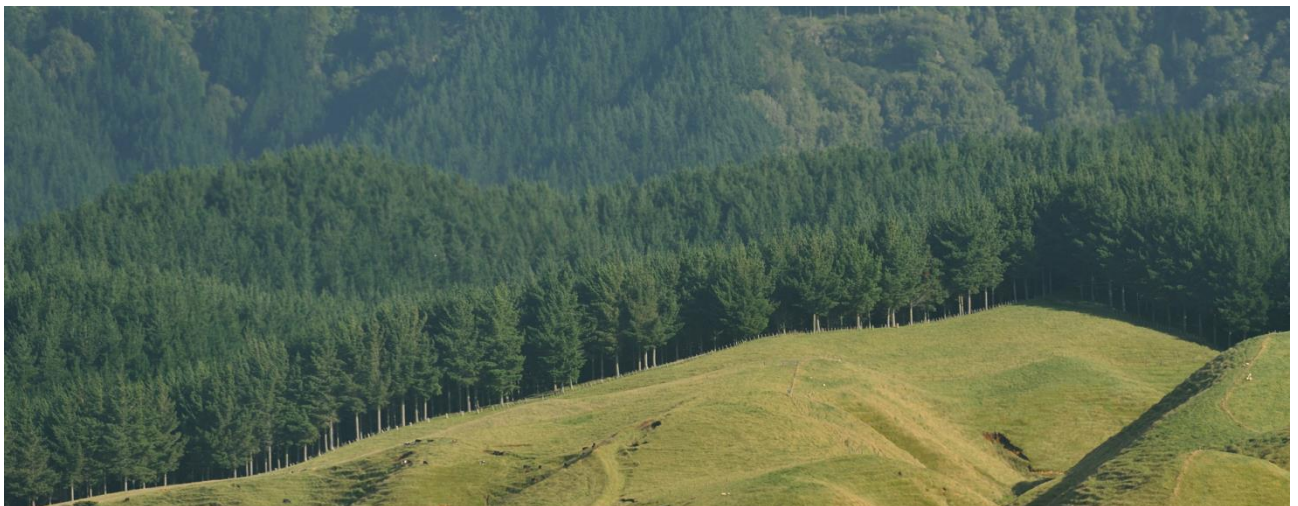
# Provision of information to the NZ ETS

---

*Toby Stevenson, Corina Comendant, Malin Niemi, Kieran Murray*

---

June 2017





## About Sapere Research Group Limited

---

Sapere Research Group is one of the largest expert consulting firms in Australasia and a leader in provision of independent economic, forensic accounting and public policy services. Sapere provides independent expert testimony, strategic advisory services, data analytics and other advice to Australasia's private sector corporate clients, major law firms, government agencies, and regulatory bodies.

<b>Wellington</b> Level 9, 1 Willeston St PO Box 587 Wellington 6140 Ph: +64 4 915 7590 Fax: +64 4 915 7596	<b>Auckland</b> Level 8, 203 Queen St PO Box 2475 Auckland 1140 Ph: +64 9 909 5810 Fax: +64 9 909 5828	
<b>Sydney</b> Level 14, 68 Pitt St Sydney NSW 2000 GPO Box 220 Sydney NSW 2001 Ph: +61 2 9234 0200 Fax: +61 2 9234 0201	<b>Canberra</b> Unit 3, 97 Northbourne Ave Turner ACT 2612 GPO Box 252 Canberra City ACT 2601 Ph: +61 2 6267 2700 Fax: +61 2 6267 2710	<b>Melbourne</b> Level 8, 90 Collins Street Melbourne VIC 3000 GPO Box 3179 Melbourne VIC 3001 Ph: +61 3 9005 1454 Fax: +61 2 9234 0201

For information on this report please contact:

Name: Toby Stevenson  
 Telephone: +64 4 915 7616  
 Mobile: +64 21 666 822  
 Email: [tstevenson@srgexpert.com](mailto:tstevenson@srgexpert.com)



# Contents

---

Glossary .....	v
Executive summary .....	vii
<b>1. Introduction, objectives and aims.....</b>	<b>1</b>
<b>2. Methodology and approach .....</b>	<b>3</b>
2.1 Primary research.....	3
2.2 Secondary research.....	4
2.3 Information provision analysis .....	4
<b>3. Overview of NZ ETS.....</b>	<b>5</b>
3.1 NZ ETS stakeholders.....	5
3.2 Emitters and NZU demand .....	7
3.3 Compliance cycle.....	9
3.4 Trading arrangements.....	11
<b>4. Information requirements and transaction costs.....</b>	<b>12</b>
4.1 Fundamentals (quantitative) information.....	12
4.2 Qualitative information.....	17
4.3 Information requirements in the context of the forestry sector .....	17
4.4 Transaction costs .....	18
<b>5. Current information provision in the NZ ETS .....</b>	<b>20</b>
5.1 Requirements under the legal framework .....	20
5.2 Sources of primary information.....	21
5.3 Current price information providers.....	25
5.4 The information schedule – a summary of information available .....	28
5.5 NZ ETS reform and consultation.....	35
<b>6. Analysis of current information provision and recommendations.....</b>	<b>36</b>
6.1 An NZ ETS master site .....	36
6.2 Quantitative information .....	39
6.3 Qualitative information.....	59
<b>7. References .....</b>	<b>61</b>

## Appendices

Appendix 1 Stakeholder list, interview topics and questions .....	65
Appendix 2 Drivers of emissions and carbon removals .....	72

## Tables

Table 1 Stakeholder list and use of information	5
Table 2 Key government agencies	21
Table 3 Organisations in New Zealand that offer NZU prices	26
Table 4 Definition of aggregation levels	29
Table 5 NZ ETS Information Schedule	30
Table 6 Key quantitative information	40
Table 7 The context for publicly disclosed NZU prices in New Zealand	47
Table 8 Recommended provision of quantitative information	49
Table 9 List of NZ ETS stakeholders engaged with	65

## Figures

Figure 1 NZ ETS compliance cycle	10
Figure 2 Fundamentals data – the drivers of NZU demand and supply	16
Figure 3 Agencies responsible for managing type of information	38

## Glossary

---

CCRA	Climate Change Response Act 2002
Deforestation	Deforestation is the conversion of forestland to non-forestland.
EPA	Environmental Protection Authority
ETS	Emissions Trading Scheme. An ETS is a market mechanism that allows entities to trade rights to emit greenhouse gases.
FMCA	Financial Markets Conduct Act
GHG	Greenhouse gas
Harvesting	Harvesting occurs when forestland is cleared and new, future seedlings either are planted or naturally regenerate. There is no change in land-use; the forestland is considered temporarily un-stocked. There is a time limit for how long harvested land may be temporarily un-stocked before it is deemed deforested (see Deforestation above).
Land holder	A holder of a registered forestry right. Includes an owner of that land.
MACC	Marginal abatement cost curve
MfE	Ministry for the Environment
MPI	Ministry for Primary Industries
OIA	Official Information Act
NZ ETR	New Zealand Emission Unit Register. This is a central registry of ETS participants and it administers the holding accounts into which NZUs are transferred and from which units are paid.
PFSI	Permanent Forest Sink Initiative
Participant	A company with regulatory obligations under the NZ ETS. A person becomes a mandatory participant if that person undertakes certain activities of the ETS, such as pre-1990 forestland deforestation. Other people may become participants by voluntarily registering in the ETS, for example, when they own post-1989 forestland.
NZU	A New Zealand Unit, or NZU, is a greenhouse gas unit specific to the ETS in New Zealand.
Removal activities	Activity that causes a reduction of greenhouse gases in the atmosphere.



## Executive summary

---

The New Zealand Ministry for the Environment (MfE) is carrying out a review of the NZ ETS in order to assess the scheme's operation and effectiveness to 2020 and beyond. As part of this work, we were commissioned by MfE to analyse the current information provision in the NZ ETS and offer recommendations on the scope, type, and form of information that needs to be provided in the market to improve price discovery and market transparency, and, as a consequence, improve the efficiency of the market.

In particular, we were asked to look into the information needed for NZ ETS stakeholders<sup>1</sup> to get a better view of historical market activity, to understand the supply and demand fundamentals of the scheme, and to form the best possible views about future NZU prices. Our analysis looks into how ETS information provision can be improved so as to ensure that the NZU price and intrinsic value are better aligned.

We were also asked to provide recommendations by taking into account (i) any commercial sensitivities arising from providing the data, and (ii) the additional reporting costs that may accrue to market participants and the implementation costs that may accrue to the entities providing the information.

We used a mixed method approach to the analysis, which included:

- semi-structured interviews with NZ ETS stakeholders;
- detailed questionnaires sent out to NZ ETS stakeholders;
- research of information currently published on governmental sites;
- analysis of submissions provided by market participants to the 2015/16 NZ ETS review;
- scan of the academic and grey literature discussing the impact of unit supply and demand drivers and of policy announcements on market activity, and
- development of a framework for analysing the relevant NZ ETS information.

We considered the provision of both quantitative and qualitative information in the NZ ETS. We grouped the quantitative data into two categories of fundamentals data, and two categories of transactions data. Qualitative data includes announcements of policy and regulatory changes.

### Our typology of NZ ETS information

#### *Quantitative data*

- Fundamentals data relating to emissions and carbon removals
- Fundamentals data relating to carbon market design
- Transactions data relating to transaction tracking systems, and
- Transaction data relating to transaction data on market platforms

#### *Qualitative data*

- Announcements of policy and regulatory changes

---

<sup>1</sup> By stakeholders, we mean the broader group of agents that closely follow how the NZ ETS functions for regulatory, accountability, compliance or profitability purposes.

The analysis of quantitative data involved:

- collating a detailed schedule of information currently provided by multiple sources;
- filtering the detailed schedule into an information schedule detailing the current sources, level of aggregation, frequency and timing of release, period covered and delivery mechanism (the filters), and
- for each type of information, providing a recommendation against each filter, taking into account associated stakeholder costs and commercial sensitivities.

## **Current information provision**

### *Quantitative information*

A major issue is that the NZ ETS quantitative information is provided across multiple governmental sources (e.g. MfE, MPI, EPA, MBIE, and Treasury), at many levels down a website's hierarchy, is incomplete and is sometimes in a non-friendly format. This has made it difficult for market participants to find relevant information, ensure that the information accessed is the most up to date, as well as being able to use the information easily for their own analytical purposes. This issue was raised during the submissions to the 2015/16 NZ ETS review as well as during our stakeholder engagement.

Much data needed to gain an understanding of NZ ETS historical activity and to make well-informed decisions about the NZU price is currently published; however, not at the needed level of aggregation or frequency of release. Some information is currently not published at all, even though it is used by public authorities for internal decision-making (e.g. MPI's forecasts about forestry removal activities and the associated entitlements). Some information is not provided directly and instead must be derived through manual calculations. This particularly relates to forecasts of NZU issuance, which are currently provided by the NZ Treasury.

### *Qualitative information*

A major issue raised in the submissions and in our interviews/questionnaires is a poor understanding of the government's commitment to future emissions reduction plans and a general lack of visibility of upcoming policy changes. NZ ETS participants seek greater certainty and equal access to announcements. To ensure this, announcements should be made through a single channel to everyone and should be provided in advance of policy implementation.

## **Recommendations**

### *Delivery mechanism*

We recommend the establishment of an NZ ETS master site to give central access to all information relevant to NZ ETS stakeholders. The master site would be a portal that would redirect to the MfE, EPA, and MPI sites, therefore providing the relevant information. For example, if a user requires information on projected deforestation, then the user is redirected

to the corresponding site hosted by the MPI. In addition to links, the master site would also include general information that is displayed directly on the master site, (e.g. a schedule of information release sourced from all authorities). The box to the right summarises the type of information that we recommend to be provided (at minimum) through the master site.

We recommend that the Ministry for the Environment be the guardian of the master site. In this role, MfE would not be directly responsible for the content published by the other governmental authorities; however, it would be responsible for ensuring that the authorities maintain their information up to date. MfE would also be responsible for the information directly displayed on the site.

#### *Quantitative information*

For each type of quantitative information, we provide recommendations on the level of aggregation, frequency and timing of release, period covered, issuing entity, and delivery mechanism.

Our key general recommendations are:

- Information should be released at a sector activity level, following the taxonomy of Schedules 3 and 4 of CCRA 2002. Where this is not possible due to confidentiality issues, sector activities should be aggregated.
- There should be a higher frequency of release if data is collected more often than the current frequency of release (e.g. quarterly release of information on NZU transfers for removal activities).
- Data should be released as soon as practicably possible (e.g. preliminary emissions data could be released before EPA’s Annual ETS Report).
- Enhanced raw data should be made available through the NZ ETR. Such data should include calendar-year information on emissions or on carbon removal activities.

We found that no major additional reporting costs will accrue to market participants with reporting obligations as a result of our recommendations. However, some implementation costs will accrue to EPA, MfE, and MPI. A major cost will relate to extending the capability of the NZ ETR to host lower-level raw data and to allow reports to be generated.

#### **Information to be included on the NZ ETS master site**

##### *Information provided/ hosted by the EPA*

- Historical emissions
- Historical ETS activity data
- Current reports on historical information
- Transaction data

##### *Information provided/ hosted by the MfE*

- Projected emissions
- Estimates of marginal abatement costs
- Information on international
- Description of existing trading services
- Regulatory and compliance information
- Key dates/timelines in the NZ ETS compliance cycle

##### *Information provided/ hosted by the MPI*

- Historical and projected deforestation and afforestation
- Projected removals by registered post-1989 foresters
- Total forestry land registered (post-1989) and deforested (pre-1990)
- Uptake of deforestation offsetting
- Projected deforestation
- Age-class of registered post-1989 forests
- Tutorials on NZ ETS on-boarding
- Forestry mapping
- Other information

##### *All - EPA/MfE/MPI*

- Policy announcements
- A schedule of information release and key regulatory dates

*Qualitative information*

We recommend that policy and regulatory announcements should be made via the NZ ETS master site. This will ensure that market relevant information is published to everyone at the same time. We also recommend that, for major policy changes, an information release protocol is considered in the spirit of Section 30GA of CCRA 2002. Accordingly, policy objectives would be communicated five years in advance (on a rolling basis) and be reviewed on an annual basis.

# 1. Introduction, objectives and aims

---

The Ministry for the Environment (MfE) has commissioned us to analyse current information provision in the NZ ETS, and to provide recommendations for improving this provision so as to enhance NZ ETS price discovery and market transparency.

Price discovery and market transparency are essential for a well-functioning carbon market because they allow market participants to make informed decisions regarding their emissions abatement options. Adequate and timely information transparency is at the core of carbon market efficiency, as it underpins the quality and assuredness of price discovery. When market participants have adequate knowledge about the factors determining the NZU supply and demand and the factors affecting the actual trade between buyers and sellers, the price signal will be reliable and the market will be efficient.

## NZU price vs NZU value

In this paper we distinguish between the NZU price and the NZU intrinsic value, so it is important to clarify this distinction. Whereas the former relates to transactions observed on the market, the latter abstracts from active trading, and reflects NZU supply as determined by various ETS design elements (e.g. emissions cap, allocation rules, and linkage to international markets) and NZU demand as determined by the emissions abatement capabilities of market participants with compliance obligations (i.e. the participants' marginal abatement cost curves).

In theory, the NZU price and value should converge, but in practice they may be dissimilar due to market failures. For example, in the absence of an adequate oversight regime, a market player with a dominant position in NZUs could potentially distort the market by delaying NZU sale until closer to the compliance deadline, when it could trade at higher prices due to increased demand by other players with compliance obligations. Another possible failure is asymmetric information about NZU supply and demand (i.e. the ETS is not fully informed), which can leave market participants with quite a different basis to arrive at views about the trade-off they face with regards to abating another unit of emissions versus holding or buying NZUs. In both of these cases, the NZU market price can diverge from the intrinsic value.

Given that, by definition, an ETS has trading at its core, the price signal rather than the intrinsic value is what drives the market players' abatement and trading decisions. However, from a regulator's perspective, it is the intrinsic value of NZUs that underpins decisions about emissions reduction targets, because this value is linked to the participants' marginal abatement costs, which in turn determine the estimated economic cost of the ETS policy. To ensure that the trading incentives align with the policy objectives, minimising the gap between the NZU market price and intrinsic value becomes an important goal.

In this report we focus on the current and future NZU *prices* rather than *values* because our perspective is that of market participants who have to make trading decisions. Our

recommendations are aimed at bringing the NZU price more in line with its intrinsic value by improving the provision of information in the NZ ETS.<sup>2</sup>

## Objectives and aims

The objectives of this report are to assess and to provide recommendations on key NZ ETS information provision aspects that would allow market participants and other stakeholders to:

- understand the supply and demand fundamentals of the NZ ETS, both in the past and into the future;
- make the best possible forecasts about the (future) price of an NZU;<sup>3</sup>
- understand current and historical market activity, and
- factor in NZ ETS costs into their short-term and long-term decisions.

To achieve these objectives, the aims of this report are to assess:

1. What NZ ETS and carbon market information New Zealand ideally should be providing to the market, including:
  - identifying the status quo of information provision, including which parties currently hold this information and the extent to which it is made available, and
  - identifying the most appropriate level of aggregation for this data, taking into account commercial sensitivities of market participants as well as the need for effective market function.
2. How the information provision should look, including:
  - reviewing how the various types of information should be released. This includes frequency, timing/scheduling of release and mechanism of release.
3. How to manage the release of information, including:
  - identifying which parties are best placed to provide the information (for example government, market intermediaries etc.).

---

<sup>2</sup> We note that the MfE is currently pursuing a number of other streams of work that will contribute to minimising the gap between the NZU price and value. These include the wider NZ ETS review and the revision of the NZ ETS market governance.

<sup>3</sup> Generally, when we talk about future NZU prices we refer to future spot prices, i.e. prices at which NZUs can be traded for immediate delivery at some point in the future. Forward prices converge to spot prices upon the expiry of forward contracts.

## 2. Methodology and approach

---

To meet the objectives of the report, we use a mixed-method approach involving both primary and secondary research, and an approach for analysing the relevant NZ ETS information. We describe this in more detail below.

### 2.1 Primary research

In order to gain a better understanding of information requirements in the NZ ETS, we conducted semi-structured interviews and sent out questionnaires to a number of NZ ETS stakeholders. Our mixed approach to stakeholder engagement is due to the diversity of the stakeholders. For some stakeholders, our questions were more detailed and structured. In these cases, we deemed questionnaires to be the most efficient and cost-effective form of communication. Appendix 1 provides a list of the stakeholders we engaged with.

The questionnaires had the following objectives:

- Gain a better understanding of the current provision of *quantitative* data in the NZ ETS, as well as the necessary improvements to make to help market stakeholders make better forecasts about NZU price. These improvements are weighed against any associated increase in reporting costs and data sensitivity issues.
- Gain a better understanding of the current provision of *qualitative* data in the NZ ETS, as well as the necessary improvements to make to help market stakeholders make better forecasts about NZU price.
- Gain a better understanding of the current experience with buying and selling NZUs.

The questionnaires shared many common elements across the different types of market stakeholders, with some tailoring done to reflect the specific business operation needs. Appendix 1 includes the detailed questionnaires.

Each interview was tailored to reflect the different interests of stakeholders for participating in the NZ ETS. The aim of interviews carried out with policymakers and regulators, for example, was to clarify (i) how information relevant to the NZ ETS is collected, used, and published currently, and (ii) what assumptions are being used to make different forecasts. By contrast, the aim of interviews with carbon brokers was to gain a better view of the current market trends in the spot and forward markets, as well as future market developments. Appendix 1 includes the list of questions asked during our interviews.

## 2.2 Secondary research

In addition to interviews and questionnaires, we also (i) researched information currently being published on governmental sites, and (ii) analysed submissions provided by market stakeholders during the 2015/16 NZ ETS review,<sup>4</sup> particularly focusing on information provision issues. An overview of primary sources of information relevant to the objectives of this report is provided in Chapters 5.2 and 5.4, and an overview of information-related issues highlighted in the NZ ETS submissions is provided in Chapter 5.5. To inform our analysis of market-relevant information, we also undertook a scan of the academic and grey literature discussing the impact of unit supply and demand drivers and of policy announcements on market activity.

## 2.3 Information provision analysis

Our analysis focuses on the provision of both quantitative and qualitative information in the NZ ETS. We break down the quantitative data into four categories, two of which refer to fundamentals data and the other two to transactions data. The fundamentals data relate to emissions and carbon market design, whereas the transaction data relate to transaction information going through the NZ ETS tracking system or market platforms. By qualitative data, we mean announcements of policy and regulatory changes.

The analysis of quantitative data involved the following three main steps:

- Collation of a detailed schedule of NZ ETS-related quantitative information that is currently provided by different sources. Details included: type of information, source and the period covered, aggregation level, release frequency, time series frequency, and format (the filters).
- Systematisation of the detailed scheduled into a summary information schedule, providing for each type of information: the current sources, level of aggregation, frequency and timing of release, period covered, and delivery mechanism.
- For each type of information, drawing a recommendation against each filter, based on (i) the information required to make judgements about NZU price and market activity, (ii) costs accruing to market stakeholders, and (iii) commercial sensitivity issues.

---

<sup>4</sup> See <http://www.mfe.govt.nz/publications/climate-change/new-zealand-emissions-trading-scheme-review-2015-16-discussion-document>

### 3. Overview of NZ ETS

New Zealand passed the Climate Change Response Act 2002 (CCRA), which is administered by the Ministry for the Environment. The Act ratifies the Kyoto Protocol and the United Nations Framework Convention on Climate Change. In 2008, the CCRA was amended to provide for the implementation, operation, and administration of a greenhouse gas emissions’ trading scheme and sets out its principal legal framework.<sup>5</sup>

The purpose of the scheme is to support and encourage global efforts to reduce the emission of greenhouse gases by (a) assisting NZ to meet its international obligations and (b) reducing NZ’s net emissions of those gases below business-as-usual levels.<sup>6</sup>

The NZ ETS is governed by three agencies who share responsibility for the different pieces of the administration, operation, and policy choices relating to the ETS. These agencies are the EPA, MfE, and MPI.

#### 3.1 NZ ETS stakeholders

By stakeholders, we mean the broader group of agents that closely follow how the NZ ETS functions for regulatory, accountability, compliance or profitability purposes. Different NZ ETS stakeholders have different information requirements. Thus, understanding the stakeholders’ interest and objectives concerning the NZ ETS is crucial for decision making on how to improve price discovery and increase market transparency.

Table 1 illustrates different stakeholder groups in New Zealand and how they may use the information provided.

**Table 1 Stakeholder list and use of information**

Stakeholders	Use of information
<b>Policy makers and regulators</b>	
National and regional governments	Monitoring and enforcement
Regulators	Lead and contribute to regulatory practice and capability initiatives and maintain oversight of the scheme

<sup>5</sup> Climate Change Response (Emissions Trading) Amendment Act 2008.

<sup>6</sup> Climate Change Response Act 2002, section 3.

Stakeholders	Use of information
<b>Stakeholders with obligations under ETS</b>	
Entities with mandatory obligations (mandatory participants)	Identify current and future costs to enable better decision making
Entities with voluntary obligations (voluntary participants, such. post-1989 registered forestry holders) and downstream companies with option to opt-in) and entities voluntarily buying and cancelling NZUs.	Identify current and future costs to enable better decision making
<b>Financial intermediaries and stakeholders that may choose to join (and then face obligations)<sup>7</sup></b>	
Business and strategy consultants	Provide advisory on NZU price, trading opportunities, market rules, and risk management options  Provide aggregation services for carrying out trades
Carbon brokers and banks	Identify the carbon asset distribution in the market and design winning trading strategies
Carbon traders	Identify the carbon asset distribution in the market and design winning trading strategies
Non-registered forestry holders	Identify current and future costs to enable better decision making, explicit decision making on if to join
<b>Other stakeholders</b>	
Civil society	Scrutinise how the scheme is working and assess compliance by companies, information
Consumers/companies	Follow the dynamics of the NZU price, given that this price may be passed on to end users in certain sectors (e.g. energy)

<sup>7</sup> This includes voluntary participants.

Stakeholders	Use of information
NGOs/independent organisations	Provide information intermediary services
Asset managers	Quantify their carbon risk exposure, manage carbon assets and design innovative carbon trading products (options, futures, repos)
Investors	Assess and manage their carbon risk exposure
Credit rating agencies	Integrate carbon risk component into their corporate ratings
CSR and SRI professionals	Calculate carbon emissions benchmarks, identify best corporate performers and design climate performance indexes

**Source:** Sapere analysis based on role description as per EU ETS Company Database, Market analysis and carbon disclosure solution<sup>8</sup>

In this report, we focus on all types of stakeholders above except ‘other stakeholders’. We use ‘stakeholders’ and ‘market participants’ interchangeably; although, in most instances, we use ‘market participants’ to describe the activities of mandatory and voluntary participants, financial intermediaries, and entities that may join the scheme in the future.

### 3.2 Emitters and NZU demand

Emitters are in the forestry, energy, industry, liquid fossil fuels, synthetic gas, or waste areas. Currently, agriculture only has an obligation to report emissions, but not to surrender emissions. These participants, being a person or business that carries on an activity specified in Schedule 3 or 4 of the CCRA,<sup>9</sup> have several key obligations, including to:<sup>10</sup>

- have a holding account for surrendering, repaying, or receiving New Zealand units;
- collect prescribed data and information, and calculate emissions and removals about the activity, and
- surrender one NZU for each tonne of emissions,<sup>11</sup> except reduced liability sectors.

<sup>8</sup> See [https://www.carbonmarketdata.com/files/publications/EUETS\\_company\\_database.pdf](https://www.carbonmarketdata.com/files/publications/EUETS_company_database.pdf)

<sup>9</sup> This includes, for example, de-forestry pre-1990 forestland, importing coal, producing iron or steel, slaughtering ruminant animals, operating a disposal facility (Schedule 3), or owning post-1989 forestland or storing carbon dioxide after capture (Schedule 4).

<sup>10</sup> Sections 61-63 of CCRA 2002.

<sup>11</sup> See Section 63 of CCRA 2002 for the definition of a participant’s liability to surrender units to cover emissions.

## Liability to surrender units

Emitters with activities in the forestry, liquid fossil fuels, stationary energy, industrial processes, synthetic gases, and waste sectors have mandatory and unit liability obligations as from 1 January 2013. Agriculture is deferred from ETS entry indefinitely.<sup>12</sup> The surrender obligation may be met either in units or by paying \$25 per unit, or a mixture of both.<sup>13</sup>

## Participation by the forestry sector

When referring to the forestry sector, there are two categories of participation:

- pre-1990 forest land participation, and
- post-1989 forest land participation.

Owners of pre-1990 forestland received a one-off allocation of NZUs to offset some of the economic impacts of the NZ ETS, and they do not earn NZUs for increases in their forests carbon stock.<sup>14</sup> If pre-1990 forestland is deforested, the landowner (or a third party who has deforestation rights over the forest) automatically receives a mandatory compliance obligation under the NZ ETS.

Post-1989 forestland participation is voluntary and for that reason, holders of this forestland do not receive allocations of NZUs. Post-1989 forestland owners or holders of a registered forestry right or lease can apply at any time to register their post-1989 forestland into the ETS. The incentive for the foresters is to receive NZUs for their carbon stocks, which they can sell. However, they also have to surrender units for decreases in the carbon stock (e.g. due to harvesting or fire). If participants decide to deregister, they have to repay the units that were issued for that forestland.<sup>15</sup>

## International units have been phased out

The ETS had initially accepted Kyoto units and NZUs as sufficient to meet the surrender obligations. These included Certified Emissions Reductions, Emissions Reduction Units<sup>16</sup> (except from nuclear energy projects), and Removal Units (forestry sector net removals). However, the Government restricted the acceptable class of units to NZUs from 31 May 2015, due to uncertainties within Kyoto markets including “decisions in the international climate change negotiations in Doha [and] restrictions on NZ’s ability to trade any international Kyoto units after 2015.”<sup>17</sup>

---

<sup>12</sup> Leining and Kerr (2016).

<sup>13</sup> Section 178A(2) of CCRA 2002.

<sup>14</sup> See <http://www.mfe.govt.nz/sites/default/files/media/Climate%20Change/nzets-review-forestry-technical-note-final.pdf>

<sup>15</sup> MPI (2015).

<sup>16</sup> Except from nuclear energy projects and other banned unit types.

<sup>17</sup> See <https://www.beehive.govt.nz/release/decisions-kyoto-protocol-emission-units>

## NZUs are earned or allocated

NZU issued by the New Zealand government are currently the only compliance instrument accepted to meet obligation under the NZ ETS. NZUs are either earned or allocated to participants. NZUs are freely allocated to industrial sectors in line with six principles that are crafted to insulate some types of businesses from disproportionate costs. These principles aim to support the producers' international competitiveness and prevent leakage of production and emissions abroad.<sup>18</sup> Units are earned for carbon removal activities in the (post-1989) forestry and non-forestry sectors.<sup>19</sup>

In 2015, the Government allocated 4.6 million NZUs and transferred 8.5 million NZUs for carbon removal activities (units 'earned'), which compares to a total of 20.4 million NZUs surrendered for compliance. This suggests that the annual supply of NZUs meets only a portion of the annual demand.

## 3.3 Compliance cycle

The figure below illustrates the NZ ETS compliance cycle.

The key timelines in the cycle are as follows:

- Market participants must notify the EPA about their regulated activities within 20 working days from the activity start date. The notification is made via the central Registry. In case of deforestation of pre-1990 forestland, they must notify MPI.
- Participants must complete emissions returns by 31 March for the ETS activities carried out in the previous calendar year (1 Jan – 31 Dec), with some exceptions.
- Emissions returns for other removal activities (as per Part 2 in Schedule 4 of the Climate Change Act 2002) can be provided on a quarterly basis, within 20 days after 31 March, 30 March or 30 September.<sup>20</sup>
- Reporting by post-1989 foresters.
- The mandatory emissions return period for post-1989 forestry is of five years. Within this period, emissions returns may be submitted under certain circumstances by 30 June or within six months from the end of the mandatory emissions return period.

---

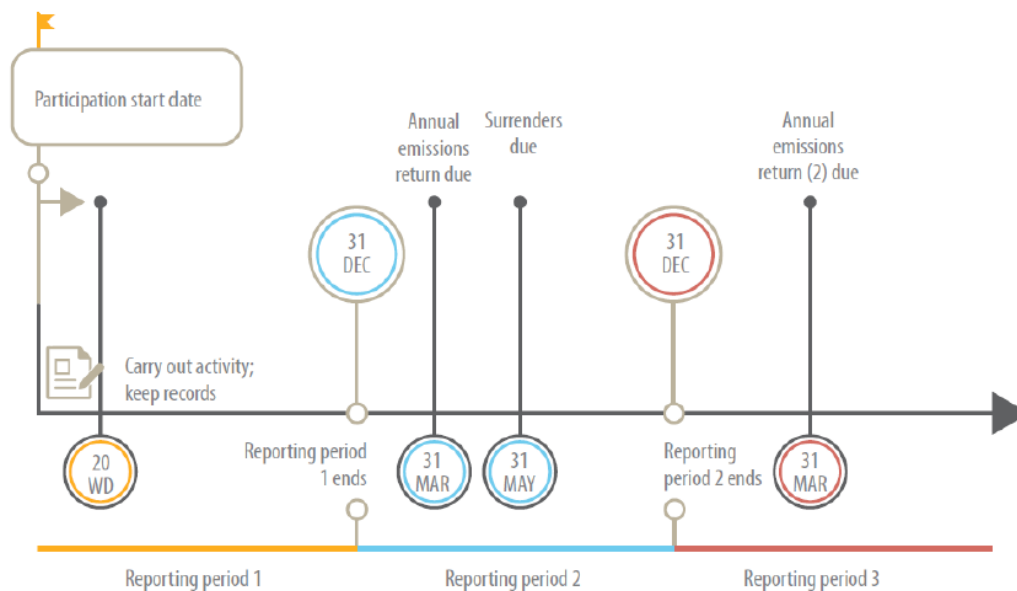
<sup>18</sup> The principles are that the government will attempt to maintain broad equity of treatment between and within sectors; seek to avoid long-term regrets in designing and implementing short-run policies; make the transition to the ETS more manageable by being relatively generous in the first commitment period; not provide assistance to firms whose profits will be largely unaffected by the introduction of an ETS; favour assistance via gifting units as opposed to a progressive obligation, but will leave open the possibility of using a progressive obligation in some sectors; and move to zero assistance over time for overall economic efficiency, equity, and administrative reasons. See: <http://www.mfe.govt.nz/publications/climate-change/framework-new-zealand-emissions-trading-scheme/5-how-emission-units-are>

<sup>19</sup> See Schedule 4 of CCRA 2002.

<sup>20</sup> Note that reporting entities are able to apply for a 20 working day extension to the emission return submissions deadline, and that amendments may be made after the returns deadline to correct inadvertent errors in reporting.

- Generally, post-1989 foresters have the option to provide voluntary annual returns within a five-year period. Overall, for the five years, the total NZU transferred is the same as if the reporting were mandatory.
- After surrendering the emissions return, the Registry calculates the number of NZUs that a participant must surrender or is due to receive. Surrendering of NZUs must be done by 31 May each year.
- For non-forestry sectors receiving free allocation, the deadline for applying for NZUs is 30 April and the NZUs are allocated as soon as practicable, typically within two weeks. For removal activities, entitlements are transferred within 20 days from the emissions returns. Thus, given that emissions returns for removal activities can be submitted throughout the year as per above, entitlement transfers also occurs throughout the year.
- Finally, another key date relates to the EPA’s release of emissions data. Emissions data is collected in the third quarter of the calendar year, and final data becomes available on 1 July. The current format of the release is an annual ETS report in pdf.

**Figure 1 NZ ETS compliance cycle**



**Source:** EPA (2015d)

## 3.4 Trading arrangements

### Price management

It is important to note that New Zealand does not have a national “cap” on emissions, distinguishing it from true “cap-and-trade” schemes.<sup>21</sup> This means that the NZU price is the key mechanism for incentivising behaviour to reduce emissions. Before the 2015 restrictions on the use of international units, New Zealand was a price-taker given its large exposure at the time to international unit trade.<sup>22</sup> Currently, the price of NZUs is determined by the internal supply and demand of such units.

Prior to 2009, the NZ ETS had no restrictions in terms of a cap or floor on the price of an NZU. Legislative amendments in 2009 and 2012 introduced a fixed price option of \$25 per tonne of emissions and extended this indefinitely. There are otherwise no restrictions on the price of the NZU.

### NZU transfer

The legislative framework expressly describes how individuals and businesses may apply to have NZUs transferred (or rather, application procedures to transfer NZUs are referred to in the legislation and regulations that enable the Registrar of the NZEUR to follow the registration procedure set out in the Act – including certain administrative checks and verifications relating to NZUs and the legal identity of the parties involved – before recording the transaction on the searchable NZU register).<sup>23</sup> This includes the administrative details, such as features about account holders that must be searchable, including matters like the total quantity of NZUs issued in a particular year, total holdings and NZUs transferred nationally and internationally, and so on.<sup>24</sup>

### Trading platform

However, it is notable that the framework is otherwise silent regarding rules about the marketplace in which suppliers and emitters exchange NZUs. This has given rise to a few third parties who act as ‘price matchers’, serving as a conduit between buyers and sellers in the NZ ETS marketplace. Derivatives traded on securities exchanges and derivatives offered to retail investors are regulated under the Financial Markets Conduct Act (FMCA). These ‘price matchers’ do not have specifically designed regulatory requirements under the FMCA regime, so there are limited disclosures and other regulatory requirements that NZU traders need to comply with.

---

<sup>21</sup> From its inception, the NZ ETS was not designed to place a quantity limit on domestic emissions; instead, it was designed to operate nested within the international Kyoto cap. However, even though there is no ‘hard’ cap, there are GHG emission reduction targets as follows: By 2020: 5% reduction from 1990 GHG levels (unconditional target). By 2030, 30% reduction from 2005 GHG levels (equivalent to 11% reduction from 1990 GHG levels) (Nationally Determined Contribution of New Zealand), and by 2050 a 50% reduction from 1990 GHG levels.

<sup>22</sup> See, for example, Ormsby and Kerr (2016).

<sup>23</sup> See, for example, Section 21AA of CCRA 2002 and the Climate Change (Unit Register) Regulations 2015.

<sup>24</sup> Section 27 of CCRA 2002.

## 4. Information requirements and transaction costs

---

Information transparency is essential for a well-functioning NZ ETS because it enables regulated entities to make informed decisions regarding their emissions abatement options. Fundamentally, this decision is about trading NZUs on the market or undertaking abatement activities. Information that leads to an understanding of NZU price is thus key to ensuring that regulated entities are able to achieve compliance with their emissions at minimum costs. When this is achieved, the carbon market is efficient because it enables regulated entities to comply in a cost-effective manner.

Our primary focus is on fundamentals data and the ways in which provision of this information can be improved in the context of the NZ ETS. However, because the analysis of information transparency would be incomplete without a discussion of transaction data like volumes and price, we include this in our assessment as well. Fundamentals-related data is especially important for making forecasts of NZU prices, whereas transaction data provides information about current prices.

A well-functioning carbon market would ideally have timely and accurate information about emissions levels and some sense about the unit holdings of market participants. The word ‘timely’ is key: information releases that cause abrupt and large price movements reduce the market participants’ ability to make forecasts about unit prices and therefore about the costs of abatement. Infrequent and lagged data releases could lead to large surprises and market adjustments, if this data differs markedly from the expectations of market participants.

Finally, complete information transparency is not necessarily desirable. In addition to issues relating to data confidentiality (such as commercial sensitivity and privacy issues)<sup>25</sup> and meaningfulness,<sup>26</sup> reporting information that is not useful for decision-making carries unnecessary costs. At the same time, ensuring an adequate level of information can relieve market participants of other ‘transaction costs.’ We discuss these in more detail in Section 4.4.

### 4.1 Fundamentals (quantitative) information

In carbon markets, fundamentals information relates to the drivers of unit supply and demand, and therefore to the drivers of unit price. In this section we focus on the quantitative drivers of supply and demand – i.e. the drivers that relate to the measurement of emissions, and of unit supply and demand in the market. We discuss the relationship between qualitative data and unit price in the subsequent section.

For the purpose of our study, we extend the definition of market ‘fundamentals,’ which typically refers to energy prices, weather conditions and economic conditions. Our

---

<sup>25</sup> We discuss these in Section 6.2.

<sup>26</sup> E.g. what level of data aggregation provides meaningful insights.

interpretation of carbon market fundamentals is broader, and includes the drivers of unit supply and demand that arise due to conditions that can be either internal or external to the market.

In particular, when trying to unpick these fundamental drivers of emission unit prices, we distinguish between:

- drivers that affect the level of emissions and carbon removals, and
- drivers that relate to carbon market design elements.

Whereas the former relate to drivers that are exogenous to the carbon market, the latter concerns market characteristics that are governed directly by carbon market regulators. The drivers relating to carbon market design can significantly influence the perception of market participants concerning the level of NZU over- or under-supply at present or in the future. Such drivers include the allocation method (including the ability to earn units), restrictions on inter-temporal flexibility (e.g. banking) and use of international units, and information provision.

Although *both* types of drivers affect the supply and demand of NZUs (and, therefore, the NZU price) – in other words, both types of drivers are ‘fundamental’ – it is the second type that carbon market regulators can directly control to improve unit price discovery.

## Drivers of emissions and carbon removals

An increase in emitting activities (i.e. of emissions) by entities regulated under a carbon market implies that a higher number of NZUs must be sourced and surrendered in order to ensure compliance. By contrast, a rise in carbon removals increases the available supply of NZUs. The main drivers of emissions and carbon removals include economic activity (e.g. boom or recession), price levels (e.g. oil, dairy or timber prices), weather patterns, available abatement options, and overlapping emissions reduction policies. Appendix 2 describes these drivers in more detail.

For the purpose of this report, highlighting the drivers of emissions and carbon removals is important because these drivers are reflected in the assumptions used by public authorities to make forecasts about emissions and carbon removals. Information on these assumptions is no less important than the forecasts themselves.

## Drivers relating to carbon market design elements

For the purpose of our study, we consider the following drivers relating to the way in which carbon market design elements influence the unit demand and supply:

- **The cap.** The cap level of an ETS has a direct consequence on the unit supply and demand dynamics, and therefore on the unit price signal. As mentioned previously, the NZ ETS does not have a conventional cap, and the relationship between emissions controlled under the ETS and total New Zealand emissions is unclear. Because of the uncertainty regarding the link between the ETS emissions reduction target and the NZ-wide target, NZU reflect *expectations* about future policy stringency. As such, although the domestic unit price can be useful for assessing market expectations about politics, it reveals little information about the cost of abatement (or the difficulty of mitigation), and therefore has limited value as a long-term price signal.

- **Sector coverage.** This driver is particularly important in the NZ context, given the inclusion of forestry in the NZ ETS. In the absence of a fixed cap, the transfer of NZUs for carbon removal activities has a direct impact on NZU supply in the market.
- **Unit allocation.** Allocation options include granting units based on historical emissions ('grandfathering'), on levels of output or input, an environmental performance benchmark, or a forestry-related benchmark. Unit allocation methods relate to the sector-level supply and demand drivers that are specifically linked to the design of the carbon market. In New Zealand, for example, highly emissions-intensive industries receive 90 percent of the allocative baseline, whereas moderately-intensive activities – 60 percent<sup>27</sup>. The rules for sector-level allocation have a direct bearing on NZU demand and supply. In our study, the focus is not on whether allocation should be free or via auctions, but rather – on whether the regulatory environment regarding sector-specific allocations is transparent and predictable. In other words, are the rules for issuing units at the sector level clear and certain enough to be able to make forecasts about unit allocations? In the context of the NZ ETS, a special case of NZU issuance relates to units 'earned' for carbon removal activities (also referred to as 'entitlements').<sup>28</sup> The bulk of these activities take place in the forestry sector, where forestry participants earn units for carbon sinks on post-1989 registered forest land.<sup>29</sup> Singling out these earned units is important because they constitute a great proportion of unit supply in the NZ ETS.<sup>30</sup>
- **Deforestation offsetting.** In the NZ ETS, a pre-1990 forestry participant can offset their liability for deforestation by establishing a new equivalent forest elsewhere instead of surrendering NZUs. In 2014, for example, emissions reported from deforesting pre-1990 forest land amounted to 6.7 million NZU,<sup>31</sup> so a shift away from surrendering units to using offsetting can significantly impact the NZU demand profile.
- **Alternative programs that explicitly increase the supply of units in the ETS.** In the context of the NZ ETS, a relevant program of this kind is the Permanent Forest Sink Initiative (PFSI), which targets owners of land that will be kept under forest cover indefinitely. Under the PFSI, owners of permanent forests received NZUs, which they can sell into the market.
- **Inter-temporal restrictions.** Inter-temporal restrictions refer to any limitations that carbon market regulators may impose on the market participants' ability to carry old units forward ('banking'), or to borrow units from the future ('borrowing'). Because there are no borrowing provisions in the NZ ETS, we focus on banking. Information about banked units is important because it gives market participants an understanding of the extent to which the market is over or under-supplied. This, in turn, helps

---

<sup>27</sup> See Leining and Kerr (2016).

<sup>28</sup> As described in chapter 2.4, rather than 'allocated,' the units for carbon removal activities are distinguished as being 'earned'.

<sup>29</sup> Carbon sinks can be achieved through afforestation, deferral of tree harvest, and changes in forest management to maximise carbon uptake.

<sup>30</sup> In 2015, for example, the number of units transferred for carbon removal activities was of 8,522,341 units (the bulk of which was to the forestry sector), whereas total allocation was of 4,644,021 units (EPA, 2015a).

<sup>31</sup> See EPA's 2014 Emission Trading Scheme Report.

participants place a price on units. Information about the level of banking can be derived from information on unit allocation and surrender. Information about the units held in accounts relative to liabilities under also provides insight into the size of the unit bank. In the NZ ETS, the ability to surrender cheap international units (before the 2015 Kyoto de-link) led to massive banking of NZUs<sup>32</sup> to the extent that the bank is currently sufficient to cover more than three years of gross emissions in the ETS sectors (under full obligation).<sup>33</sup>

- **Restrictions on the use of international units.** The demand for domestic units is directly influenced by the availability of any compliance substitute instrument like offset credits. The fewer the limitations on the use of international units, the lower the potential demand for domestic units depending on the relative price between international and domestic units. For the NZ ETS, Diaz-Rainey and Tulloch (2016) found that, before the Kyoto units were banned for compliance, the major determinant of NZUs was imported units.<sup>34</sup>
- **Voluntary cancellation** of units by entities that are not under a mandatory ETS obligation. Such voluntary participation is largely driven by the entities' corporate responsibility objectives and/or reputational benefits.
- **Other information**, such as the number of participants provide further insights into the potential demand and available supply, and the level of market liquidity.

Knowing the NZU allocation (including earned units), the number of banked NZUs and the potential demand for international units, one can derive the net NZU position<sup>35</sup> in the market by subtracting these from the total NZU demand. The net NZU position measures the extent to which regulated entities are short (or long) of NZUs; in other words, it measures the extent to which the market is over- or under-supplied. Having access to information that would better allow estimating the net NZU position (at a suitable level of aggregation) is thus important to making judgements about the NZU price.

Figure 2 below illustrates how the drivers for emitting activities and the drivers relating to carbon market design interact to determine the net market position.

Based on the analysis above, it can be concluded that, in order to make forecasts about the NZU price, policymakers and market participants rely on information pertaining to:

- emissions trends based on the level of emitting activities (driver 1 above), and
- net position in the market based on carbon market design elements (driver 2 above).

---

<sup>32</sup> Some of these NZUs may have been banked anyway to cover future harvesting obligations by post-1989 forest owners. Also, the current bank may (to some extent) be the result of high transaction costs faced by small post-1989 forest owners when trying to sell their small volumes of NZUs.

<sup>33</sup> See Leining and Kerr (2016).

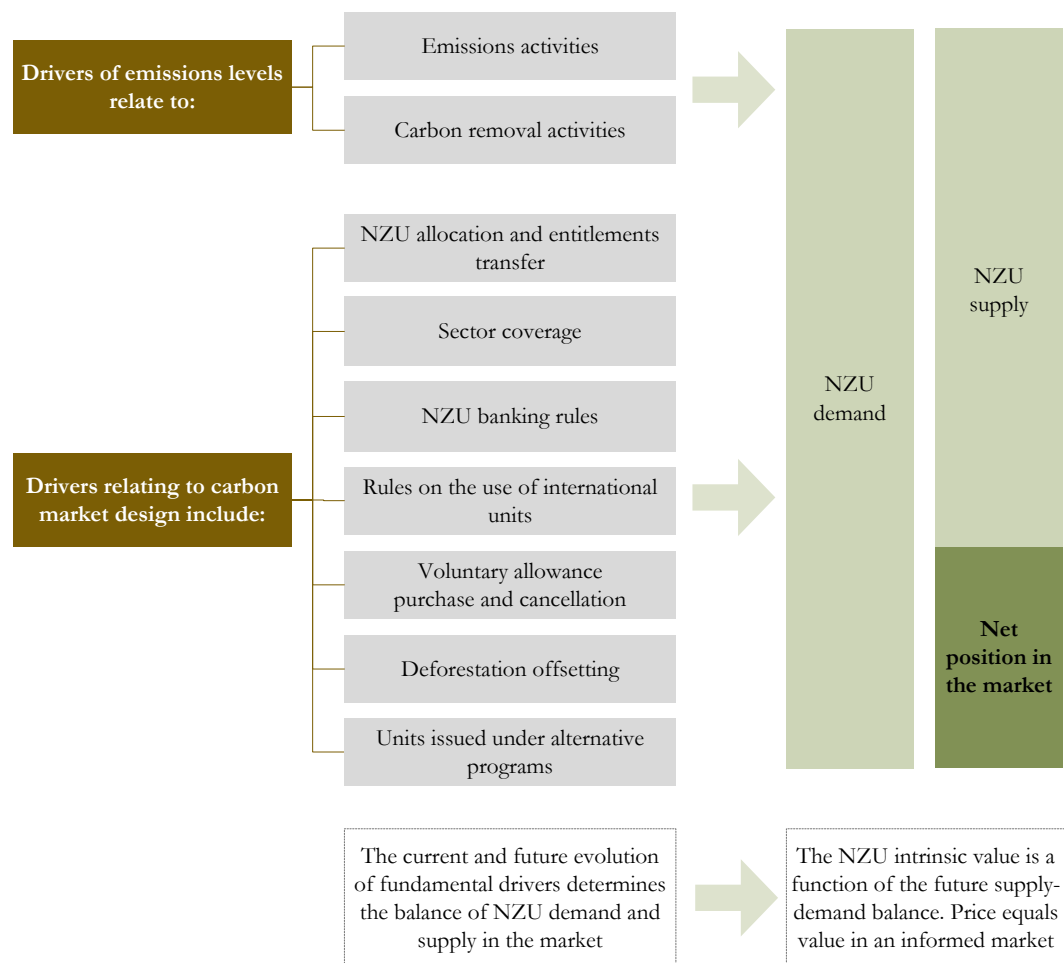
<sup>34</sup> This contrasts with the case of the EU ETS, where studies have found that the key determinants of allowance prices has been energy prices, weather and economic conditions.

<sup>35</sup> Here, by 'net NZU position' we mean the number of NZUs that entities with a compliance obligation under the NZETS have in excess or short of their overall compliance needs.

For the purpose of analysing information provision to the market, this leads our focus for fundamental market data to include:

- what the NZ official sources of sector-level emissions forecasts are, and
- what information that is currently provided in the NZ ETS with regards to NZU allocation and transfers for carbon removal activities, use of international units, NZUs surrendered, and voluntary cancellation.

**Figure 2 Fundamentals data – the drivers of NZU demand and supply<sup>36</sup>**



<sup>36</sup> Note: in the diagram, the market is shown to be in under-supply, although the same drivers can lead to an over-supply.

## 4.2 Qualitative information

For the purpose of our study, by ‘qualitative’ information, we mean the announcements publicly made public authorities (and particularly MfE, EPA, and MPI), which can have a material impact on the NZU price and on the ability of NZ ETS market participants to make judgements about the future NZU value.

The fact that the regulatory framework can change over time is a major source of uncertainty in an ETS with long-term emissions reduction objectives. The uncertainty largely stems from features relating to the cap-setting process; however, changes to other design elements like mode and rules of allocation,<sup>37</sup> surrender obligations or reporting requirements can also have significant effects. The experience of the EU ETS suggests that announcements concerning allocation and actual emissions in particular can have a significant impact on the market.<sup>38</sup>

The question of improving the release of qualitative information is to a large extent a question of managing the market’s *expectations* about policy and regulatory changes. The better the release of material information is managed, the smaller the element of ‘surprise’ at the time of announcement, and thus the lower the shock on the market price. The market would benefit from government adopting a clear approach for releasing information and announcements with impact on the NZ ETS.

## 4.3 Information requirements in the context of the forestry sector<sup>39</sup>

Here we focus on forestry given (i) the large share that this sector has out of total NZU supply,<sup>40</sup> (ii) the incentives faced by forestry to change behaviour in response to prices, and (iii) the great role that the NZU forestry may play in helping New Zealand meet its international climate change obligations and reduce carbon emissions below business-as-usual levels. To date, many eligible forests have not yet joined the NZ ETS: of 645,575 hectares of eligible land, 53 percent has not been registered.<sup>41</sup> To encourage forestry participation, providing reliable information needed to forecast the NZU price, and ensuring policy certainty are essential.

### The NZU price

NZU price is an important determinant of forestry participation because it affects afforestation and deforestation decisions. In the NZ ETS, studies suggest that some

---

<sup>37</sup> E.g. a recent study by Koch et al (2015) suggests that following the announcement of a ‘backloading’ decision to postpone the auctioning of 900 million allowances in the third commitment period of the EU ETS the market reacted with a 23 percent decline in price over a seven-day event period.

<sup>38</sup> For example, the 2006 announcement by the European Commission that verified emissions were 4% less than the yearly allocation (and therefore much less than the market’s expectations of emissions levels) led to a decline in the EUA price by almost fifty percent in two days. See Ellerman et al (2007).

<sup>39</sup> Note that policy certainty and reliability of carbon price forecasts are issues of relevance to all sectors.

<sup>40</sup> See Figure 6 in EPA’s 2015 Facts and Figures report.

<sup>41</sup> EPA, 2015 Facts and Figures report.

afforestation in 2011 may have been in response to the high ETS price at the time, and that the collapse in prices from mid-2011 inhibited forestry investment.<sup>42</sup>

Price volatility is also an issue, especially for smaller forest owners.<sup>43</sup> Although large-scale forest owners may be able to cope with large price fluctuations, small-scale forest owners may not be as resilient. This is because large-scale foresters are more likely to have forests of a varied age-class, which allows them to repay harvest liabilities with NZUs received for young forest sequestration.<sup>44</sup>

### **Policy uncertainty**

Interviews carried out as a part of a 2011 study by Motu found that people involved in the forestry sector were confident that if policy uncertainties would be resolved, afforestation would increase significantly.<sup>45</sup>

Addressing policy uncertainties is particularly important for encouraging participation by small foresters – large-scale forest owners are likely to be better equipped to deal with uncertainties. In the face of policy uncertainty and unreliable NZU price forecast, banking of NZUs is likely to increase, thereby affecting the market liquidity.

Information releases that cause abrupt and large price movements reduce the ability of market participants to make reliable business plans. Timely and clear policy announcements, for instance about the future issuance of NZUs and the possible linkage to international markets will better enable businesses to make forecasts and better long term decisions.

## **4.4 Transaction costs**

Transaction costs arise from the exchange – not production – of goods and services. High transaction costs are a problem to the extent that the price received by sellers in a market is depressed and the price paid by purchasers is driven upwards. This means that transaction costs can make otherwise profitable trades unattractive and reduce the amount of trading, and thus reduce the gains from trade.<sup>46</sup> This creates market inefficiencies. OECD (2010)<sup>47</sup> writes:

*Polluters will only seek to trade if the gains from trade are sufficiently large to cover the transaction costs of searching for trading partners and entering into agreements.*

In a NZ ETS review from 2011, it was found that there was a “lack of market and regulatory certainty, resulting in higher transaction and compliance costs for ETS participants”.<sup>48</sup> Although many of the transaction costs incurred by market participants are a direct result of

---

<sup>42</sup> See Karpas and Kerr (2011).

<sup>43</sup> Prices can become volatile in the face of policy uncertainty and also when reliable fundamental information is absent or difficult to access.

<sup>44</sup> See Leining and Kerr (2016).

<sup>45</sup> See Karpas and Kerr (2011).

<sup>46</sup> See Stavins (1995).

<sup>47</sup> See OECD (2010).

<sup>48</sup> See MfE (2011).

an ETS policy design (such as regulatory complexity), there is often a close linkage between problems with information provision and transaction costs.

For the purpose of our study, transactions costs borne by market participants include search and reporting/compliance costs.<sup>49</sup>

Search costs are incurred when a market participant expends resources on finding market price distribution, fundamentals information and counterparties to trade. A lack of readily available fundamentals – and price information, and trading partners may result in lower trade and lower market participation.

Reporting costs arise when market participants have to comply with the regulating bodies' and service providers' information requirements. This includes requirements in relation to the scope, type and form of data collected.

Participants interviewed under the most recent evaluation of the ETS found that there was a lack of information and lack of clarity around the reporting required, which in turn made it difficult to comply with the regulatory requirements under the NZ ETS. This was especially the case for small scale forest owners or businesses that lack extra resources. The evaluation also found that a number of participants in the forestry sector rely on industry associations and consultants to keep them up to date with requirements, rather than using the information provided by the Government.<sup>50</sup>

Transaction costs incurred by the market participant can to some extent be reduced with the provision of accurate and timely information. This is primarily because information provision can decrease uncertainty and complexity. Reporting and compliance costs could be lowered with the provision of clearer and more user friendly information.

Perhaps the most obvious transaction cost that can be reduced with provision of information is search costs. For instance, the use of intermediaries – such as broker or consultancy services – may in many cases help absorb search costs as they can provide information about potential trading partners and available price offers.<sup>51</sup> Another way that search costs can be minimised is if information can be found in a single place, e.g. one portal that provides relevant information or links through to information hosted elsewhere.

---

<sup>49</sup> This topology is based on Stavins (1995) and Sin et al (2005) Negotiation costs (such as time and/or fees for brokerage, financial, legal and insurance services) and validation costs (whenever there is a concern about the validity of trade) are other transaction costs incurred by market participants. However, these are out of scope of this report as they are more related to the governance of the scheme.

<sup>50</sup> See MfE (2016a) and (2016b).

<sup>51</sup> However, although the search cost is lowered, it is somewhat offset by the market participant paying a brokerage fee.

## 5. Current information provision in the NZ ETS

---

This chapter provides an overview of the different agencies providing information with relevance to NZ ETS market participants. This information is currently provided by many sources and on different websites. This resonates with some of the comments provided during the 2015/16 NZ ETS consultation, and which raised the lack of a central information platform as an issue affecting participation.

### 5.1 Requirements under the legal framework

The legal framework of particular relevance to this report is Section 89 and 99 under the Climate Change Response Act 2002 (CCRA), and the Official Information Act (OIA) 1982.

Section 89 outlines details of information that EPA need to publish. Most of this information is in a highly aggregated form. Examples include: “the total number of units surrendered” or “the total number of New Zealand units transferred for removal activities”.<sup>52</sup>

In terms of timing of release, EPA is required to publish the information as soon as practicable after the end of the reporting year (Section 89 (2a)). A reporting year means a 12-month period starting on 1 July of one year and ending with the close of 30 June of the following year (Section 89(2a)).

Section 89(3) covers confidentiality issues. Confidentiality issues are connected to emissions data by sector activity (as per Schedule 3 of CCRA), the quantity of removals by sector activity (as per Schedule 4 of CCRA) and NZUs allocated. EPA is not required to release this information if EPA “is satisfied that publishing the information would result in the disclosure of a participant’s individual emissions or an eligible person’s own allocation”. This may be the case, for example, if a sector activity is represented by only a few entities; in this case, sector activity data could be easily mapped back to the individual entities.

Section 99 refers to the obligation to maintain confidentiality. Before releasing information in regards to NZ ETS, government officials must always take into account the obligations under this section.

The OIA has the overarching principle of “...information shall be made available unless there is good reason for withholding it” (Section 5). The Act states that withholding of information may be necessary to protect privacy issues, trade secrets or if it is likely that the information would prejudice the commercial position of the person who supplied or who is the subject of the information (Section 9). Any person may request a department or Minister of the Crown or organisation to make information available to her or him.

---

<sup>52</sup> For more information of what information that EPA is required to publish, see: <http://www.legislation.govt.nz/act/public/2002/0040/latest/DLM1662654.html>

## 5.2 Sources of primary information

This section provides an overview of government-provided information that is available with respect to the New Zealand Emissions Trading Scheme and climate change data generally, summarises who releases it, and records the mechanism and frequency of release.

There are seven key government agencies that publish or release information that relates to climate change policy initiatives.

**Table 2 Key government agencies**

Agency	Type	Category
Environmental Protection Authority	Emissions trading scheme	ETS
Ministry for the Environment	GHG emissions and removals and environmental reporting	Emissions
Ministry for Primary Industries	Emissions Trading Scheme - Forestry data	ETS
Ministry of Business, Innovation, and Employment	Energy emissions data	Emissions
Statistics New Zealand	GHG intensity and emissions	Emissions
National Institute of Water and Atmospheric Research (NIWA)	GHG measurement and modelling	Science
Landcare Research	GHG science and measurement	Science

**Note:** NIWA and Landcare Research do not release primary information for the purpose of the NZ ETS

The EPA is the primary source of ETS-specific information. Its website presents the current class of publicly available information. Other agencies hold and release a broader category of information about (a) greenhouse gas emissions and (b) climate change research, relevant, to a greater or lesser extent, to forecasting aggregate trends in emissions by sector or industry.

Overall, there appears to be no central repository, entry-point, or road-map to NZ ETS and climate change policy.

## 5.2.1 Environmental Protection Authority

The EPA provides information in five main categories - carbon market information, ETS reports, voluntary NZU cancellations, Ministerial issuance directions, and the true-up process.<sup>53</sup>

### Carbon market information

Carbon market information is provided on transaction trends, NZUs transferred, transactions by volume and historical information about each. This information is available on the EPA website, and includes:<sup>54</sup>

- transaction trends;
- units transferred;
- transactions by volume;
- historical information, and
- emissions reported.

### ETS Reports

There are four subcategories of ETS reports. Generally, these are published annually online in pdf format. The Annual ETS Report is published in line with section 89 of the Climate Change Response Act 2002 and the Synthetic Greenhouse Gas Levy Report is issued under section 250 of that Act. The ETS Facts and Figures and the Emissions reported categories are produced using information taken from these reports and published in a different format for accessibility.

### Voluntary NZU cancellations<sup>55</sup>

Individuals may voluntarily cancel emissions units in order to, for example, offset emissions. A subset of these individuals voluntarily opts to have information about cancellations published.

### Ministerial NZU issuance directions<sup>56</sup>

From time to time, the Minister for Climate Change directs the Registrar of the NZETR to issue NZUs to the Crown holding account. This occurs under section 68 of the Climate Change Response Act 2002.

---

<sup>53</sup> Policy information about the true up process under the Kyoto Protocol and changes in the types of units acceptable for submission under Commitment Period 2, 2013-2020.

<sup>54</sup> See [http://www.epa.govt.nz/e-m-t/reports/carbon\\_market/Pages/default.aspx](http://www.epa.govt.nz/e-m-t/reports/carbon_market/Pages/default.aspx) and [http://www.epa.govt.nz/e-m-t/reports/ets\\_reports/Pages/emissions\\_reported.aspx](http://www.epa.govt.nz/e-m-t/reports/ets_reports/Pages/emissions_reported.aspx)

<sup>55</sup> See <http://www.epa.govt.nz/e-m-t/reports/Pages/Voluntary-unit-cancellations.aspx>

<sup>56</sup> See <http://www.epa.govt.nz/e-m-t/reports/Pages/Ministerial-Issuance-Directions.aspx>

## 5.2.2 Ministry for the Environment

MfE hosts a range of guidance and policy information about climate change, how it could affect NZ, how NZ is adapting, reducing greenhouse gas emissions, reporting greenhouse gas emissions, and tracking greenhouse gas emissions.

### Greenhouse gas emissions and removals

One key type of information hosted captures historic and project greenhouse gas emissions and removals on an aggregated sector-level basis. The two key sources of information are:

- MfE website on New Zealand's net 2020 position,<sup>57</sup> and
- The NZ Greenhouse Gas Inventory.<sup>58</sup>

### National communications and biennial reports

MfE also produces a number of other reports on NZ's progress towards meeting internationally-agreed climate change commitments. National communication and biennial reports summarise NZ's domestic greenhouse gas emissions profile, climate change policy measures, and progress in implementing NZ's UNFCCC and Kyoto Protocol obligations.<sup>59</sup>

### Voluntary corporate reporting

MfE provides guidance on voluntary corporate reporting of emissions but does not provide publically available data.

### Tracking greenhouse gas emissions

#### *Mapping land use*

There is a general description of how the MfE maps with satellite imagery and aerial photography changes in NZ land-use using the six UNFCCC categories of forest land, cropland, grassland, wetlands, and settlements.

#### *Mapping forest carbon and measuring soil carbon*

MfE measures carbon in NZ forests and carbon stock changes in soil to keep track of greenhouse gas emissions and forest removals. It provides access to forest, soil, and LiDAR (Light Detection and Ranging) data for ecological research, forest monitoring and other purposes.

---

<sup>57</sup> See <http://www.mfe.govt.nz/climate-change/reporting-greenhouse-gas-emissions/latest-2020-net-position>

<sup>58</sup> See <http://www.mfe.govt.nz/publications/climate-change/new-zealands-greenhouse-gas-inventory-1990%E2%80%932014-snapshot>

<sup>59</sup> See: <http://www.mfe.govt.nz/climate-change/reporting-greenhouse-gas-emissions/nzs-national-communication-and-biennial-report>

## Policy and regulatory information

Guidance is provided to local governments, regions, and schools about ways to prepare for climate change.<sup>60</sup>

### 5.2.3 Ministry for Primary Industries

MPI is responsible for administering the forestry aspects of the ETS. MPI provides information to MfE and EPA regarding forestry participation (include area registered/deforested), compliance and unit entitlement and surrender forecasts. MPI summarises high-level information about climate change policy and MPI's role, targeted at forestry owners with guidance on registering and managing ETS forest land obligations on MPI's ETS online transaction system. There are descriptions of policy initiatives like the Permanent Forest Sink Initiative and the Biological Emissions Reference Group. All data and ETS related information is linked to the MfE or EPA datasets outlined above.

### 5.2.4 Ministry of Business, Innovation, and Employment

MBIE is responsible for reporting on annual emissions from energy and industrial processes. These emissions take two forms. Combustion emissions occur when fuel is burnt to produce useful energy. Fugitive emissions result from producing, transmitting, or storing fuels, or non-productive combustion (i.e. flaring gas).

Information is compiled in an annual Energy Greenhouse Gas Emissions publication.<sup>61</sup> At the time of writing, this publication is for the years 1990-2013 only. The annual emissions data is for 1990 to 2015. Quarterly electricity and liquid fuel emissions data tables are complete to December 2016.<sup>62</sup>

MBIE's cites as its source the corporate data supplied voluntarily to the MfE. This means it is not necessarily comprehensive.

### 5.2.5 Statistics New Zealand

#### Environmental indicators

Statistics NZ provides two environmental indicators that relate to climate change – greenhouse gas intensity and greenhouse gas emissions.

- Greenhouse gas intensity is provided as a ratio of real gross domestic product. Source data is the MfE's greenhouse gas inventory 1990-2014 as well as NZ's national accounts statistics.

---

<sup>60</sup> See <http://www.mfe.govt.nz/climate-change/resources>

<sup>61</sup> See <http://www.mbie.govt.nz/info-services/sectors-industries/energy/energy-data-modelling/publications/energy-greenhouse-gas-emissions>

<sup>62</sup> See <http://www.mbie.govt.nz/info-services/sectors-industries/energy/energy-data-modelling/statistics/greenhouse-gas-emissions>

- Greenhouse gas emissions data is sourced directly and exclusively from MfE's greenhouse gas inventory report and represented as a graph. Statistics NZ offers this for download as a .csv file (which MfE does not).

Both are shown as high-level graphs over 1990-2014.

## **Atmosphere and climate data**

Statistics NZ is also home to climate change data about ozone concentrations, the ozone hole, frost and warm days, growing degree days, national temperature time series, extreme weather events, insurance losses for extreme weather events, lightning, the occurrence of potentially damaging wind, and several other climate change-related measurement statistics.

## **5.3 Current price information providers**

### **Overview of current transaction data reporting**

Participants required to surrender units to meet their NZ ETS obligations have the choice of buying NZUs from other participants, paying a fixed price of \$25 for each unit they are liable to surrender to the Government or pursuing their own abatement option. Participants choosing to buy units on the open market and participants selling units onto the market enter into bilateral agreements usually through a broker or an intermediary such as a bank. Trades conducted on one of two well-known broker platforms are reported. Otherwise, prices of trades conducted on other platforms or entered into one on one are not disclosed or reported. Reported prices are the prices at which some of those trades take place but there is no way of knowing that the prices represent all trades and the trade prices reported aren't verified in any way.

### **Current transaction reporting requirements**

Trades for immediate delivery (spot trades) or forward contracts (trades for future delivery) are conducted by private transaction and no rules require disclosure of the price or any other aspect of the contracts other than registration and transfers of ownership with the EPA.

Two broker platforms that provide an avenue for trading also report the price at which trades are conducted. These platforms are privately owned and are not formal exchanges. Their rules and contractual relationships with participants are self-adopted and their governance is at the discretion of the operators. However, both of these platforms comply with legislation that the operators are familiar with by virtue of other similar activity (e.g. banking and financial markets trading).

Each trading platform also has different settlement arrangements, i.e. some settle with each other and in some cases settlement is with the intermediary. Registration of ownership of NZUs is on the New Zealand Emission Unit Register (NZEUR) managed by the EPA regardless of how trades are arranged.

### **NZU derivatives**

All NZU derivatives trading in New Zealand is currently conducted "over the counter" (OTC). OTC trading in NZU derivatives tends to be vanilla swaps (exchanging the risk of

future prices between the seller and the buyer). We have been told the trading volume for options on NZUs is picking up. Derivatives trading tend to be facilitated on some of the platforms offering spot trading.

Forward prices shown on the CommTrade website are in “contango”. Contango refers to the pattern of forward prices being progressively higher the further out the delivery date. (The opposite condition is referred to as backwardation.) The progressively higher prices are often confused with a view that prices are expected to rise in future. In fact these forward prices for NZUs simply reflect the “cost of carry”. That is the interest cost plus some allowance for counterparty risk if someone were to buy the underlying commodity and hold it till delivery. Prices currently quoted reflect an incremental cost of carry of 4.5%

The status of the prices for executed forward trades is the same as for spot. However, unlike spot trades, there is no registration requirement for forward trades. These remain the subject of bilateral contracts.

## Overview of transaction information provided

Table 3 shows four organisations that offer NZU prices, broking services or associated advisories. Organisations such as banks and other intermediaries also offer trading, price information and newsletters.

**Table 3 Organisations in New Zealand that offer NZU prices**

Organisation	Core service	Public price disclosure	Other publicly accessed service
Carbon Match <sup>63</sup>	Spot trade matching	Bid and offers and trade prices for spot delivery	News gathered from around the world
OMF financial operating as CommTrade <sup>64</sup>	Spot trade matching and forward trade matching	Bid and offers for spot delivery, bids and offers for forward trades and last traded prices for each category	News gathered from around the world and charts of prices
Westpac <sup>65</sup>	Making a market in spot carbon and forward carbon	None	None

<sup>63</sup> See: <https://www.carbonmatch.co.nz>

<sup>64</sup> See <https://www.comtrade.co.nz>

<sup>65</sup> See <https://www.westpac.co.nz/wib/financial-markets/commodities-carbon-and-energy/carbon>

Organisation	Core service	Public price disclosure	Other publicly accessed service
Carbon Forest Services <sup>66</sup>	Carbon Trading-Buying/Selling	ETS price charts	Forest Carbon/Eligibility Assessments Post-1989 Forest Applications GIS Shapefile Creation Carbon Claims (Emissions Returns) Post-1989/Pre-1990 ETS Withdrawals Carbon Field Measurements FMA XML Datafile Creation ETS Compliance Assessments

We have reviewed a number of data series available from various sources and we note that prices supplied tend to come from Comm Trade and Carbon Match, i.e. the only publicly available source of NZU prices is Comm Trade and Carbon Match.

### Future market evolution

The pattern in many commodity markets is for spot trading to evolve into OTC forwards trading and for forwards trading on a futures exchange to develop subsequently. This is how electricity markets we have experience with have generally developed.

The main differences between OTC trading and futures markets are:

- Counterparty risk is bilateral on OTC and with a central clearing house on futures exchanges;
- Contract specifications are bespoke on OTC markets but strictly standard on futures exchanges;
- Information about trades on OTC markets is opaque. Bids, offers, trade prices, volumes and open interest on futures markets are publicly available, and
- Market monitoring and oversight on OTC markets is based on broad legislation but are otherwise self-imposed. Market monitoring and oversight in futures exchanges is conducted by the exchange and the exchange rules are transparent.

No NZU futures contract is listed on any of futures markets operating in Australasia or on exchanges elsewhere that specialise in carbon-based products.

It remains to be seen whether an NZU-linked futures contract would be listed on any futures exchange but we would factor in that possibility when we look at a regulatory framework for NZUs.

---

<sup>66</sup> Carbon Forest Services, online home page, see: <http://www.carbonforestservices.co.nz/> (Accessed on 30 May 2017)

Changes to the ETS in 2014 and announcement of changes following the first stage of the ETS review have meant that prices of NZUs are firmer than they were before 2014. That movement in prices has created more interest in trading. The higher the prices and the greater the volatility, the more likely it is that traders with different backgrounds and interests will emerge. We were advised anecdotally that trades have been conducted by managed funds.

## 5.4 The information schedule – a summary of information available

Using the sources of information described in the previous two sections, we have compiled a detailed schedule of information to:

1. Create a shared understanding of the NZ ETS data currently available from various sources, the formats in which this data is currently published, the level of aggregation (e.g. industry or company level), the periods covered, the frequency of data release and the frequency of the data time series, and
2. Identify the gaps in the scope of data that can be accessed publicly, in terms of both missing data or inadequate level of granularity for the data already provided. The gaps are to be assessed in terms of the *information provision objectives* relating to supply and demand fundamentals, NZU value projections, and historical activity.

The data in the schedule is categorised into four groups:

- Fundamental – emission and removal levels;
- Fundamental – carbon market;
- Transaction – tracking systems, and
- Transaction – market platform.

The first two categories follow the convention on fundamentals data as described in chapter 3. Namely, we distinguish between the fundamentals data needed to estimate emissions levels (and therefore the potential demand for compliance units), and demand and supply data that pertains to carbon market design (e.g. units allocated, earned and surrendered).

The third category of data relates to information that tracks transactions of compliance units. This, for example, includes the number of units transferred between internal accounts, the size of transactions, and parties to transactions. Finally, market platform transaction data primarily relates to the price of units – spot bid and offers, spot execution price (i.e. the price at which a transaction was cleared), and the forward price.

We provide a summary below of the current provision of the data above, including the level of aggregation, frequency and timing of release, issuing agency and the delivery mechanism.

**Table 4 Definition of aggregation levels**

Aggregation level	Explanation
Sector – Schedule 3	Sectors with mandatory obligation under the NZ ETS. The sectors are reflected in the headlines of Parts 1-6 of Schedule 3 of CCA 2002
Sector activity – Schedule 3	Sector activities with mandatory obligation under the NZ ETS. The sector activities are described in the Parts 1-6 of Schedule 3 of CCA 2002
Sector level – Schedule 4	Sectors within which the removal activities take place. The sectors are reflected in the headlines of Parts 1-4 of Schedule 4 of CCA 2002
Sector activity level – Schedule 4	Removal activities described in Parts 1-4 of Schedule 4 of CCA 2002
Pre-1990 and post-1989 forestry	All forestry activities covered by Part 1 of Schedule 3 and Part 1 of Schedule 4
Pre-1990	Part 1 of Schedule 3
Post-1989 forestry	Part 1 of Schedule 4

**Table 5 NZ ETS Information Schedule**

Data type	Data detail	Level of aggregation	Frequency of release	Timing of release	Period covered	Who	Delivery mechanism
Fundamental – emissions and removals	Historical emissions (including from deforestation)	Sector activity – as per Schedule 3, financial year data (Annual NZ ETS Report) Sector activity – but not as per Schedule 3, calendar year data (Facts and Figures Report) Sector activity level – as per Schedule 3 excluding Part 1, calendar year (table on EPA site)	Annually (Annual NZ ETS and Facts and Figures Reports) Bi-annually, (online table)	July/August (Annual ETS Report) August, February (online table)	Reporting year (Annual ETS report) From 2010 (Fact and Figures pdf) 2010-2013 (online table)	EPA	EPA site: Annual NZ ETS Report, annual Facts and Figures (pdf), table on EPA site <sup>67</sup>
Fundamental – emissions level and removals	Other historical information on forestry: planted forest land	Post-1989, calendar year data	Annually	April	Reporting year	MPI	MPI site: The National Exotic Forest Description Report
Fundamental – emissions level and removals	Other historical information on forestry: age class	Pre-1990 or post-1989	Annually	April	Reporting year	MPI	MPI site: The National Exotic Forest Description Report
Fundamental – emissions level and removals	Other historical information on forestry: deforestation offsetting	Pre-1990, calendar year data	Annually	February/March	Up to 2025	MPI	MPI site: Deforestation Intention Survey

<sup>67</sup> [http://www.epa.govt.nz/e-m-t/reports/ets\\_reports/Pages/emissions\\_reported.aspx](http://www.epa.govt.nz/e-m-t/reports/ets_reports/Pages/emissions_reported.aspx)

Data type	Data detail	Level of aggregation	Frequency of release	Timing of release	Period covered	Who	Delivery mechanism
Fundamental – emissions level and removals	Marginal abatement cost estimates	Sector level - but not as per Schedule 3 or 4	One-off reports	N/A	N/A <sup>68</sup>	Reports commissioned by MfE	Modelling the economic impact of New Zealand’s post-2020 climate change contribution (Landcare Research) <sup>69</sup> A general equilibrium analysis of options for New Zealand’s post-2020 climate change contribution (Infometrics) <sup>70</sup> Afforestation responses to carbon price changes and market uncertainties (Manley, 2016) <sup>71</sup>
Fundamental – emissions level and removals	Projected deforestation (ha)	Pre-1990, calendar year data	Annually	February/March	Up to 2025	MPI	MPI site: Deforestation Intention Survey
Fundamental – emissions level and removals	Projected emissions from non-forestry sectors	Sector - but not as per Schedule 3, calendar year data	Biennially (Biennial Report) Quarterly (MBIE’s forecasts for the energy sector)	End of calendar year	Up to 2030 (Biennial Report) Up to 2040 (energy sector forecasts by MBIE)	MfE, MBIE (for the energy sector)	MfE - Biennial report MBIE – spreadsheet on site <sup>72</sup>

<sup>68</sup> Marginal abatement cost curves are a function of cost, not time. The reports in the ‘Delivery mechanism’ column reflect different carbon price scenarios through to 2030.

<sup>69</sup> See <http://www.mfe.govt.nz/node/20771>

<sup>70</sup> See <http://www.mfe.govt.nz/node/20761>

<sup>71</sup> See <http://www.mfe.govt.nz/sites/default/files/media/Climate%20Change/Afforestation%20responses%20to%20carbon%20price%20changes%20and%20market%20certainties.pdf>

<sup>72</sup> See <http://www.mbie.govt.nz/info-services/sectors-industries/energy/energy-data-modelling>

Data type	Data detail	Level of aggregation	Frequency of release	Timing of release	Period covered	Who	Delivery mechanism
Fundamental – emissions level and removals	Projected emissions from forestry	LULUCF (Biennial Report), calendar year data	Biennially	End of calendar	Up to 2030 Five years ahead (surrender forecasts)	MfE	Biennial Reports on MfE’s site MPI forecasts of surrenders, which can be obtained through an Official Information Act request
Fundamental – carbon market	Number of participants (total, added, and removed)	Sector activity – as per Schedule 3 and Schedule 4, financial year data	Annually	July/August (Annual NZ ETS Report)	Reporting year	EPA	EPA’s Annual ETS Report
Fundamental – carbon market	Forest land under the ETS (ha registered, added/removed)	Pre-1990 or post-1989	Ha registered - annually (Facts and Figures Report)	Ha registered annually - second half of calendar year (Facts and Figures Report)	Ha registered - reporting year (Facts and Figures Report)	MPI	Ha registered - annually (Facts and Figures Report) Ha added/removed – info not provided
Fundamental – carbon market	Number of NZUs allocated in a calendar year	Sector activity – but not as per Schedule 3, calendar year data (Facts and Figures Report) Account holder, calendar year (EPA online table)	Annually (Facts and Figures Report)	Second half of calendar year (Facts and Figures Report)	Reporting year (Facts and Figures Report) N-1 reporting year (EPA online table) <sup>73</sup>	EPA	EPA’s Facts and Figures Reports
Fundamental – carbon market	Number of NZUs to be allocated in the future	Aggregate of projected allocations and entitlements. Projections are expressed in terms of expected expenses to the Crown, based on historical price assumptions	Bi-annually	Mid- and end of financial year	Five years ahead	Treasury	Treasury’s Half Year Economic and Fiscal Update Report

<sup>73</sup> See <http://www.epa.govt.nz/e-m-t/taking-part/Industrial-allocations/allocations-decisions/Pages/2015-final-allocation-decisions.aspx>

Data type	Data detail	Level of aggregation	Frequency of release	Timing of release	Period covered	Who	Delivery mechanism
Fundamental – carbon market	Number of NZUs transferred for carbon sinks in a calendar year	Sector activity – as per Schedule 4, financial year in the Annual NZ ETS report and calendar year in the NZ ETR	Annually	Jul/Aug (Annual NZ ETS Report) January 1 (NZETR update)	EPA ETS Annual Report: forestry - from 2008; other: reporting year NZETR – from 2007 for both forestry and other sector activities. However, this data reflects transactions in a particular year, which do not necessarily reflect actual removals taking place in that year	EPA	EPA ETS Annual Report NZ ETR (reflects transactions in a particular year, which do not necessarily reflect actual removals taking place in that year)
Fundamental – carbon market	Projected number of NZUs to be transferred for carbon sinks	Sector – but only for post-1989 forestry, calendar year	Not currently released to the wider public	Not available	Up to 2021	MPI	MPI forecasts of entitlements, which was obtained by Motu through an Official Information Act request
Fundamental – carbon market	Number of NZUs held in accounts (excluding the Crown)	Aggregate, including the Crown	Annually	January 1	From 2007	EPA	NZ ETR
Fundamental – carbon market	Number of NZUs cancelled <sup>74</sup>	Company level	Monthly	Monthly	From 2012	EPA	EPA site – downloadable spreadsheet <sup>75</sup>

<sup>74</sup> This refers to voluntary cancellations by account holders who request that this data be published – this data is not published if such a request has not been made.

<sup>75</sup> See <http://www.epa.govt.nz/e-m-t/reports/Pages/Voluntary-unit-cancellations.aspx>

Data type	Data detail	Level of aggregation	Frequency of release	Timing of release	Period covered	Who	Delivery mechanism
Fundamental – carbon market	Number of NZUs surrendered for emissions/deforestation or harvesting	Sector level – but not as per Schedule 3, calendar year	Annually	Second half of calendar year	From 2010	EPA	EPA Facts and Figures Report
Transaction – tracking system	Number of transactions	Aggregate	Monthly	Monthly	From 2008	EPA	Spreadsheet on the EPA site <sup>76</sup>
Transaction – tracking system	Transaction size (internal transfers)	Transaction size	Monthly	Monthly	Previous 13 months	EPA	Graph on EPA site <sup>77</sup>
Transaction – market platform	Spot price	Closing price	Weekly to participants registered on the OMF or Carbon Match platforms	End/beginning of week	Historical	OMF, Carbon, Match, Carbon Forest Services	Spreadsheet (to participants registered on OMF or Carbon Match)
Transaction – market platform	Forward price	Closing price	N/A	N/A	Bespoke	OMF	Website

<sup>76</sup> See [http://www.epa.govt.nz/e-m-t/reports/carbon\\_market/Pages/historical\\_info.aspx](http://www.epa.govt.nz/e-m-t/reports/carbon_market/Pages/historical_info.aspx)

<sup>77</sup> See [http://www.epa.govt.nz/e-m-t/reports/carbon\\_market/Pages/transaction\\_trends.aspx](http://www.epa.govt.nz/e-m-t/reports/carbon_market/Pages/transaction_trends.aspx)

## 5.5 NZ ETS reform and consultation

The MfE undertook a two stage review of the NZETS in 2015/16. The second stage was intended to inform in-principle policy decisions to be taken in mid-2017 and, if required, legislative change in 2018. Stage two included a technical paper on Operational Matters<sup>78</sup> that posed two questions on changes to how and what information is provided under the scheme.

The two questions were:<sup>79</sup>

- (a) OM 4: Does the current level of information available allow you to make informed decisions about your participation in the NZ ETS? If not, please give examples of information you think would be useful, and how it would help you.
- (b) OM 5: Are there any additional forms of information that would assist with your understanding of, or participation in, the market?

Overall, there were 22 submissions that addressed these two questions, of which over a quarter of the submissions came from the forestry sector. The submissions provide some early indications about the types of information that the market may wish to see.

For OM4 and OM5, submitter's responses were typically very brief and the majority provided no comment to either or both of OM 4 and OM 5. This means that it is possible the responses are not necessarily reflective of broader ETS participants' views.

About 45% or 10/22 of submitters provided a response to OM4. Of those, 60% or 6/10 said that the current level of information is not sufficient to make informed decisions and 4/6 of that group made comments about information that would better enable those decisions, which are recorded below. It is worth noting that that majority (55% or 12/22) did not respond to this question.

Only around 40% or 9/22 submitters answered OM5. However, of those, 88% or 8/9 said that yes there are additional forms of information that could or should be provided. To supplement that view, 100% of those eight provided examples of additional forms of information, which are summarised below.

We have reviewed all of the detailed answers to these consultation questions. We have taken these answers into account alongside other research we conducted as we prepared our recommendations.

---

<sup>78</sup> See MfE (2015b).

<sup>79</sup> See MfE (2016a).

## 6. Analysis of current information provision and recommendations

---

Our findings from our primary and secondary research, including the results from the MfE consultation, suggest that the current release of NZ ETS related information is fragmented, incomplete, untimely, and provided in a non-user friendly format. It is fragmented in the sense that information is scattered around several websites and systems, and in some cases market sensitive information only reaches a subset of the market participants, depending on which authority's mailing list is used. Information is incomplete in the sense that there is not enough information provided in order for market participants to factor in NZ ETS costs into their short- and long-term decision-making. In addition, it is untimely because there is a lag between collection of market relevant information, and information provision. All these limitations, including the non-user friendly format of information provision, hinder price discovery and market transparency, which undermines the functioning of an efficient carbon market.

Drawing on these limitations and the objectives of this study, we have developed a set of recommendations regarding how information provision can be improved in order to increase price disclosure and transparency in the NZ ETS.

In drawing our recommendations, we were guided by the following key general principles:

- information should be made public on a timely basis;
- information should be released to every market participant at the same time, and
- the detail, frequency and timing of information release should:
  - consider the trade-off between the benefits of richer information and the costs associated with the provision of this information, and
  - avoid jeopardizing commercial sensitivity and the well-functioning of other correlated markets.

Finally, although the focus of this report is on NZU, we believe that most of the recommendations provided would also be relevant for international units, if or when these are recognised as fungible compliance instruments in the NZ ETS.

### 6.1 An NZ ETS master site

A major problem with the current mechanism of information provision is that information is scattered over the NZ ETR, EPA, MPI, MfE and the Treasury websites. Much information is also many levels down a complex website hierarchy – making information increasingly difficult to find. This issue with information being difficult to find is critical and this is feedback that has been received through our stakeholder engagement, as well as through the submission process.

A NZ ETS master site would provide a good solution to the current fragmented information provision. Firstly, it would greatly reduce the transaction costs incurred by market participants – in particular because it would reduce the costs involved in searching for information. Reporting and compliance costs could also be lowered with the provision of

clearer and more user friendly information. Secondly, it provides an easy tool for targeting information towards market participants, and for making sure that information is provided as widely and as evenly as possible. The idea of a master site was supported by our interviews with market participants.

We are mindful of the issues that arose with the previous centralised climate change website, and the learnings from this should be taken into consideration. Therefore, we provide the following recommendations for the NZ ETS master site:

- **Have one agency as the gatekeeper of the information provided on the website.** One issue with the previous centralised climate change website was that there were too many agencies responsible for the information on the site. This led to the fact that no agency felt directly responsible, and information quickly got out of date. Thus, in order to avoid “the tragedy of the commons”, we suggest that one agency should be the ‘guardian’ of the type of information displayed on the site. We suggest that this be the Ministry for the Environment, given that MfE is the Government’s principal adviser on environmental and climate change policy matters. The actual operation of the website could be either done by in-house ICT teams or outsourced to a private vendor.
- **Structure the website in a way that avoids a complete restructuring of the current systems.** Costs and IT issues can be minimised through the provision of links on the master site, which would redirect the user to relevant websites, including the EPA, MfE and MPI websites. In this way, EPA, MfE and MPI would still be responsible for updating relevant NZ ETS information on their respective websites. MfE – as the guardian of the content on the NZ ETS master site – would need to make sure that the links provided are up to date and accurate. Using links, instead of moving all information directly to one site will lower the start-up costs of the website and it also keep the maintenance costs down for MfE.
- **Host some information directly on the NZ ETS master site.** Not all information should be provided via links. Instead, more permanent information that can be easily transferred from existing systems should be gathered on the master site. This information may include (but is not limited to) information about NZ ETS, regulatory compliance information and tutorials for how to participate in the scheme.
- **Only have NZ ETS relevant information on the website.** One issue with the previous climate change website is that it tried to incorporate too many components relating to different aspects of climate change policies.

Figure 5 illustrates our recommendation of what information should be included on the NZ ETS master site, and the agencies that are responsible for providing the respective information, and maintaining it up to date. Note that the information shown only reflects the information within the scope of this project, and does not include other NZ ETS information relating to the on-boarding or reporting process / cycle (among other). This information will need to be reflected in addition.

**Figure 3 Agencies responsible for managing type of information**

	EPA	MfE	MPI
<b>Fundamentals - emissions and removals</b>	Historical emissions	Projected emissions	Historical and projected deforestation and afforestation
<b>Fundamentals - carbon market design</b>	<p>Historical ETS activity data (link to NZ ETR):</p> <ul style="list-style-type: none"> <li>- No. of NZUs allocated</li> <li>- No. of NZUs transferred for removal activities</li> <li>- No. of NZUs held in accounts</li> <li>- No. NZUs held in accounts</li> <li>- No. NZUs cancelled</li> <li>- No. NZUs surrendered</li> </ul> <p>Current reports on historical information:</p> <ul style="list-style-type: none"> <li>- Annual NZ ETS Report</li> <li>- Facts and Figures Report</li> <li>- Summary of historical trading data<sup>80</sup></li> </ul>	<p>Projected NZU supply:</p> <ul style="list-style-type: none"> <li>- Number of NZUs to be allocated</li> <li>- Number of NZUs to be transferred for removal activities (non-forestry)</li> </ul> <p>Estimates of marginal abatement costs</p> <p><i>International linking</i></p> <ul style="list-style-type: none"> <li>- <i>Supply and demand of NZUs from the linking ETS</i></li> <li>- <i>Analysis of the impact from linking on the NZ ETS</i></li> </ul>	<p>Projected removals by registered post-1989 forestry participants</p> <p>Forestry land:</p> <ul style="list-style-type: none"> <li>- Total area of post-1989 forest registered</li> <li>- Total area of pre-1990 forest land deforested</li> </ul> <p>Uptake of deforestation offsetting</p> <p>Age-class profile of registered post-1989 forest</p> <p>Projected deforestation</p>
<b>Transaction - tracking system</b>	<p>Transaction data:</p> <ul style="list-style-type: none"> <li>- Number of transactions</li> <li>- Transaction volume</li> </ul>		
<b>Transaction - market platform</b>		<p>Description of existing types of services available to carry out trading, without necessarily specifying business names of brokers, traders, consultants</p>	
<b>Qualitative and other information</b>	<p>Policy announcements</p> <p>Schedule of information release and key regulatory dates</p>	<p>Policy announcements</p> <p>Regulatory and compliance information</p> <p>Schedule of when data and information is reported</p> <p>Schedule of information release and key regulatory dates</p>	<p>Policy announcements</p> <p>Schedule of information release and key regulatory dates</p> <p><i>Tutorials: pre-1990 and post-1989 forestry and other on-boarding info</i></p> <p><i>Information for participants, including</i></p> <ul style="list-style-type: none"> <li>- <i>Clear definition of 'forested land'</i></li> <li>- <i>Guidelines on field measurements for post-1989 foresters with 100+ hectares</i></li> </ul> <p><i>Forestry mapping</i></p>

<sup>80</sup> See [http://www.epa.govt.nz/e-m-t/reports/carbon\\_market/Pages/default.aspx](http://www.epa.govt.nz/e-m-t/reports/carbon_market/Pages/default.aspx)

Note that the information reflected in italics does not directly relate to the fundamentals and transaction data that we investigated as part of the project. This information came up during our discussions with the MPI and forestry participants, who, for example, highlighted the complexity of the NZ ETS regulatory framework for foresters, and that greater clarity would be beneficial. In particular, it was pointed out that some on-boarding tutorials for foresters would be welcome, as well as a greater clarity around the forestry mapping tools, large forest measurements, and definition of ‘forested land.’ Because forestry represents a significant share of the NZU market, we suggest that such information be reflected on the master NZ ETS site too.

Another type of information that we did not explicitly investigate as part of this project but should be added to the master site relates to the potential linking between the NZ ETS and international market(s). In this case, the master site should provide information on the demand and supply of international units, and the impact of linking on the NZ ETS.

In the following two chapters, we provide more detailed recommendations on the provision of the quantitative and qualitative information reflected above.

## 6.2 Quantitative information

This chapter gives an overview of issues concerning the current provision of quantitative data in the NZ ETS, and provides a suite of recommendations.

The first half of the chapter discusses the current situation based on findings from our analysis, interviews and questionnaires for market participants, and describes the principles and criteria we used in drafting the recommendations. The second half of the chapter provides a table of detailed recommendations per each type of quantitative information identified as critical for market participants. This table also provides a detailed description of the current provision of each type of information.

Our recommendations for quantitative information are based on the following three main criteria:

- the level of aggregation and the release schedule that is required for market participants to undertake market analyses and make judgements about the NZU value;
- the associated reporting costs falling on market participants, and the associated implementation costs falling on the entities implementing the data improvements, and
- confidentiality issues arising from a more detailed or more frequent information disclosure.

## Key quantitative information

Drawing on findings from our research, interviews and questionnaires, Table 13 lists information that is critical for enabling market participants to analyse current and historical NZ ETS activity, and to make judgments about the value of NZUs.

**Table 6 Key quantitative information**

Type of information	Detail
Fundamental – emissions level	Historical and projected emissions (forestry and non-forestry sectors)
Fundamental – carbon market design	Number of participants Historical and projected NZU allocation Historical and projected NZU transfer for removal activities Number of NZUs held in accounts Number of NZUs cancelled Number of NZUs surrendered
Fundamental – tracking system	Number of transactions Size of transactions
Fundamental – market platforms	Market prices (spot and forward)

Much of the data above is already publicly released, however not necessarily at the level of detail needed to (i) gain a thorough understanding of the level of over- (or under-supply) in the market, and (ii) make well-informed decisions about future NZU prices. Additionally, the information is scattered across several sources, which complicates the market participant's search for reliable and timely information.

Some information is currently not published at all, even though it is used by public authorities for internal decision-making. This particularly relates to forecasts about forestry removal activities and the associated entitlements, which MPI is responsible for. Most recently, such information was possible to obtain through an OIA request.<sup>81</sup> We were not able to find the sources of information regarding projections of NZUs to be transferred for carbon removals in the non-forestry sector, other than embedded in Treasury's forecasts in monetary terms (although we assume that such information could be obtained through an OIA request too). An over-arching objective of our recommendations is to ensure that information essential for making market analyses and forecasts of NZU price is made as easily accessible as possible, and is provided through transparent channels.

<sup>81</sup> Motu, Emissions Trading Scheme Forecasting Data - OIA16-0167, NZU issuance is an expense to the government and when issued, creates a liability on the Crown's books.

### The release of OIA requests

Further on the issue on how information is being released is the notion of information released under the OIA. Firstly, an OIA request may be a sign of information being (a) under-supplied, or (b) not being correctly supplied. The latter refers to the fact that the person sending the OIA request may have requested information already available, but could not easily find the information. Second, information provided through an OIA request may only reach a small subset of market participants. Depending on the information, only providing information to a subset of the market may have negative implications for the market as a whole.

Therefore, any information released under the OIA should be reviewed to assess whether it has any NZ ETS market significance. When we spoke to MPI, they were aware of this issue and they addressed it by often making the information provided through OIA requests available on their website. We suggest that MfE, MPI and EPA adopt a protocol of always releasing OIA requests that might have implications for the market to the wider public. Again, the NZ ETS master site offers a great platform for centralising this information. Centralising and disclosing OIA requests may also have the possibility to reduce the overall number of OIA requests, and thus freeing up resources across the agencies.

Finally, some information is not directly provided, and must instead be derived through manual calculations. This particularly relates to forecasts of NZU issuance. This information is currently reported by the Treasury in its *Half Year Economic and Fiscal Update Reports*, and is provided in terms of dollar expenses associated with future NZUs, calculated based on historical market price information.<sup>82</sup>

### Level of aggregation

In our research we found that, across the various sources available, information is provided using different taxonomies for sector and sector activities. This means that market participants are required to carry out their own mapping between the sector and sector activity taxonomies from Schedules 3 and 4 of the CCRA 2002, and the taxonomies used in other sources. This complicates the market participants' analyses of market activity, and introduces a higher margin of error – the complexity of such mapping has also been raised in our discussions with market participants.

Given the above, our recommendations regarding the level of information aggregation follow a

single taxonomy with regards to sectors and sector activities (as applicable). In particular, the recommendations follow the taxonomy as described in Schedule 3 and of CCRA 2002. This is the taxonomy that the EPA is already using.

Overall, our recommendations (given in Table 17) regarding the level of aggregation level are a function of three variables:

- the level of detail already provided;
- the level of detail that is needed to make judgements about the NZU price, and
- confidentiality constraints, as per Schedule 89 and 99 of CCRA 2002.

---

<sup>82</sup> See NZ Treasury (2016).

Most recommendations for fundamentals data are at the sector activity level, with possible aggregation to address existing information confidentiality concerns.

## Frequency of release

Our recommendations on the frequency of information release are based on:

- a review of the current frequency with which information at the lowest level of aggregation is released, and
- an analysis of the frequency with which information is currently collected.

We generally recommend a higher frequency of release if data is collected more often than the current frequency of release. This, for example, relates to NZU transfers for removal activities (which can occur on a quarterly basis), emission forecasts in some sectors (quarterly updates in the energy sector), and size / volume of transactions (which can occur daily or weekly). We also recommend a bi-annual release of information on NZU allocation and transfer projections, which we assume to be possible given that such data is used in the Treasury's Half Year Economic and Fiscal Update Reports.

## Timing of release

An over-arching principle underpinning our recommendation on the timing of information release is that data should be released as soon as practicably possible. This means that some of the data that is currently published through the Annual NZ ETS and Facts and Figures Reports should be provided earlier than the release cycle of those reports. This particularly refers to emissions data for a calendar year, which for Schedule 3 activities is collected through emissions returns by March 31 each year. We note that reporting entities are able to apply for a 20 working day extension to the emission return submissions deadline, and that amendments may be done after the returns deadline to correct inadvertent errors in reporting. Because of this, the EPA could release preliminary data on emissions as soon as practicable after March 31, and final data by June 30.

Similarly, because emissions returns for removal activities can be submitted each quarter, emissions data released to the public should be updated accordingly.

Overall, we found that the frequency and timing of different information release (reports, NZETR update, online tables etc.) is not clearly communicated. Some of this frequency and timing is determined by the NZ ETS compliance cycle and the CCRA 2002 provision that information should be released 'as soon as practicable' after the end of the reporting year. From the market participants' perspective, this is too vague given that they expect information to be provided on a timely basis. Thus, we recommend that a schedule of information release should be clearly communicated – and where exact dates are not possible, a specific period in the calendar should be provided instead (e.g. first week or middle of July). We recommend that such an information release schedule be included on the master NZ ETS site, as described in Chapter 6.1.

## The delivery mechanism

An overarching principle underpinning our recommendations on the delivery mechanism is that there should be a single major source of raw quantitative information regarding NZ ETS activity. This is for several reasons. First, a single source of such information ensures that market participants have access to the most up-to-date and accurate information. Second,

this reduces the market participants' search cost for data. And third, a single database of this kind ensures a level playing field for all market participants, by providing them with an equal opportunity to carry out market analysis at the level of detail that they require (smaller market participants, for example, may not have the resources needed to compile a detailed set of data from different sources). We believe that the NZ Registry (NZ ETR) is the mechanism best placed to provide such data. We should also note, however, that based on discussions with the EPA, this recommendation comes with technical constraints. To accommodate the extended NZ ETR functionality as described here, the current system will require revision from a technical perspective. As a next step, we recommend that a review be carried out of the current NZETR capability and of the costs ensuing from extending the NZETR functionality.

An important characteristic of the enhanced data to be provided through the NZ ETR is that it should also reflect calendar-year activities. At the moment, historical NZ ETR information on allocation, surrender, and transfers for removal activities is on a transaction basis.<sup>83</sup> Specifically, the NZ ETR reports transactions that occurred within a certain year, and does not attribute these transactions to an associated year in which emissions or removals activity took place.<sup>84,85</sup> This is an issue for market participants because such transaction data cannot be easily used to make assessments about the market's current level of over- or under-supply (put differently, to make assessments about the market's net position as described in Chapter 4.3). Instead, market participants require information on emissions, allocation, transfers for carbon removals, and surrenders in a particular calendar year, which would allow them to compare the demand for and supply of NZUs associated with activities within the same period.

The annual NZ ETS and Facts and Figures reports published by the EPA help market participants with interpreting the data in the NZ ETR by providing information on allocations, surrenders etc. relating to activities within the same period. However, their joint interpretation is complicated by the fact that the first document reports activities on a financial-year basis, whereas the second – on a calendar-year basis. The market participants we have interviewed or surveyed have expressed preference for data to be released on a calendar-year basis because this aligns with the NZ ETS reporting year. We thus recommend that the annual NZ ETS document reports on calendar-year activities, which the users could complement with the raw data reports from the NZ ETR as described in the previous paragraph.

For the avoidance of doubt, we do not recommend that the enhanced NZ ETR should replace the existing annual ETS reports, or other filtered historical information that the EPA currently provides.<sup>86</sup> We believe that this filtered and summarised information is useful for

---

<sup>83</sup> Note that the NZ ETR also facilitates intra-account transfer of NZUs that are not necessarily linked to issuance or surrender.

<sup>84</sup> For example, a surrender transaction in year N may be associated with an emissions activity in year N-2 and is recorded in year N because it reflects an amendment that results in a surrender obligation.

<sup>85</sup> The calendar-year emissions data is currently provided in the Facts and Figures report. However, emissions reported in this document are not by sector activities as per Schedule 3 of CCRA 2002. Additionally, having the raw data in the NZETR would improve data collection by creating a single point of data access, and would allow market participants to make their own analysis at the level of aggregation needed.

<sup>86</sup> See [http://www.epa.govt.nz/e-m-t/reports/carbon\\_market/Pages/default.aspx](http://www.epa.govt.nz/e-m-t/reports/carbon_market/Pages/default.aspx)

getting an overview of the NZ ETS activity, and for market participants who do not require detailed market analysis. However, to make more accurate judgements about NZU price, more detailed information is needed, which in turn requires a different delivery mechanism.

To ensure that the enhanced data released via the NZ ETR can be effectively used by market participants, a review of the registry's usability will need to be undertaken, given the proposed inclusion of enhanced data.

## Confidentiality

As discussed in Chapter 5.1, the confidentiality of NZ ETS data is governed by Sections 89 and 99 of CCRA 2002. The EPA has taken a precautionary approach with regards to public information release, and currently does not release account balances, surrender data, and transactional information at an account holder level. Data confidentiality issues may also arise at the sector activity level (using the Schedule 3 taxonomy), where such an activity is represented by only a few market participants. The current legislation requires the EPA to seek permission from participants involved in activities that have only a few participants, as such disclosure may allow individual emissions and surrender information to be derived.

A concern that was raised by one stakeholder we interviewed was that lower-level information transparency may raise the risk of collusion when the regulated activity has only a few market participants.<sup>87</sup> In this case, the colluding partners could share individualised data regarding future prices and quantities of NZUs that they'd be willing to sell, which is especially significant if the partners hold a sizable share of the total NZU supply. However, this is only a hypothesis and we recommend that such implications of data disclosure be further explored. The experience of other markets, for example, shows that publishing account-level data on emissions and allocation does not necessarily lead to anti-competitive behaviour (e.g. EU ETS).<sup>88</sup>

Our questionnaires did not reveal major concerns regarding commercial sensitivity of data reported at the sector activity level (e.g. emissions, allocations, surrenders), or even at the account level as long as the accounts are kept anonymous (e.g. transaction volume or price).<sup>89</sup> It is possible that the questionnaires may not have been representative of sector activities that are most exposed to confidentiality issues, and a further inquiry into this matter could be pursued. In particular, a wider consultation with NZ ETS stakeholders should be undertaken to assess the adequacy of the prescriptive restrictions imposed by the current legislation on the provision of some information, and of the interpretations of legal provisions where the restrictions are less clear.

---

<sup>87</sup> In this case, transparency at the sector activity level would allow market participants with similar activities to identify each other.

<sup>88</sup> We should also highlight that the EPA already publishes industrial NZ ETS industrial allocations at the account level, although with a lag. See <http://www.epa.govt.nz/e-m-t/taking-part/Industrial-allocations/allocations-decisions/Pages/2015-final-allocation-decisions.aspx>

<sup>89</sup> Although there is the risk that reporting at this level would allow account id's to be figured out. For example, one can buy an unusual number of units and see which anonymised account label has a transaction for that amount. Our recommendations do not include reporting at the account level, unless this is already being done.

The risk of anti-competitive behaviour should also be explored within the wider review of the NZ ETS governance regime. In the meantime, we recommend that where confidentiality issues may arise on a sector activity level, the data should be aggregated by combining two or more (related) sector activities. This would align with the current provisions of Sections 89 and 99 of the CCRA 2002.

Finally, a note on the transparency of transactions data. The issue of commercial sensitivity is particularly relevant here given that lower-level data on transactions can reveal the trading and risk management strategies of market participants, which in turn can provide insights into the participants' production profiles. We therefore recommend that current information on NZU volumes and price continue to be published at an aggregate level. Another option that could be considered is to publish lower-level transactions information (i.e. at sector activity or account level) with a delay (e.g. the EU ETS releases this data with a three-year delay).

### **Reporting costs to market participants**

Participants surveyed did not raise any significant reporting costs associated with the release of more detailed or frequent information, as most of this is already provided by them.

### **Entity best placed to provide information**

In deriving the recommendation regarding entities best placed to provide a certain type of information, we used the following criteria:

- the type of data that is currently collected by the entity as part of its existing business operations or regulatory mandate;
- the type of information that market participants must report and the mechanism by which this reporting is done, and
- the delivery mechanism being used to release the data.

For example, because emissions returns are filed through the NZ ETR, and because EPA administers the NZ ETR, we conclude that the EPA should continue administering the NZ ETR with the enhanced data reflected in our recommendations.

### **Cost to public agencies**

Most costs arising from the provision of enhanced NZ ETS information will fall on public agencies, which will be required to release data in addition or in a different format than what is currently done. In particular, these costs will fall on the MfE, EPA and MPI as listed below.

- The costs to the MPI will be associated with the public and timely release of forecasts of transfers for forestry removals and forecast for emissions and surrenders.
- The costs to the MfE will be associated with the:
  - provision of forecast information on NZU allocation and transfers for carbon removals in non-forestry sector activities. This information is currently provided by the Treasury on an aggregate basis and in monetary terms. This data will need to be decomposed by NZUs for allocation to industrial sectors, and by NZUs for transfers relating to removal activities; and

- maintenance of the master NZ ETS site, as described in Chapter 6.1.
- The costs to the EPA will be associated with the provision through the NZ ETR of lower-level data associated with activities on a calendar-year basis. Given that such data is already collected, we don't expect these costs to be too high, unless there are significant infrastructure performance hurdles to be overcome. Additional costs may be incurred from the inclusion of data not currently reflected in the NZ ETR reports, such as historical emissions, number of NZUs allocated, number of participants, number of transactions and transaction volumes.

## Market prices

An overarching principle underpinning the rules for what market price information (that is not currently being released) should be released, and how it should be released, is based on the experience gained in a number of other markets.

Where prices are discovered through trade conducted on an open exchange, both spot markets and derivatives, those prices are able to be captured by anyone and typically the exchange will release them.

Where trades are conducted on a bilateral basis, the price at which those trades takes place are a matter between the two parties unless those trades have been conducted through a medium such as a broker platform, where parties have been required as a condition of participation to allow their activity to be made public. Trades conducted directly between parties are referred to as over the counter trades or OTC trades<sup>90</sup>. Often the issue of a lack of visibility over prices struck in OTC markets is a source of frustration. Active players gain an advantage because they get a sense of where the market is trading. Traders who don't trade as frequently, including large players, become frustrated about the lack of knowing where the market is trading, and the lack of a level playing field in respect of who is aware of where the market is trading. The problem extends to all commentators and forecasters in the market. Without a reliable history of prices, it is difficult to make robust commentary on the current market and future prospects.

Many mechanisms have been adopted to provide markets a sense of where prices have traded during the day without disclosing the price attributed to specific trades between parties. Devices include surveying all market participants for their bid and offer, and then averaging those prices as an index. Another technique is for trade prices to be disclosed and prices to be released anonymously.

When it comes to carbon markets, spot trades are conducted either through brokers or OTC, and in some markets, on spot exchanges. Where futures markets exist, those prices provide a source of publicly available information about participant's expectations of prices and their response to news. Otherwise, forward trades are conducted through brokers or OTC as is the case with the spot market. It is usually the case that brokers insist that their matching process is conducted in open view of the market, although each broker decides what information is made available and what information is not.

---

<sup>90</sup> See decision about the difference between contracts traded OTC or traded on a recognised exchange in section 5.3).

In New Zealand, the carbon market is still in the early stages of market development. Even though it has been in place for some years, it is still small compared to other carbon markets that have developed more quickly on account of their size. The traded carbon market is a subset of our overall emissions profile. The traded carbon market refers to the collection of mechanisms whereby residual demand from emitters with surrender obligations under the ETS secure supply from registered account holders. The amount of secondary market trading may exceed demand as NZUs are traded between participants multiple times. Forward trading and options add another dimension to the available risk management mechanisms and overall market volumes.

The dynamics of the market is influenced by the timing of surrender commitments and expectations of prices in the future. Information on the actual and perceived size of the demand side and supply side of the scheme would be an input for anyone wanting to forecast NZU prices. Traded prices will be heavily influenced by policy announcements or the expectation of price announcements and the timing of announcements.

Spot trade and forward trading is conducted through two well-known platforms (CommTrade and Carbon Market), through market makers such as Westpac and between parties often facilitated by intermediaries. The pattern of price disclosure and the volume of trades are shown in the table below.

**Table 7 The context for publicly disclosed NZU prices in New Zealand**

Matching via:	OMF CommTrade	Carbon Match	Westpac and other market makers	Other intermediaries and bilateral trades
<b>Products</b>	Spot, forwards and options	Spot only	Spot, forwards	Spot, possibly derivatives, leasing and repos
<b>Public disclosure</b>	Bid, offer and last price disclosed, volumes not disclosed	Bid, offer disclosed, volumes not disclosed	Prices and volumes not disclosed	Prices and volumes not disclosed
<b>Disclosure to platform participants</b>	Historic prices but not volumes	Historic prices and volumes		
<b>Price reporting</b>	Prices reported to MfE and vendors	Prices reported to MfE but not vendors	Prices not reported	Prices not reported
<b>Trade volume reporting</b>	Volume disclosed to MfE but not other vendors	Volume disclosed to MfE but not other vendors	Volumes not reported	Volumes not reported

Source: Sapere

We have not established that there is anything that needs to be changed in respect of price and trade volume disclosure. The simple fact is there is no open exchange reporting for either spot trades or forward trades so any imposed release of prices would require an intervention aimed at forcing the disclosure of the prices at which every trade was conducted. There is no market failure and the lack of any formal exchange is the result of the size of the market and the stage of its development.

We note that the two broker platforms that publish the prices at which trade is conducted are self-governing. As a result they set the standards of governance for their own platform themselves and that may be something the governance work stream is considering.

### **The recommendations table**

The following table provides recommendations relating to the provision of each key type of quantitative information discussed above. In drawing these recommendations, considerations were made of any confidentiality issues, major additional reporting costs to market participants, and implementation costs accruing to the agency providing the information.

**Table 8 Recommended provision of quantitative information**

Data type	Data detail	DRAFT RECOMMENDATIONS						Major reporting costs? <sup>91</sup>	Confidentiality issues? <sup>92</sup>	Additional costs for 'Who'?
		Level of aggregation	Frequency of release	Timing of release	Period covered	Who	Delivery mechanism			
Fundamental – emissions and removals	Historical emissions (including from deforestation)	Sector activity – as per Schedule 3 and Part 1 of Schedule 4	Bi-annually	Final data - August and February Preliminary data could be released as early as practicable after March 31	From 2008 or 2010 (earliest data available)	EPA (no change)	NZ ETR. A link on the master site will redirect to the NZ ETR reports site	No	No	Yes, as historical emissions are not currently published via the NZETR
Fundamental – emissions and removals	Other historical information on forestry: planted forest land	Post-1989, calendar year data (no change)	Annually (no change)	April (no change)	Historical data	MPI (no change)	A link on the master site will redirect to the MPI site where the National Exotic Forest Description Report is uploaded, and where Reports from previous years can also be accessed	No	No	Small costs – currently Reports from previous years are not provided at the same location
Fundamental – emissions and removals	Other historical information on forestry: age class	Pre-1990 or post-1989, calendar year (no change)	Annually (no change)	April (no change)	Historical data	MPI (no change)	A link on the master site will redirect to the MPI site where the National	No	No	Small costs – currently Reports from previous years are not

<sup>91</sup> The question asked is: Are there any major additional reporting costs to market participants that had to be considered in making the recommendation?

<sup>92</sup> The question asked is: Are there any confidentiality issues that had to be considered in making the recommendation?

Data type	Data detail	DRAFT RECOMMENDATIONS						Major reporting costs? <sup>91</sup>	Confidentiality issues? <sup>92</sup>	Additional costs for 'Who'?
		Level of aggregation	Frequency of release	Timing of release	Period covered	Who	Delivery mechanism			
							Exotic Forest Description Report is uploaded, and where Reports from previous years can also be accessed			provided at the same location
Fundamental – emissions and removals	Other historical information on forestry: deforestation offsetting	Pre-1990, calendar year data (no change)	Annually (no change)	February/March (no change)	Up to 2025 (no change)	MPI (no change)	A link on the master site will redirect to the MPI site, where the Deforestation Intention Surveys are uploaded	No	No	No
Fundamental – emissions and removals	Marginal abatement cost estimates	No change (sector level but not necessarily as per Schedules 3 or 4)	No change (one-off reports)	N/A	N/A	No change (MfE)	A link on the master site will redirect to existing studies estimating NZ marginal abatement costs	No	No	No
Fundamental – emissions and removals	Projected deforestation (ha)	Pre-1990, calendar year data (no change)	Annually (no change)	February/March (no change)	Up to 2025 (no change)	MPI (no change)	A link on the master site will redirect to the MPI site, where the Deforestation Intention Surveys are uploaded	No	No	No

Data type	Data detail	DRAFT RECOMMENDATIONS						Major reporting costs? <sup>91</sup>	Confidentiality issues? <sup>92</sup>	Additional costs for 'Who'?
		Level of aggregation	Frequency of release	Timing of release	Period covered	Who	Delivery mechanism			
Fundamental – emissions and removals	Projected emissions from non-forestry sectors	Sector activity – as per Schedule 3, calendar year data	Annually, with quarterly updates as possible	See 'Frequency of release'	The periods considered for meeting key emissions reduction targets (e.g. up to 2030)	MfE	A link on the master NZ ETS site. The link should contain associated assumptions	N/A	N/A	Yes, as projections of emissions at the level of Schedule 3 sector activity are not currently made
Fundamental – emissions and removals	Projected emissions from forestry	Pre-1990 or post-1989 forestry, calendar year data	Annually	End of calendar year (to ideally align with the timing for the release of non-forestry projected emissions)	For deforestation – the period covered by the Deforestation Surveys  At least five years ahead for surrender forecasts	MPI	A link on the master NZ ETS site redirecting to MPI's Deforestation Intention Surveys  A link on the master NZ ETS site redirecting to forecasts about surrenders, including assumptions made	N/A	N/A	The additional costs should be minimal as MPI already holds the requested information
Fundamental – carbon market	Number of participants (total, added, and removed)	Sector activity – as per Schedule 3 and Schedule 4	Quarterly (monthly if possible)	Quarterly (monthly if possible)	Historical record	EPA	NZ ETR. A link on the master NZ ETS site will redirect to the NZ ETR reports site	No	No	Yes, as the number of participants is not currently published via the NZETR
Fundamental – carbon market	Forest land under the ETS (ha registered, added/removed)	Pre-1990 or post-1989 (no change)	Annually (no change)	Second half of calendar year (no change)	Historical information	MPI (no change)	A spreadsheet on the MPI site providing historical information on ha registered, added and removed each			Yes, as detailed information on ha added/removed is not currently provided

Data type	Data detail	DRAFT RECOMMENDATIONS						Major reporting costs? <sup>91</sup>	Confidentiality issues? <sup>92</sup>	Additional costs for 'Who'?
		Level of aggregation	Frequency of release	Timing of release	Period covered	Who	Delivery mechanism			
							year. The NZ ETS master site will have a link redirecting to the spreadsheet			
Fundamental – carbon market	Number of NZUs allocated in a calendar year	Sector activity – as per Schedule 3, Schedule 3, calendar year. Where confidentiality arises, sector activities with only a few participants could be aggregated. Account holder information can continue to be reported as currently	Annually for sector activity level  Account-level information – with delay as currently	As soon as practicable after NZUs have been allocated (mid-April)	Historical years under the NZ ETS	No change	NZ ETR. A link on the master NZ ETS site will redirect to the NZ ETR reports site  Also, a link on the master NZ ETS site that will redirect to the EPA's site reporting allocations at account level <sup>93</sup>	No	Yes, see comment in the 'Level of aggregation' column. <sup>94</sup>	Yes, as the number of NZUs allocated is not currently published via the NZETR
Fundamental – carbon market	Number of NZUs to be allocated in the future	Sector activity – as per Schedule 3. Where no confidentiality issues arise, sector activities	Bi-annually (no change)	Mid- and end of calendar year (no change)	5 years ahead (no change)	MfE	A link on the master NZ ETS site. The link should contain associated assumptions	N/A	Yes, see comment in the 'Level of aggregation' column	Yes, as projections of allocations will need to be derived based on (i)

<sup>93</sup> See <http://www.epa.govt.nz/e-m-t/taking-part/Industrial-allocations/allocations-decisions/Pages/2015-final-allocation-decisions.aspx>

<sup>94</sup> Note that entities surveyed did not reveal confidentiality issues with releasing this info at the sector activity level.

Data type	Data detail	DRAFT RECOMMENDATIONS						Major reporting costs? <sup>91</sup>	Confidentiality issues? <sup>92</sup>	Additional costs for 'Who'?
		Level of aggregation	Frequency of release	Timing of release	Period covered	Who	Delivery mechanism			
		with only a few participants could be aggregated								Treasury's total NZ ETS expenses and (ii) projected entitlements (or transfers for removal activities) – see further below
Fundamental – carbon market	Number of NZUs transferred for carbon sinks in a calendar year	NZ ETS sector activity (as per Schedule 4, calendar year) and PFSI transfers (calendar year)	Quarterly, given that emissions returns can fall into different quarters <sup>95</sup>	As soon as practicable after emissions returns for removal activities have been completed and NZUs have been transferred	From 2008	EPA (no change)	NZ ETR. A link on the central NZ ETS site will redirect to the NZ ETR reports site	No	No	Some, as the NZETR currently publishes data on entitlements on aggregate, without differentiating between sectors or sector activities
Fundamental – carbon market	Projected number of NZUs to be transferred for carbon sinks	NZ ETS sector activity (as per Schedule 4, calendar year) and PFSI transfers (calendar year). Where confidentiality issues arise,	Bi-annually	Mid- and end of calendar year to align with projections on free allocations of NZUs to Schedule 3 sectors	At least five years ahead	MPI (forestry) MfE (non-forestry)	A link on the master NZ ETS site redirecting to forecasts about surrenders, including assumptions made	N/A	N/A	Yes for MfE, as it does not currently make projections of removals in the non-forestry sectors.  For MPI, the additional costs

<sup>95</sup> As described in Chapter 3.4.

Data type	Data detail	DRAFT RECOMMENDATIONS						Major reporting costs? <sup>91</sup>	Confidentiality issues? <sup>92</sup>	Additional costs for 'Who'?
		Level of aggregation	Frequency of release	Timing of release	Period covered	Who	Delivery mechanism			
		ETS sector activities with only a few participants could be aggregated								should be minimal as it already holds the requested information.
Fundamental – carbon market	Number of NZUs held in accounts (excluding the Crown)	By sector activity (as per Schedules 3 and 4) for regulated entities, and by non-regulated entities (e.g. financial intermediaries) on aggregate. Where confidentiality issues arise, activities with only a few participants could be aggregated. Where an entity's holdings cannot be mapped to a sector activity because the entity operates	Bi-annually	Mid-year (to align with the collection of data on allocation and surrender), and beginning of next calendar year	Since records are possible	EPA (no change)	NZ ETR. A link on the master NZ ETS site will redirect to the NZ ETR reports site	No	Yes, see comment in the 'Level of aggregation' column. <sup>96</sup>	Yes, as the number of NZUs held in accounts is not currently published via the NZETR

<sup>96</sup> Note that entities surveyed did not reveal confidentiality issues with releasing this info at the sector activity level.

Data type	Data detail	DRAFT RECOMMENDATIONS						Major reporting costs? <sup>91</sup>	Confidentiality issues? <sup>92</sup>	Additional costs for 'Who'?
		Level of aggregation	Frequency of release	Timing of release	Period covered	Who	Delivery mechanism			
		across multiple activities, the number of NZUs held should be indicated against the full list of such activities								
Fundamental – carbon market	Number of NZUs cancelled <sup>97</sup>	Company level (no change)	Monthly (no change)	Monthly (no change)	From 2012 (no change)	EPA (no change)	Two options: keep the spreadsheet available as currently on the EPA site or make it available via the NZETR. Either way, a link on the master NZ ETS should redirect to the location of the spreadsheet	No	No	Minimal
Fundamental – carbon market	Number of NZUs surrendered for emissions / deforestation or harvesting	NZ ETS sector activity ( as per Schedule 3 or Part 1 of Schedule 4, calendar year), PFSI transfers	Quarterly, given that emissions returns (and assessments/amendments to returns) can fall into different quarters	As soon as practicable after emissions returns for removal activities have been completed	From 2010 (no change)	EPA (no change)	NZ ETR. A link on the central NZ ETS site will redirect to the NZ ETR reports site	No	No	Yes, as the NZETR does not currently provide information on the number of NZUs

<sup>97</sup> This refers to voluntary cancellations by account holders who request that this data be published – this data is not published if such a request has not been made.

Data type	Data detail	DRAFT RECOMMENDATIONS						Major reporting costs? <sup>91</sup>	Confidentiality issues? <sup>92</sup>	Additional costs for 'Who'?
		Level of aggregation	Frequency of release	Timing of release	Period covered	Who	Delivery mechanism			
		(calendar year) <sup>98</sup>		and NZUs have been transferred						surrendered at the level of Schedule 3 sector activity. Also, the current surrender data provided in the NZETR is at the aggregate level and reflects surrender transactions in a year, and not surrenders associated with emissions in that year
Transaction – tracking system	Number of transactions	Sector activity level – Schedules 3 and 4, where no confidentiality issues arise. Alternatively, sector activities with only a few	Monthly (no change)	Monthly (no change)	From 2008 (no change)	EPA (no change)	Two options: make the spreadsheet available as currently on the EPA site or via the NZETR. Either way, a link on the central NZ	No	Yes, see comment in the 'Level of aggregation' column. <sup>99</sup>	Yes, particularly if the delivery is via the NZETR, which currently does not provide data on the number of transactions

<sup>98</sup> Some entities report emissions across multiple activities, which may complicate the mapping of reporting emissions by sector activities. In the short-term, we recommend adding a note where this is the case. In the longer-term, we recommend requiring entities to report by sector activities.

<sup>99</sup> Note that entities surveyed did not reveal confidentiality issues regarding the release data on number of transactions between two (anonymous) accounts.

Data type	Data detail	DRAFT RECOMMENDATIONS						Major reporting costs? <sup>91</sup>	Confidentiality issues? <sup>92</sup>	Additional costs for 'Who'?
		Level of aggregation	Frequency of release	Timing of release	Period covered	Who	Delivery mechanism			
		participants could be aggregated. Where an entity's transactions cannot be mapped to a sector activity because the entity operates across multiple activities, the number of transactions should be indicated against the full list of such activities.						ETS should redirect to the location of the spreadsheet		
Transaction – tracking system	Transaction size (internal transfers)	A list of all completed transactions by volume. The listed transactions should only reflect the transfer between the originator and	Ideally daily, as information on transactions is most meaningful if assessed together with daily price information. Weekly also possible	Same as 'Frequency of release'	Previous 13 months; longer if this can be supported by the system with no major additional infrastructure	EPA (no change)	NZ ETR. A link on the master NZ ETS site will redirect to the NZ ETR reports site	No	Yes, see comment in the 'Level of aggregation' column. <sup>101</sup>	Yes, as the NZETR does not currently provide information on transaction volumes

<sup>101</sup> Note that entities surveyed did not reveal confidentiality issues with releasing information on transaction volumes between two (anonymous) accounts.

Data type	Data detail	DRAFT RECOMMENDATIONS						Major reporting costs? <sup>91</sup>	Confidentiality issues? <sup>92</sup>	Additional costs for 'Who'?
		Level of aggregation	Frequency of release	Timing of release	Period covered	Who	Delivery mechanism			
		the final beneficiary – i.e. transactions by intermediaries should be removed <sup>100</sup> . The volumes reported should also reflect only one side of the trade (to avoid duplication)			costs					
Transaction – market platform	Spot price	Closing price (no change)	Ideally daily	Ideally daily	Historical (no change)	Private match makers <sup>102</sup>	Existing platforms <sup>103</sup>	No	No	No
Transaction – market platform	Forward price	Closing price (no change)	Ideally daily	Ideally daily	Bespoke (no change)	Private match makers <sup>104</sup>	Existing platforms <sup>105</sup>	No	No	No

<sup>100</sup> Intermediate transactions will be mostly carried out by carbon brokers, business consultants, traders, which the EPA should be able to identify.

<sup>102</sup> As mentioned previously, we have not established that there is anything that needs to be changed in respect of price disclosure by existing private vendors. Hence, we do not recommend any changes. However, we acknowledge that price disclosure recommendations may differ when viewed from the perspective of improving market governance. We are aware that a review of the NZ ETS governance is under way, and we are willing to review our recommendation in light of the findings from this governance review.

<sup>103</sup> Ibid.

<sup>104</sup> Ibid.

<sup>105</sup> Ibid.

## 6.3 Qualitative information

Submissions during the recent NZ ETS reform consultation process revealed two weaknesses of the NZ ETS that are particularly relevant when discussing the release of qualitative data. These are a general lack of visibility of upcoming policy changes and a poor understanding of the government's commitment to future emissions reduction plans. Both issues have also been highlighted in our stakeholder engagement. One stakeholder stated that "announcements should be made at the same time, in the same way, on the same platform, to all people." Another said "Market needs certainty. Announcements should be provided well in advance of policy implementation."

### **Announcements with potential impact on the market**

In the NZ ETS, there are currently no protocols or established guidance for making announcements with potential impact on the market. By contrast, there are protocols in place to manage announcements in markets regulated by the 2013 Financial Markets Conduct Act – and some of these may apply to the NZ ETS too (e.g. if the ETS announcements might impact equities). A key principle of such protocols is that announcements should be released as widely and through as many channels as possible.

Market prices represent the market's perception of the value of the right to emit GHG at the time the last trade was made. Any announcements or releases of information that have the potential to change the market participant's perception of the value of emissions rights should be treated with the same care as the information that affects other markets such as equity markets and financial markets is treated.

An example of the relationship between the release of information and the protection of market integrity is enshrined in the Financial Market Authority's continuous disclosure requirements<sup>106</sup> for listed companies. Here the obligation lies with directors and officers of the companies to provide timely advice to the market of information, events and developments that would impact on the perception of value of their shares as those situations occur. From a central agency perspective the Reserve Bank of New Zealand routinely provides information that similarly would impact on the perception of value across all financial markets through its website<sup>107</sup>. The Reserve Bank also offers the option to subscribe to email alerts, RSS feeds, twitter and a YouTube channel.

In both the continuous disclosure requirements and the Reserve Bank's information release approach it has been recognised that information that is not commercially sensitive should be disclosed in a manner that doesn't create a category of advantaged investors and disadvantaged participants. The parallel for the carbon market is that information, announcements and presentations that include information that may impact on the market's perception of value should be made available and easily accessible to the widest audience

---

<sup>106</sup> In the Financial Markets Conduct Act 2013 continuous disclosure provisions means "provisions that require a listed issuer that is a party to a listing agreement with a licensed market operator to notify information about events or matters as they arise for the purpose of that information being made available to participants in the licensed market".

<sup>107</sup> See <http://www.rbnz.govt.nz/news>

possible at the same time across all mediums. If this principle is adopted, one of the anxieties about information relating to the carbon market would be alleviated. The NZ ETS master site offers an excellent platform for such information releases. We also suggest that the user of the site is given an option to subscribe to information releases.

### **The protocol for dealing with major regulatory changes**

The release of information relating to major NZ ETS regulatory changes as they are being considered by the Ministry for the Environment could follow the protocol provided by Section 30GA of CCRA 2002, which sets out that the limit of (i) NZUs to be allocated freely or by auction, or of (ii) international unit accepted in the NZ ETS is decided every 5 years on a rolling basis (with annual updates). This process could be extended to cover other decisions, such as relating to international unit supply or NZU, and we recommend that further work be done to investigate this option.

### **The master site**

We suggest that the master site hosts a time table of key dates of information releases and dates that might be of interest for regulatory compliance reasons. A time table would provide a good overview of NZ ETS relevant information, and it would highlight the timing and mechanism of release. For instance, the time schedule would show when the NZ ETS Facts and Figures and the Annual NZ ETS reports are released, and when data from the NZ ETR is getting updated. All agencies would be responsible for providing dates of relevance to their responsibility areas.

Other information that could be provided on the master site includes a schedule of MPI road shows and the presentation materials used on the road shows. Also, general background information on how the NZ ETS works and compliance and reporting information should be on the site. This information may be accompanied with tutorial videos targeted at different market participants. A special section for the forestry participants could be created to facilitate their navigation to the different tools used as part of the NZ ETS regulatory process for foresters (e.g. forestry mapping tools).

## 7. References

---

- Alberola, Chevallier, & Cheze, 2008. The EU Emissions Trading Scheme: The Effects of Industrial Production and CO<sub>2</sub> Emissions on European Carbon Prices.
- Alberola, Chevallier, & Cheze, 2009. Emissions Compliances and Carbon Prices under the EU ETS: A Country Specific Analysis of Industrial Sectors.
- Bertrand, V., 2014. Carbon and Energy Prices under Uncertainty: A Theoretical Analysis of Fuel Switching with Heterogeneous Power Plants. *Resource and Energy Economics*, Volume 38, pp. 198-220.
- Borenstein, S. et al, 2013. Issue Analysis: The Timing of Information Release in the Greenhouse Gas Emissions Cap-and-Trade Market Emissions Market Assessment Committee for AB 32 Compliance Mechanisms.
- Carbon Forest Services, online home page. Available at: <http://www.carbonforestservices.co.nz/> (Accessed on 30 May 2017)
- Carbon Match, online home page. Available at: <https://www.carbonmatch.co.nz/> (Accessed on 30 May 2017).
- Chevallier, J., 2010. The European Carbon Market (2005-2007): Banking, Pricing and Risk-Hedging Strategies. Available at: <https://hal.archives-ouvertes.fr/halshs-00458787/document> (Accessed on 28 March 2017).
- Christiansens, A. C., Arvanitakis, A., Tangen, K. & Hasselknippe, H., 2005. Price Determinants in the EU Emissions Trading Scheme. *Climate Policy*, Issue 5, pp. 15-30.
- Climate Change Response (Emissions Trading) Amendment Act 2008.
- Climate Change Response Act 2002.
- Climate Change (Unit Register) Regulations 2015.
- DeJonghe, C., Delarue, E., Belmans, R. & D'haeseleer, W., 2008. Fuel Switching in the Electricity Sector under the EU ETS: Review and Prospective. *J Eneg Eng-Asce*, Volume 134, pp. 40-46.
- Diaz-Rainey, Ivan, and Daniel Tulloch, 2016. Carbon Pricing in New Zealand's Emissions Trading Scheme. Available at: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2759284](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2759284) (Accessed on 19 April 2017).
- Ellerman et al (2007), A.D., Buchner, B.K., 2007. The European Union Emissions Trading Scheme: origins, allocation, and early results. *Review of Environmental Economics and Policy* 1, 66–87.
- Ellerman, A. D., Marcantonini, C. & Zaklan, A., 2014. The EU ETS: Eight Years and Counting. *EUI Working Paper RSCAS* , Issue 4.

Environmental Protection Authority (EPA), Carbon market, domestic, units, transferred, NZEUR, emissions, unit. Available at [http://www.epa.govt.nz/e-m-t/reports/carbon\\_market/Pages/default.aspx](http://www.epa.govt.nz/e-m-t/reports/carbon_market/Pages/default.aspx) (Accessed on 30 May 2017).

Environmental Protection Authority (EPA), 2015a. Emissions Trading Scheme Report. Available at: [http://www.epa.govt.nz/e-m-t/reports/ets\\_reports/annual/Pages/default.aspx](http://www.epa.govt.nz/e-m-t/reports/ets_reports/annual/Pages/default.aspx) (Accessed on 18 April 2017).

Environmental Protection Authority (EPA), 2015b. ETS Facts and Figures. Available at: [http://www.epa.govt.nz/e-m-t/reports/ets\\_reports/annual/Pages/default.aspx](http://www.epa.govt.nz/e-m-t/reports/ets_reports/annual/Pages/default.aspx) (Accessed on 18 April 2017).

Environmental Protection Authority (EPA), 2015c. Industrial Allocation Decisions. Available at <http://www.epa.govt.nz/e-m-t/taking-part/Industrial-allocations/allocations-decisions/Pages/2015-final-allocation-decisions.aspx> (Accessed on 30 May 2017) (Accessed on 18 April 2017).

Environmental Protection Authority (EPA), 2015d. Being a Participant in the Emissions.

Trading Scheme. User Guide. Available at [http://www.epa.govt.nz/Publications/Being\\_a\\_Participant.pdf](http://www.epa.govt.nz/Publications/Being_a_Participant.pdf) (Accessed on 31 May 2017).

EU ETS Company Database, Market analysis and carbon disclosure solution. Available at: [https://www.carbonmarketdata.com/files/publications/EUETS\\_company\\_database.pdf](https://www.carbonmarketdata.com/files/publications/EUETS_company_database.pdf) (Accessed on 18 April 2017).

European Commission, 2013. Green Paper. A 2030 framework for climate and energy policies.

Financial Markets Conduct Act 2013.

Infometrics, 2015. A general equilibrium analysis of options for New Zealand's post-2020 climate change contribution. Available at: <http://www.mfe.govt.nz/node/20761> (Accessed 30 May 2017).

Karpas, Eric and Suzi Kerr, 2011. Preliminary Evidence on Responses to the New Zealand Forestry Emissions Trading System". Motu Working Paper 11-09. Wellington: Motu Economic and Public Policy Research.

Kettunen, J et al., 2011. Investment Propensities under Carbon Policy Uncertainty, The Energy Journal, Vol. 32, No. 1.

Koch, N., Grosjean, G., Fuss, S., Edenhofer, O., 2015. Politics matters: regulatory events as catalysts for price formation under cap-and-trade. Available at: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2603115](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2603115) (Accessed on 20 April 2017).

Landcare Research, 2015. Modelling the economic impact of New Zealand's post-2020 climate change contribution. Available at: <http://www.mfe.govt.nz/node/20771> (Accessed 30 May 2017).

Leining, C., Kerr, S., 2016, 'Lessons Learned from the New Zealand Emissions Trading Scheme', Motu Working Paper 16-06. Available at: <http://motu.nz/our-work/environment->

[and-resources/emission-mitigation/emissions-trading/lessons-learned-from-the-new-zealand-emissions-trading-scheme/](#) (Accessed on 28 March 2017).

Manley, B., 2016. Afforestation responses to carbon price changes and market uncertainties. Available at:

<http://www.mfe.govt.nz/sites/default/files/media/Climate%20Change/Afforestation%20responses%20to%20carbon%20price%20changes%20and%20market%20certainties.pdf> (Accessed 30 May 2015).

Ministry of Business, Innovation and Employment (MBIE), Energy and data modelling. Available at: <http://www.mbie.govt.nz/info-services/sectors-industries/energy/energy-data-modelling> (Accessed on 30 May 2017).

Ministry for the Environment, 2011. ETS Review 2011: Proposed amendments to the Climate Change Response Act 2002.

Ministry for the Environment, National communication and the biennial report. Available at <http://www.mfe.govt.nz/climate-change/reporting-greenhouse-gas-emissions/nzs-national-communication-and-biennial-report> (Accessed on 30 May 2017)

Ministry for the Environment, Climate change resources. Available at: <http://www.mfe.govt.nz/climate-change/resources> (Accessed on 30 May 2017)

Ministry for the Environment (MfE), 2016a. New Zealand Emissions Trading Scheme Review 2015/16: Operational Matters Technical Note. Wellington: Ministry for the Environment.

Ministry for the Environment (MfE), 2016b. The New Zealand Emissions Trading Scheme evaluation report. Available at <http://www.mfe.govt.nz/publications/climate-change/new-zealand-emissions-trading-scheme-evaluation-report-2016> (Accessed 30 May 2017).

Ministry for the Environment (MfE), 2016c. The New Zealand Emissions Trading Scheme Evaluation . Available at <http://www.mfe.govt.nz/publications/climate-change/new-zealand-emissions-trading-scheme-evaluation-report-2016> (Accessed 30 May 2017).

Ministry for the Environment (MfE), 2015a. New Zealand Emissions Trading Scheme Review 2015/16: Discussion document and call for written submissions. Available at: <http://www.mfe.govt.nz/publications/climate-change/new-zealand-emissions-trading-scheme-review-2015-16-discussion-document>. (Accessed on 10 May 2017).

Ministry for the Environment (MfE), 2015b. New Zealand Emissions Trading Scheme Review 2015/16: Stage two submissions. Available at: <http://www.mfe.govt.nz/climate-change/reducing-greenhouse-gas-emissions/new-zealand-emissions-trading-scheme/reviews-nz-e-2> (Accessed on 30 May 2017).

Ministry for the Environment (MfE), 2015c. New Zealand's Second Biennial Report under the United Nations Framework Convention on Climate Change. Available at: <http://www.mfe.govt.nz/sites/default/files/media/Climate%20Change/second-biennial-report.pdf> (Accessed on 21 April 2017).

Ministry for Primary Industries, 2015. An overview of Forestry in the ETS. Available at: <https://www.mpi.govt.nz/document-vault/6991> (Accessed 30 May 2015).

Motu, Emissions Trading Scheme Forecasting Data - OIA16-0167, Available at <http://motu.nz/our-work/environment-and-resources/emission-mitigation/emissions-trading/emissions-trading-scheme-forecasting-data/> (Accessed on 30 May 2017).

Neuhoff, K., Schopp, A., Boyd, R., Stelmakh, K., Vasa, A., 2012. Banking of Surplus Emissions Allowances: Does the Volume Matter?

New Zealand Government Website. Decisions on Kyoto Protocol emission units (6 December 2013). Available at <https://www.beehive.govt.nz/release/decisions-kyoto-protocol-emission-units> (Accessed on 30 May 2017).

New Zealand Treasury (NZ Treasury), 2016., Half Year Economic and Fiscal Update. Available at : <http://www.treasury.govt.nz/budget/forecasts/hyefu2016/hyefu16.pdf> (Accessed on 30 May 2017).

OECD 2010. Guidelines for cost-effective agri-environmental policy measures. Paris, OECD Publishing.

OMF CommTrade Carbon, online home page. Available at: <https://www.commtrade.co.nz/> (Accessed on 30 May 2017).

Ormsby, J. and Kerr, S., 2016., The New Zealand Emissions Trading Scheme de-link from Kyoto: impacts on banking and prices, Motu Working Paper 16-13, pp. 8.

Parliamentary Counsel Office, New Zealand Legislation, Climate Change Response Act 2002. Available at: <http://www.legislation.govt.nz/act/public/2002/0040/latest/whole.html#DLM1662654> (Accessed on 30 May 2017).

Sin, I., Keer, S., Hendy, J., (2005. Taxes vs Permits: Options for Price-Based Climate Change Regulation. New Zealand Treasury Working Paper 05/02.

Stavins, R.N., 1995. Transaction Costs and Tradeable Permits, Journal of Environmental Economics and Management 29, 133 – 148.

Reserve Bank of New Zealand, online news page. Available at: <http://www.rbnz.govt.nz/news> (Accessed on 30 May 2017).

# Appendix 1 Stakeholder list, interview topics and questions

Table 9 lists the types of stakeholders we engaged with, and the type of engagement.

**Table 9 List of NZ ETS stakeholders engaged with**

Type of stakeholder	Number	Interview / questionnaire
Central government and regulator	3	Interview
Mandatory non-forestry participants	2	Questionnaire
Voluntary non-forestry participant (opt-in)	1	Questionnaire
Mandatory forestry participants	2	Questionnaire
Voluntary forestry participants	1	Questionnaire
Carbon brokers	3	Interview
Business and strategy consultants (forestry)	1	Questionnaire
Carbon traders and analysts	3	Interview

## Stakeholders, excluding central government and regulators

In the questionnaires, we listed types of information related to the fundamentals of demand and supply. The types of information included:

- historical and projected emissions;
- historical and projected emission removal levels;
- historical and projected deforestation;
- number of NZUs allocated and number of NZUs to be allocated in the future;
- number of units transferred for removal activities;
- number of units held in accounts;
- number of units cancelled;
- number of units surrendered;
- number of transactions;
- transaction volume (number of units);
- parties to transactions;
- market prices;
- spot bid;
- spot offer, and
- forward price.

*Mandatory and voluntary participants, business consultants and carbon traders*

This group was asked the following questions:

1. Do you require this information to be provided in the market in order to make judgement / forecasts about NZU value?
2. If yes to (1), at what level of aggregation would you find the data most useful?
3. If yes to (1), what frequency of data release would you find most useful for making judgement / forecasts about NZU value?
4. If yes to (1), please indicate if making the data publicly available at the level of aggregation indicated in Q(2) would raise any data sensitivity issues for you?

For participants with reporting requirements we also asked:

5. If yes to (1), please indicate if reporting on this data at the level of aggregation indicated in (2) and at the frequency level in (3) would increase your current reporting costs.

We also asked a set of open-ended questions, listed below.

- Please provide any comments regarding the provision of qualitative information in the NZ ETS. By qualitative information we mean the way in which announcements are made by authorities regarding the release of relevant information, such as policy changes, data release, commentaries etc.
- Please describe/comment on the approach you've taken for selling/buying units in the NZ ETS. If you have used a broker, please tell us whether your experience has been satisfactory or not, and why.
- If you are an opt-in participant, what specific information about the NZ ETS did you find missing or difficult to find/access when making the decision on whether or not to opt into the scheme? (This question were only relevant for non-forestry participants)
- Please provide any general comments regarding your experience with finding needed information on NZ ETS. Do you find that the provision is fragmented, incomplete, untimely, or done in a non-user friendly format? We would appreciate any specific examples, and other comments you may have.
- Please provide any other comments you would like to make regarding information provision in the NZ ETS. This can be based on your current experience with collecting or reporting on data, your view of what the improvements should be, any concerns about transaction costs or data sensitivity, or other.

*Carbon brokers, carbon traders and analysis*

This group was asked the following general questions (some traders were both interviewed and asked to complete the questionnaire above):

- How information opacity has affected the ability / readiness to trade in the spot and the forward markets
- Market liquidity trends, and the main factors affecting NZU liquidity
- Thoughts around how the trading arrangements could evolve
- The feasibility / implications of publishing intra-day NZU spot data, including volume and price
- The liquidity of forward trading and the level of interest in forward trading

- Any data confidentiality concerns regarding disclosure of trades completed
- The types of market participants that most commonly apply for broker services – by size, sector, trading experience etc. (only directed at carbon brokers)
- Their approach to trading NZUs (including platforms used and types of contracts) (only directed at carbon traders and analysts)
- The types of market participants that they most commonly trade with directly (only directed at carbon traders and analysts)

## Central government and regulators

For the Government agencies, we tailored interview questions around their current information provision and responsibilities. Below we list the questions directed at EPA, MPI, MfE.

### *Environmental Protection Agency*

#### **1. Historical emissions**

Currently, the annual ETS report provides emissions at the sector activity level but only for the reporting year.

- (a) Would it be feasible for the NZ ETS Registry (NZETR) to provide historical emissions by each sector activity? If not, please explain.
- (b) Would it be feasible for the NZETR to provide historical emissions by account holders? If not, please explain (including any concerns about commercial sensitivity etc.).

#### **2. Historical emissions removal levels**

Currently, the annual ETS report provides the emissions removal level in the forestry and other sectors. For forestry removals, it provides information since 2008, whereas for other removal activities – for the reporting year only.

- (a) Would it be feasible for the NZETR to provide historical emission removal levels by each removal activity? If not, please explain.
- (b) Would it be feasible for the NZETR to provide historical emission removal levels by account holder? If not, please explain (including any concerns about commercial sensitivity etc.).

#### **3. Number of units issued**

- (a) The NZETR provides annual aggregate information on number of units ‘issued.’ Could you please clarify what this number includes (in addition to allocation and entitlements, which we assume to be included)?

#### **4. Number of units allocated**

The NZETR currently provides historical information of units issued on an aggregate level, and the annual ETS Facts and Figures provides allocation information by sector activities (although not exactly by the same list of activities as per the annual ETS report).

- (a) Would it be feasible for the NZETR to provide historical allocation by each sector activity? If not, please explain.

- (b) Would it be feasible for the NZETR to provide historical allocation by each account holder? If not, please explain (including any concerns about data sensitivity etc.).

#### **5. Number of units transferred for forestry and non-forestry removals (entitlements)**

The NZETR currently provides historical information on entitlements for the forestry and non-forestry activities on aggregate. The ETS Facts and Figures provides historical entitlements by forestry and non-forestry removal activities.

- (a) Would it be feasible for the NZETR to provide historical entitlement data separately for forestry and non-forestry activities? If not, please explain.
- (b) Would it be feasible for the NZETR to provide historical entitlement data by account holder? If not, please explain (including any concerns about commercial sensitivity etc.).

#### **6. Number of units held in accounts**

The NZETR publishes data on the number of offsets held by each account, but not also on the number of NZUs.

- (a) Would it be feasible for the NZETR to provide historical information on units held by accounts? If not, please explain (including any concerns about commercial sensitivity etc.).

#### **7. Number of units voluntarily cancelled**

The NZETR provides historical data on voluntary cancellations on aggregate; data on voluntary cancellations is also provided on the EPA site on a monthly basis and at the account level.

- (a) Would it be feasible for the NZETR to provide historical information on units voluntarily cancelled by accounts? If not, please explain.

#### **8. Number of units surrendered**

The NZETR currently provides aggregate historical data on the number of units surrendered. Additionally, the ETS Facts and Figures provides such historical data at the sector level (the source of this data seems to be MPI).

- (a) Would it be feasible for the NZETR to provide historical data on units surrendered at the sector level? If not, please explain.
- (b) Would it be feasible for the NZETR to provide historical data on units surrendered at the sector activity level? If not, please explain.
- (c) Would it be feasible for the NZETR to provide historical data at the account level? If not, please explain (including any concerns about commercial sensitivity etc.).

#### **9. Number of unit transactions**

On its site, the EPA currently provides monthly data on the total number of unit transactions in the NZ ETS.

- (a) Please clarify what this transactions number means. (Does this reflect a final transfer of unit ownership between accounts?)
- (b) Would it be feasible for the NZETR to provide historical information on the number of transactions between each two accounts? If not, please explain

(including any concerns about commercial sensitivity – e.g. the EU ETS publishes transaction-related data with a 3-year delay).

#### **10. Size of transactions**

- (a) The EPA publishes monthly data on the total number of units transferred internally. Would it be feasible for the NZETR to provide information on the number of units transferred between each two accounts? If not, please explain (including any concerns about commercial sensitivity – e.g. the EU ETS publishes transaction-related data with a 3-year delay).

#### **11. Compliance cycle**

There are three key dates in the NZ ETS compliance cycle: emissions returns by 31 March, units surrendering by 31 May, EPA report on emissions by 1 Jul.

- (a) Could you please clarify what the timeline is for unit allocation in the Registry accounts for regulated activities under Schedule 3?
- (b) Is it correct to assume that entitlements for removal activities are granted shortly after the submissions of the emissions returns? What is the exact timeline?

#### **12. Wrap up**

- (a) Do you have any other comments that you would like to make?

*Ministry for the Environment*

#### **1. Projected emissions**

- (a) Through the biennial reports, the MfE currently provides emissions forecasts for the following sectors: energy, transport, industrial processes and product use, and agriculture, LULUCF, and waste. Would it be feasible to provide such projections but (i) mapped by the sectors as covered by the NZ ETS, and/or (ii) at the sector activity level as defined above?
- (b) Table 5 from the second biennial report provides the detailed assumptions used for making emissions projections. Are the biennial reports the central source of information containing these assumptions?

#### **2. Projected removal levels**

- (a) Are there any projections being made of emission removal levels that may occur in the forestry sectors in the future? This, as we understand, is equivalent to making projections about forestry unit entitlements.
- (b) Are there any projections being made of emission removal levels that may occur in the non-forestry sectors? This, as we understand, is equivalent to making projections about non-forestry unit entitlements.
- (c) If yes to 2.1 and/or 2.2, are there any restrictions to making the key assumptions used in those projections publicly available?

#### **3. Projections of NZU allocation to non-forestry sectors**

- (a) How far ahead does the MfE make projections about the units that will be annually issued for the NZ ETS as a whole?

- (i) How are these projections tied to the NZ carbon budgets assumed under international agreements (e.g. COP 21 in Paris)? Some market participants have mentioned the need for more clarity/transparency regarding progress against carbon budgets and on how NZ ETS contributes to meeting these budgets.
- (b) How far ahead does the MfE make projections about the units that will be allocated annually to non-forestry sectors (each separately)?
- (c) How far ahead does the MfE make projections about the units that will be allocated annually to non-forestry sector activities (each separately)?
- (d) How far ahead does the MfE make projections about the units that will be allocated annually to non-forestry account holders (each separately)?
- (e) If projections are made for any of the Qs 3.1-3.4, are there any restrictions to making the key assumptions used in the projections publicly available?
- (f) If projections are made for any of the Qs 3.1-3.4, are these communicated in either a restricted or an unrestricted form? (e.g. in the EU ETS, allocations at company level are published for years ahead within a trading period)
  - (i) If projections are made for Qs 3.1-3.4, but these are not communicated in any way, please explain why (including any concerns about data sensitivity etc.).

#### **4. Projections of international unit use**

- (a) What projections, if any, are currently being made about the potential future use of international units to meet emissions reductions commitments made under international agreements (e.g. COP 21 Paris Agreement)?

#### **5. NZU allocation**

- (a) How does the MfE decide on how many units it will issue a year, given that entitlements are issued post-factum (i.e. after the removal activities have taken place)?
- (b) What happens to any left-over units that were not allocated or provided as entitlements?
- (c) What information is made publicly available with regards to how the MfE decides on the number of entitlement units to be allocated or rolled-over?

#### **6. Carbon price**

- (a) The second biennial report provides information on the carbon prices used for projecting emissions in the non-forestry and forestry sectors.
- (b) What assumptions are being used in making projections about carbon prices, and how do they differ between forestry and non-forestry sectors?
- (c) Are there any restrictions to making these assumptions publicly available?

## 7. Wrap up

- (a) Do you have any other comments that you would like to make?

*Ministry for Primary Industries*

### 1. Projected deforestation

The New Zealand Biennial Reports under the UNFCCC provide projections about LULUCF<sup>108</sup> emissions. In the context of the NZ ETS, projections about the level of deforestation are important because they affect forecasts of future NZU supply.

- (a) Do projections about the level of deforestation differentiate between pre-1990 and post-1989 forests (in the meaning of the NZ ETS)?
- (b) Apart from the biennial reports, what are the other sources providing easily accessible information on projected deforestation and on the assumptions used in making these projections?

### 2. MPI's ETS online system

- (a) Are you aware of any current issues with the online system? (I.e. how user-friendly is it?)
  - (i) What feedback have you received from users of the online system?
- (b) Can you tell us about your Sustainable Forestry Bulletin (e.g. how often do you send out updates, what sort of information does it include etc.?)
  - (i) Approximately how many registered forestry owners have subscribed to this list?

### 3. Forestry participation

- (a) Of 650,000 hectares of eligible land, 53 percent has not been registered under the ETS. Are you aware of any reasons for why these potential market participants have not registered their land (E.g. too complicated, not aware of it, participating in other programmes)?
- (b) What are the incentives for some forestry owners to choose to participate in alternative forestry programmes, such as the Afforestation Grant Scheme or the Permanent Forest Sink Initiative, as opposed to directly in the NZ ETS?

### 4. Compliance by the forestry sector

- (a) During the 2016 consultation for the NZ ETS review, it was indicated that the rise in reporting failures (e.g. late filings, failure to submit the emissions report etc.) starting in 2012-13 was primarily attributable to forestry-sector participants. Could you please explain why that might be the case?

### 5. Wrap up

- (a) In your opinion, what are the overall issues with the information provision in regards to NZ ETS?
- (b) Do you have any other comments that you would like to make?

---

<sup>108</sup> Land-use, land-use change and forestry

## Appendix 2 Drivers of emissions and carbon removals

---

The drivers of emitting activities include:

- **Economic activity.** Several studies show that fluctuations in the level of economic activity play an important role in carbon price returns in the combustion, paper and iron sectors.<sup>109</sup> Other studies show that one of the main causes of the European Emission Allowance (EUA) weak price signal can be attributed to the deep and lasting economic crisis that followed the 2007-2008 financial markets crash<sup>110</sup>.
- **Price levels.** Prices of products/services delivered by the main traders on a carbon market can have a significant impact on the price of units. The higher those prices, the more profitable production expansion would be at the margin, and thus the higher the pressure on unit demand to cover the additional emitting activities. According to Hintermann et al (2014), for example, natural gas prices were found to have a significant influence on the price of EUAs during Phase II of the EU ETS. Another way to think about global prices is in terms of opportunity costs. This is particularly relevant for the NZ forestry sector. Evidence suggests, for example, that low afforestation levels in NZ since 2008 has been consistent with relatively low timber prices. By contrast, the increasing dairy prices from 2008 to 2014, created pressure to convert cleared land or young forests to dairy<sup>111</sup>. Harvested forest, in turn, carries the liability to surrender units in proportion to the GHG released back in the atmosphere as a result of harvesting.
- **Climate.** The impact of weather patterns on the unit supply and demand is indirect through the influence on energy demand (e.g. for heating or air conditioning) and clean energy supply (e.g. from hydro, wind or solar power plants). It was observed, for example, that the colder temperatures of winter 2006 increased EUA prices, whereas the warmer winter of 2007 pushed prices down<sup>112</sup>. In the NZ energy sector, climate variables are one of the assumptions included in projections of sector emissions.<sup>113</sup>
- **Abatement options.** The availability of different emissions abatement options can help regulated entities reduce their levels of emission even when economic activity is high. This directly affects the unit demand and supply in the market. The literature on fundamental factors affecting the unit price in the EU ETS, for example, suggests that fuel switching in the EU has been one of the most relevant short-term abatement option.<sup>114</sup>

---

<sup>109</sup> See Alberola et al (2008) and Alberola et al (2009).

<sup>110</sup> See. European Commission (2013) and Neuhoff et al (2012).

<sup>111</sup> See Leining and Kerr (2016).

<sup>112</sup> See Chevallier (2010).

<sup>113</sup> See MfE (2015).

<sup>114</sup> See Bertrand (2014) and Christianses et al (2005).

- **Overlapping emissions reduction policies.** Overlapping policies include deployment targets for renewable energy sources (RES) and carbon taxes. The coexistence of an ETS and RES deployment targets, for example, creates a classic case of interaction effects. Since renewable targets displace CO<sub>2</sub> emissions within an ETS, unit demand and price will be reduced. A simulation by DeJonghe et al (2008), for instance, shows that the unit price could drop to zero depending on the stringency of the targets, although Ellerman et al (2014) caution on the conclusions drawn regarding the of unit price impacts due to RES targets.