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Stationary Energy and Industrial Process Component of the New Zealand Emissions Trading Scheme

Technical Advisory Group
Final Report

October 2008

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Summary

I General

Role of the Stationary Energy and Industrial Processes Technical Advisory Group

The Stationary Energy and Industrial Processes Technical Advisory Group (SEIP TAG) was established in December 2007 to provide guidance and advice on technical design elements of the stationary energy and industrial process (SEIP) emissions components of the New Zealand Emissions Trading Scheme (NZ ETS). The SEIP TAG comprises 16 experts, including three government officials and 13 industry experts (see Annex I membership list).

The key task of the SEIP TAG is to provide advice to the Government **on options for a transitional and partial offsetting of NZ ETS-related costs** as a result of emissions from the SEIP sectors.

Some clarification is warranted as to what is meant by ‘transitional and partial offsetting of NZ ETS-related costs’ and related terminology such as ‘free allocation’ in this context. One of the key principles underlying the NZ ETS legislation is that emitters face the full cost of their emissions. Participant firms face this full cost through the obligation to surrender New Zealand Units (NZUs) for every tonne of their associated emissions.

Most New Zealand firms will face increased costs of production under the NZ ETS, either because they are required to surrender NZUs to cover their emissions or because they face higher energy and fuel costs. Many firms will be able to pass a portion of these costs down the supply chain to their customers. However, many firms, typically those in trade-exposed sectors, will be unable to pass on the bulk of these costs. To reduce the impacts on firms unable to pass these costs on, two options for partially offsetting these costs during a transition period were considered by the Government in its Framework Document of 2007. The first option was an allocation of NZUs free of charge, the second was a progressive obligation on emitters. Both of these options and related design issues were referred to the SEIP TAG for further evaluation.

Specific issues related to this task are:

- a) defining and evaluating different options for the allocation of units or other assistance
- b) as part of the above, defining thresholds (size and scope) for assistance, rules for entry, trade exposure tests, recognition of early action etc
- c) advising on specific issues about partially offsetting the costs of electricity – specifically, how to assess the impacts of emission costs on electricity costs.

The Terms of Reference of the SEIP TAG (see Annex II) did not extend to design features of the NZ ETS that are specifically addressed as provisions in the draft legislation (now the **Climate Change Response (Emissions Trading) Amendment Act 2008**, hereafter referred to as the Act), for example the definition of emission obligation, the fixed allocation pool for the SEIP sectors, or the phase out of allocation from 2019 to 2029.

General Caveats

- Participation in the SEIP TAG is in no way indicative of support by members of the SEIP TAG for the design features of the NZ ETS laid out in the Act.
- Members of the SEIP TAG have participated as technical experts rather than as representatives of their firms or industry organisations. The respective organisations to

which the members belong reserve the right to challenge or disagree with the recommendations put forward by the SEIP TAG.

- Recommendations supported by government officials on the SEIP TAG do not necessarily reflect government policy.
- The allocation options considered by the SEIP TAG are methodologies to allocate units within a pool fixed at 90 per cent of eligible firms' emissions in 2005 (as set out in the Act). The fact that industry members have deliberated on allocation methodologies within this context should not be interpreted as being indicative of their support for the framework prescribed in the legislation. In fact, a number of industry members of the SEIP TAG strongly believe that it is not possible to develop a plan that prevents leakage and economic regrets within a pool fixed at 90 per cent of eligible firms' emissions in 2005, and that this would be further exacerbated if a new entrant reserve, and/or intensity-based allocation is provided within the fixed pool.

Summary and recommendations

The SEIP TAG has generally worked to try and reach consensus on recommendations reflecting the views of the group. However, for some recommendations members have reserved the right to express an industry, officials or a minority view (a minority view can be expressed by as few as one TAG member). The wording of the recommendations reflects the degree of consensus, for example:

- “the SEIP TAG recommends” indicates a recommendation supported by all members of the SEIP TAG
- “the majority of SEIP TAG recommends” indicates a majority of SEIP TAG members favour the recommendation – a minority view may also be expressed
- “industry members of the SEIP TAG recommend” indicates a recommendation supported by industry members of the SEIP TAG
- “officials on the SEIP TAG recommend” indicates a recommendation supported by government officials on the SEIP TAG.

Organisation of the work/structure of this report

The SEIP TAG met on 12 occasions during a period from December 2007 to September 2008. The SEIP TAG set up a number of sub-groups which met separately from the full SEIP TAG to progress specific issues in more detail.

The above tasks essentially fell into two categories; firstly, those **work streams relevant to the preparation of a draft allocation plan** and, secondly, **methodologies relevant to the drafting of regulations**. This report addresses each of these issues in Sections II and Section III respectively.

Work on areas relevant to the preparation of a draft allocation plan is further split up into a series of work streams. These were:

- **data requirements**
- **eligibility**
- **allocation sub-group**
- **sub-group on electricity market price effects**
- **progressive obligation.**

The work stream on data requirements addressed issues relevant to all the allocation work streams.

Section II – Issues Relevant to the Preparation of an Allocation Plan

Table 1 outlines the decision tree framework adopted by the SEIP TAG for working through the various issues relevant to the preparation of an allocation plan.

Table 1 Decision tree framework – issues relevant to the preparation of a draft allocation plan

SEIP TAG work relevant to allocation		
Issue	Task of the SEIP TAG	Recommendations
A. Why should costs be offset in the SEIP sectors?	Clarify the rationale for offsetting costs	
B. How should costs be offset?	Consider whether economic regrets should be avoided by a <u>transitional allocation of emission units</u> or a <u>progressive obligation</u> .	Recommendation 1
C. Who should be eligible for an allocation of units?	<ol style="list-style-type: none"> 1. Define trade exposure <ol style="list-style-type: none"> 1. Consider what tests/thresholds should be used to determine whether impacts are material enough to warrant assistance. <ol style="list-style-type: none"> a. Determine whether a test should be on the basis of impact on cost, profit or revenue. b. Evaluate whether multiple thresholds (categories of trade exposure) are warranted. c. Consider how the point of eligibility should be defined. 2. Define any other thresholds <ol style="list-style-type: none"> a. Determine rationale for and nature of de-minimus threshold or tests. b. Determine rationale for and nature of automatic threshold. 	Recommendations 2–12
D. How should we allocate units?	<ol style="list-style-type: none"> 1. Develop criteria and apply them to different allocation methodologies. 2. Consider how new entrants and growth by incumbents should be addressed. 3. Consider what rules should be applied to firms that close. 4. Consider what rules should apply to firms that move location within New Zealand. 	Recommendation numbers 13–18
E. How should we address electricity price impacts?	<ol style="list-style-type: none"> 1. Review previous modelling work on this issue, identify and undertake additional modelling if required. 2. Define the electricity price impact in a carbon-constrained world. <ol style="list-style-type: none"> a. Determine a rationale of how to calculate the price impact for period 2010–2012. b. Determine a rationale of how to determine the cost of an NZU. 3. Determine the factor (tCO₂-e/MWh) that will be applied to eligible firms who are exposed to the electricity price impact. 	Recommendation number 19

A Rationale for cost offsetting

As a starting point in its work, the SEIP TAG discussed the underlying rationale for partially offsetting NZ ETS-related costs. The SEIP TAG considered the discussion included in the Framework Document, which focussed on economic regrets; it also considered a wider set of issues relating to protection against emissions leakage.

The SEIP TAG agreed that the primary purpose of any cost-offsetting measures (eg, allocation of units) is the avoidance of economic regrets.

The majority of the SEIP TAG agreed that the focus of any cost-offsetting measures should be on trade-exposed firms ie, those firms producing goods that are sold at prices set in international markets where it is unlikely that emission regulations are affecting prices. It is these firms who face international competition who could, if faced with significant NZ ETS -related costs, be forced to reduce output and, in some cases, close plants.

However, some **industry members** are of the view that this definition of economic regrets and its focus on firms producing goods that are sold at prices set in international markets is too narrow and that there may be other circumstances where compensation for stranded assets resulting from the introduction of the NZ ETS is warranted.

B How NZ ETS related costs should be offset?

Two broad options were considered as the method for providing assistance to firms facing increased costs: **(1) a progressive obligation** and **(2) a transitional allocation of emission units**.

A progressive obligation introduces a requirement for selected participants in the NZ ETS to surrender emission units at a rate that starts at less than one NZU for one tonne of CO₂-equivalent emissions but that builds up to a one for one requirement over time.

The SEIP TAG concluded that a progressive obligation would not adequately target trade-exposed firms. Specifically, targeting the progressive obligation at trade-exposed firms was considered to be more difficult to administer in an NZ ETS employing an upstream point of obligation. As a consequence the SEIP TAG recommended no further work on this option.

Recommendation 1

The SEIP TAG recommends that a progressive obligation not be pursued further as an option for offsetting NZ ETS related costs to industry.

In summary, a transitional allocation of units was identified as the preferred method for providing assistance to firms facing increased costs under the NZ ETS. Consequently, the remainder of the report focuses on key design decisions around an allocation model.

C Who should be eligible for an allocation of units?

The SEIP TAG identified a number of steps to work through in defining who is eligible to receive units. Some criteria or tests are needed in order to determine the entities that are eligible for an allocation of units. The necessary components of a test or criteria should be shaped by the rationale for allocation, and as stated above, this is to reduce the likelihood of economic regrets. The SEIP TAG agreed that a two step process would be needed to determine eligibility:

1. Defining which entities are trade exposed, and
2. Identifying a ‘materiality threshold’ at which point the cost impacts of the NZ ETS are expected to be significant.

Defining a point of eligibility

In order to determine eligibility, a first requirement is to define whether the basis for determining eligibility is defined at the firm, product, or process level, or specific components of these. The SEIP TAG considered this issue and noted that:

- it is products that are trade exposed as it is the product’s characteristics, rather than the plant’s or firm’s, which determine whether it can be traded internationally and whether New Zealand firms can pass on costs from increased prices
- it is production processes that have emissions and result in emission costs
- individual firms can have more than one process and produce more than one product; defining eligibility at a firm level can lead to an allocation of units for products that would not be defined as eligible if produced by a firm with a different structure.

Based on the above, the SEIP TAG decided that the point of eligibility should be based on measuring the emissions associated with the process of turning specified raw materials into a trade-exposed product or products.

Recommendation 2

The majority of SEIP TAG recommends that eligibility be defined with respect to the process(es) of turning specified input(s) into trade-exposed product(s).

Defining beginning and end points of eligible processes

The above definition (of the point of eligibility) needs additional specificity around the beginning and end points of eligible processes. This is needed in order to define the total number of emission units in the pool used for allocation, and to estimate the number of units that will be allocated to individual entities.

The arguments for splitting the eligibility consideration into smaller distinct processes (a narrow definition) are that this enables the removal of allocations on closure of a process, and this minimises the number of units that would be allocated. If the thresholds are ‘right’, this would be consistent with the objective of avoiding economic regrets at least cost. The argument for a wider definition is that it provides greater assurance against leakage through greater generosity of allocation whereby a greater proportion of cost increases are offset.

The balance of views comes down to whether there is a perceived greater risk of getting the definition boundary wrong such that leakage might occur with economic regret, or of the Government allocating more allowances than it needed to, at a potential cost to taxpayers. During the SEIP TAG’s deliberations, industry members supported a wide definition whereas officials on the SEIP TAG supported use of narrower definition.

Recommendation 3

Industry members of the SEIP TAG recommend that a wide definition is used when defining the beginning and end points of an eligible process. Officials on the SEIP TAG recommend that a more narrow definition is considered.

Defining trade exposure

The SEIP TAG defined trade exposure as:

“Firms that are subject to international competition in export markets and/or from imports (or the threat of imports), and the prices they receive for their goods and services do not reflect the cost of emissions”.

Therefore, a product is **trade exposed** if the costs of production increase in New Zealand because of the NZ ETS, but the cost increase cannot be passed on because the price is set by plants in another country that do not face the same cost increases. There are two elements that need to be examined:

- whether the product is traded between different countries and thus under competition from goods produced elsewhere
- whether the product price currently includes a cost of emissions.

Given the openness of the New Zealand economy and the fact that New Zealand is largely a price taker in respect of the goods it produces, the SEIP TAG concluded that the vast majority of New Zealand products could be considered to be trade exposed to some degree.

Recommendation 4

The SEIP TAG recommends that the definition of trade exposure be all New Zealand products except those where:

- there is no current international trade of the product across oceans or
- it is impracticable to ship the product between New Zealand and another country or
- an equivalent level of cost of emissions is included in the price of the competing products.

Recommendation 5

The SEIP TAG recommends that there be as much certainty around eligibility criteria and how they will apply in future allocation periods as possible.

- It is noted by the SEIP TAG that there may be some grounds on which criteria could be revised in future allocation periods but that the Government should take all efforts to ensure as few changes as possible.

Setting a materiality threshold

In addition to being trade exposed, the other component of the eligibility test put forward by the SEIP TAG is that the production process faces a material increase in costs. There are a number of ways by which this can be defined; all of which are trying to measure the size of the cost

increase relative to some other factor. This is essentially an emissions intensity measure and possible factors considered by the SEIP TAG included:

- costs
- profits
- revenue.

The SEIP TAG concluded that costs were the preferred measure. The costs to be included in a cost intensity test need to be defined, and, specifically, whether they will include raw material costs.

Notwithstanding the above, industry members of the SEIP TAG were concerned that a cost-based intensity measure might not identify all vulnerable plants. Specifically, it would not discriminate between:

- a firm operating in a low margin industry with a low-cost intensity but which would be significantly trade exposed and
- a firm operating in a high margin industry with a high-cost intensity but which would not be significantly trade exposed.

Recommendation 6

The SEIP TAG recommends that cost is used as the factor for calculating emissions intensity and, that tonnes of emissions per unit of costs is used as the basis for determining material impact.

- Industry members of the SEIP TAG recommend that a profit-based intensity test also be available to capture low margin enterprises.
- Officials do not recommend using a profit-based intensity test.

Specifying the level where a cost intensity threshold should be set is a difficult task. Specifically, it is not possible to define a level of cost increase that is sufficiently high to result in an economic regret, nor an intensity that would result in such an impact. Thus simplifying approaches must be adopted. The SEIP TAG considered a number of options for achieving this.

None of the approaches considered are ideal. In terms of the setting of a threshold, the SEIP TAG recommends that ideally both materiality and equity (around the margin of the threshold) be taken into account. The most important of these is materiality (as measured by the level of emissions intensity of costs). In addition, the SEIP TAG recommends that if robust data is available, decision-makers should seek to use any discontinuities in the series of emissions intensities when deciding on specific threshold(s). Placing thresholds around discontinuity points in the series is likely to reduce inequities caused by the creation of thresholds.

Recommendation 7

The SEIP TAG recommends that an intensity threshold is set through consideration of a level of emissions intensity of costs that is deemed to result in material impacts and a reasonable probability of a reduction in output.

- An additional factor to consider, if possible, and if robust data is available, would be a discontinuity in a graph showing the range of intensities of all potentially eligible processes (after taking into account the targeted cost intensity level).

Once a threshold is defined, the process can lead either to the definition within an allocation plan of the product/processes that are eligible for allocation or just to the definition of the methodology that would be used to define those that are eligible.

Recommendation 8

The SEIP TAG recommends that the draft allocation plan includes a list of products/process combinations, or rules for determining start and end points of processes for purposes of determining eligibility, or both.

Single or multiple thresholds

The SEIP TAG considered the merits of adopting more than one materiality threshold to create separate tiers of eligibility. The tiers could be used to define processes that were eligible for different rates of allocation eg, those with higher emissions intensities might be eligible for a higher level or rate of allocation.

There are clear pros and cons associated with using one, or more than one, threshold for determining eligibility. Within the context of a fixed pool of allocation, using more than one threshold means that some firms' contributions to the pool are allocated to other firms simply on the basis of relative emissions intensity. On the one hand those firms that are 'losing' a slice of transitional assistance may consider they have been treated inequitably. On the other hand, the use of more than one threshold would allow greater targeting of the pool to available allocation. Further, it would be likely to reduce the level of inequity caused around the margins of firms receiving transitional assistance and those not receiving transitional assistance.

Recommendation 9

The majority of the SEIP TAG recommends there be a single threshold. A minority of the SEIP TAG recommend further consideration of a small number of discrete tiers with more emissions intensive firms receiving a higher level of assistance.

Implementing the materiality threshold

Implementing the materiality threshold test requires a decision on who is made eligible and specifically whether there is a tag-along clause in which, for any given industry, if one plant or process is defined as eligible, all other plants in that industry are defined as eligible.

Recommendation 10

The SEIP TAG recommends that the eligibility test be applied to the emissions intensity of costs of all plants producing a specified product in 2005. If 20 per cent or more of total national emissions associated with the production of that product come from plants that are eligible for an allocation because of the emissions intensity of their production costs, then 100 per cent of plants that produce that product are deemed to be eligible to receive an allocation.

Base years for determining eligibility

Comparison of any individual industrial process with the threshold will need to be undertaken for a specified time period. This needs to be **recent**, as it needs to reflect actual vulnerability to costs, and **historical**, to avoid disincentives to intensity improvement. The SEIP TAG recommends that an average intensity over a recent historical period be used. More specifically, the SEIP TAG recommends that the average intensity between 2005 and 2007 inclusive is used. It is recommended that firms have a choice of financial or calendar year.

Recommendation 11

The SEIP TAG recommends that the eligibility test is applied to the average emission intensity of costs for individual industries for the period 2005 to 2007, inclusive.

Thresholds to limit transaction costs

The SEIP TAG discussed two other possible thresholds that could be used to limit transaction costs in the process of defining eligibility. Both are based on absolute levels of emissions as opposed to emission intensity. They are:

- an upper threshold that was used to identify the most exposed firms. All plants that were trade exposed and with emissions above the absolute emissions threshold would be eligible and would not need to pass the intensity threshold
- a lower, de minimus, threshold that would make ineligible any plant that had emissions less than that threshold. This would be used to isolate emission sources which were never conceived as being the subject of an allocation.

The SEIP TAG considered that the upper threshold could send unfortunate signals through providing automatic allocations to the highest emitters. It also believed that the emphasis in designing an allocation plan was on making the process of being tested for eligibility via the intensity threshold as simple as possible.

There were some concerns raised over the use of a de minimus threshold because of the potential impacts on small and medium-sized industries (SMEs). There was a suggestion that an alternative approach could use a financial barrier eg, an application fee that might (or might not) be reimbursed if the applicant was later deemed to be eligible. It was noted by the SEIP TAG that the 50,000-tonne threshold discussed in the Framework Document is considerably higher than would be adopted were a de minimus threshold to be introduced.

Recommendation 12

The SEIP TAG recommends that a de minimus threshold be considered once the draft allocation proposal is almost complete.

Note:

- The 50,000-tonne threshold discussed in the Framework Document is considerably higher than that envisaged by the SEIP TAG were a de minimus threshold to be introduced.
- Some members consider that a financial application fee could act as a de minimus threshold.

D How do we allocate?

Choice of allocation methodologies

The SEIP TAG considered a number of options for defining the number of units that should be allocated to eligible processes. The key issues included:

- the use of historical or updated data
- whether allocations should be made to new entrants.

Five options were identified, as set out in Table 2.

Table 2 Allocation options

	Emissions-based	Output-based
Initial basis	1(a) Historical emissions A percentage of emissions in an historical year(s).	2(a) Historical output A percentage of output in an historical year(s) times an agreed benchmark emissions factor.
New entrant reserve	1(b) Historical emissions + new entrant reserve As above, plus a separate new entrant reserve.	2(b) Historical output + new entrant reserve As above, plus a separate new entrant reserve.
With updating		2(c) Updated output A percentage of output in a recent year times an agreed benchmark emissions factor.

Option 1(a) and 1(b) (historical emissions) are frequently referred to as **grandparenting**. Option 2(c), an updated output methodology, is sometimes referred to as an intensity-based allocation within a cap.

The allocation options considered by the SEIP TAG are methodologies to allocate units within a pool fixed at 90 per cent of eligible firms' emissions in 2005 (as set out in the Act). The fact that industry members have deliberated on allocation methodologies within this context should not be interpreted as being indicative of their support for the framework prescribed in the legislation.

At the outset, the SEIP TAG identified a number of criteria for evaluating the various allocation methodologies. These included assessing the extent to which a methodology:

- gives incentive to efficient emission reductions
- gives incentive to efficient improvement
- avoids or minimises leakage
- rewards early action
- provides certainty for those eligible to receive an allocation of units
- minimises administrative costs.

An additional principle, which was often raised in the SEIP TAG's discussions, was the concept that 'you take out what you put in' ie, there should be a strong correlation between what an eligible firm contributes to the fixed pool of units (based on their emissions in 2005) and what they receive in the form of an allocation of units.

Officials on the SEIP TAG abstained from making recommendations on allocation methodologies at this stage.

In summary, the criterion of most importance to a majority of industry members of the SEIP TAG in considering the merits of the various allocation methodologies was the need to provide a high level of certainty for recipients as to the number of units they will receive on a year-to-year basis. Strongly related to this is the concept that what a participant receives in the form of an allocation of units should closely correspond to what they put in. While many of the industry SEIP TAG members voiced support for an intensity-based methodology and a new entrant reserve if unconstrained by a fixed pool, they did not consider that such approaches were workable with this constraint.

These views led a majority of industry members to conclude that a methodology based on historical emissions (grandparenting) is preferred over the other options. It was also the major reason why a new entrant reserve was **not** recommended if it is to be taken out of the fixed pool.

Recommendation 13

A majority of industry members of the SEIP TAG recommend, in the context of a fixed pool of emission units for allocation as specified in the Act, that the basis for defining the number of units given to any individual entity is historical emissions (grandparenting) with no new entrant reserve.

Recommendation 14

Industry members of the SEIP TAG recommend that, if the Government wishes to provide an allocation of units to new entrants, this be done outside of the cap.

Base year(s) for allocation

The SEIP TAG considered a period of base years prior to, and post, 2005 (2005 being the year which determines the size of the pool according to the Act).

Recommendation 15

The SEIP TAG recommends that allocations to individual recipients are based on average emissions taken from three consecutive years, of the recipient's choice, between 2003 and 2007.

Special circumstances

The SEIP TAG recognises that some individual recipients may be adversely affected by constraining the years that may be chosen. In special circumstances, where an individual recipient can demonstrate that these years do not reflect business-as-usual emission levels because of a reduced capacity while upgrading, alternative criteria may be used to determine the level of allocation.

Recommendation 16

Industry members of the SEIP TAG recommend that there is provision for alternative criteria to be applied for firms with special circumstances.

Special circumstances shall be defined as cases where an individual recipient can demonstrate that these years do not reflect historical business-as-usual emission levels because of a partial or full plant closure for maintenance or upgrading beyond normal practice. However, under no circumstances should individual allocations be based on increased emission levels as a result of growth in production post 2007.

Plant replacement

Discussion focussed on the specific issue of closure of an old plant by a firm and the opening of another plant, by the same firm, at a different site.

Recommendation 17

The SEIP TAG recommends that if an historical emissions allocation methodology is adopted, that firms retain the same allocation if an eligible activity is being closed at one site and opened at another.

Closure rules

Closure rules are very important in terms of influencing decisions at the margin. The Act states that the entity that is eligible for an allocation of units loses this eligibility on closure. However, defining closure is not necessarily straightforward, nor is it so that economic regrets only occur at closure.

Recommendation 18

The SEIP TAG recommends that, for the purpose of determining whether a plant is still to receive an allocation of emission units, criteria take account of:

- (a) clear, permanent plant closures for which plants should no longer be eligible
- (b) temporary closures during which they should continue to receive an allocation
- (c) closures for reasons that are initially defined as of a temporary nature but that occur for periods that are longer than would be considered normal in that industry. Under these circumstances, allocations should cease and any allowances that have been allocated historically during this period of "temporary closure" should be repaid.

E How do we address electricity price impacts?

The SEIP TAG identified a number of issues for consideration in working through the electricity price impact of the introduction of the NZ ETS. It was agreed that:

- eligibility was defined under the same criteria as direct emissions
- analysis of the price impact would be completed using different methodologies to determine the most appropriate method for the allocation period of concern (2010–2012)
- a transparent price curve for the NZU will be needed for the electricity price impact to be converted into an allocation of units to eligible firms.

Recommendation 19

The SEIP TAG recommends that further analysis be conducted to help determine a methodology for the allocation of emission units to compensate for the electricity price impact.

Section III – SEIP Emissions Calculation Methodologies

The Methodologies (Regulations) sub-group was tasked with developing methodologies for the activities related to the:

- SEIP sectors, Schedule 3, Part 3 and 4
- opt-in for stationary energy, Schedule 4, Part 4
- other removal activities, Schedule 4, Part 2, Sub-part 1.

The sub-group, after reviewing the provisions of the draft Bill, has systematically examined each activity listed under the stationary energy, industrial processes and opt-in sections.

Recommendation 20

The SEIP TAG recommends that the table of methodologies by activity (in Annex IV) produced by the sub-group form the basis of the methodologies for the SEIP regulations.

Recommendation 21

The SEIP TAG recommends that, at the end of a compliance period, any coal in a stockpile or natural gas in temporary storage is excluded from the total obligations for the participant for that period.

Recommendation 22

The SEIP TAG recommends that, when calculating total emissions from the combustion of used oil, waste oil, used tyres or waste, all organic waste components are excluded if they have been captured at an upstream point (ie, forestry sector) or if the emissions are not included within the Kyoto Protocol.

Recommendation 23

The SEIP TAG recommends that, when the draft SEIP exposure regulations are released for public submissions, the methodologies sub-group should reconvene and review the regulations and provide officials with feedback on the regulations.

With respect to the other removal activities (in Schedule 4, Part 2 of the Act), the methodologies sub-group agreed that it was not appropriate to develop methodologies for each potential removal activity as the list could be large and the Act did not list activities but rather set out criteria that must be met. Therefore, the methodologies sub-group agreed that a process should be developed, and the other removal regulations should detail the process a participant must follow in order to verify they are carrying out a removal activity and to verify the total emissions sequestered either permanently or exported. Officials are currently undertaking work to establish an appropriate process and will consult on the draft regulations in mid-2009.

Recommendation 24

The SEIP TAG recommends that the regulations for other removal activities specify a process that participants must follow in order to verify they are carrying out a removal activity and to verify the total NZUs they are entitled to.

Treatment of particular issues outside of the Terms of Reference of the SEIP TAG

The following issues were raised in the SEIP TAG but not discussed in detail as they pertain to specific design features of the legislation and are therefore outside of the group's Terms of Reference.

Some industry members expressed concern that firms who purchase industrial heat or steam, including that from cogeneration plants (as a substitute for the direct use of coal or gas), are precluded from receiving an allocation of NZUs.

Some industry members expressed concern that liquid fossil fuels used in the SEIP sectors do not receive an allocation of NZUs.

Officials note that these issues have been raised in submissions to the Select Committee and are specifically addressed in pages 31–33 of the departmental report.

SEIP TAG final report and recommendations

Section I – General

Role of the SEIP TAG

The SEIP TAG was established to provide guidance and advice on technical design elements of the stationary energy and industrial process emissions components of the NZ ETS. The Terms of Reference of the SEIP TAG (See Annex II) do not extend to those design features that are specifically addressed as provisions in the draft legislation; for example, the definition of emission obligations, the base year for allocation, and the phase out of assistance.

Parallel technical advisory groups have also been established to provide guidance and advice to the Government on technical matters related to the liquid fuels sector and the agriculture sector.

Membership

The SEIP TAG comprises 16 experts, including government officials (three) and industry experts (see Annex I membership list). The SEIP TAG has been co-chaired by Chris Baker (Saunders Unsworth) and Mark Storey (Emissions Trading Group).

Key tasks

The key tasks of the SEIP TAG set out in the Terms of Reference were:

- 1 To advise on options for providing assistance to industry. Specific issues related to this task are:**
 - a) define and evaluate different options for the allocation of units or other options for offsetting costs
 - b) as part of the above, defining thresholds (size and scope) for offsetting costs, rules for entry, trade-exposure tests, recognition of early action etc
 - c) define activity data and emission factors to assess the basis for an allocation of units.

- 2 To advise on other technical design issues to be addressed by the SEIP TAG including:**
 - a) define points of obligation and in particular advising on whether and how to administer opt-ins/carve outs
 - b) advise on specific issues about electricity – how to assess the impacts of emission prices on electricity prices, as an input to options for assistance.

The Terms of Reference of the SEIP TAG did not extend to design features that are specifically addressed as provisions in the Bill, for example the definition of emission obligation. For this reason, participation in the SEIP TAG is in no way indicative of support by SEIP TAG members for the design features of the NZ ETS as laid out in the Act.

Structure of this report

The above tasks essentially fall into two categories; firstly **work streams relevant to the preparation of a draft allocation plan** and secondly **methodologies relevant to the drafting**

of regulations. This report addresses each of these issues in Section II and Section III respectively.

Work on areas relevant to the preparation of a draft allocation plan is further split up into a series of work streams: These groups were:

- **data requirements**
- **eligibility**
- **allocation sub-group**
- **sub-group on electricity market price effects**
- **progressive obligation.**

The work stream on data requirements addressed issues relevant to all the work streams.

Section II – Issues relevant to the preparation of an allocation plan

A The rationale for transitional and partial offsetting of costs

As a starting point in their work the SEIP TAG discussed the underlying rationale for partially offsetting NZ ETS-related costs. It was noted that the draft legislation – now the Climate Change Response (Emissions Trading) Amendment Act 2008, hereafter referred to as the Act – discusses the allocation of units to the industry sector in the context of trade-exposed firms (section 73). The SEIP TAG further considered these issues and the specific reasons for concern in some detail. It considered the discussion included in the Framework Document, which focussed on economic regrets. It also considered a wider set of issues relating to protection against emissions leakage.

The SEIP TAG agreed that the primary purpose of any cost-offsetting measures (ie, allocation of units) was the avoidance of economic regrets.

Some considerable time was devoted to what the term ‘economic regrets’ meant in order to ensure there was a broad level of understanding associated with it, and the circumstances in which it was relevant. It was considered that economic regrets would occur if:

- plants closed or substantially reduced production because of increased costs that could not be passed on
- in the future, firms would be able to pass costs on because other countries are expected to adopt similarly stringent policies
- at that future time, production would be viable in New Zealand for firms that faced the full cost of their emissions; but production would not return to New Zealand because of sunk capital costs elsewhere, rearranged distribution networks, or inflexible capital markets.

Therefore the majority of the SEIP TAG agreed that the focus of any cost-offsetting measures should be on those firms producing goods that are sold at prices set in international markets for which it is unlikely that emission regulations are affecting prices. It is these firms that face international competition that could, if facing significant NZ ETS-related costs, be forced to reduce output and in some cases close plants.

However, some industry members are of the view that this definition of economic regrets and its focus on firms producing goods that are sold at prices set in international markets, is too narrow and that there may be other circumstances where compensation for stranded assets resulting from the introduction of the NZ ETS is warranted.

In their view, such compensation would not be unorthodox ie, it would be consistent with approaches taken in the EU ETS and the approach proposed in the Australian Carbon Pollution Reduction Scheme. Therefore, they suggest that any rationale for assistance should more broadly encompass compensation for firms that suffer an adverse impact on profits from investments made prior to the introduction of the NZ ETS. The remaining recommendations on allocation should be read in light of this view.

Officials on the SEIP TAG reiterated the Government’s position (as set out in the Act) that it is not the intent of an allocation package to provide 100 per cent protection to industry from cost increases, and that such assistance is transitional ie, phased out over time.

B How to provide assistance for firms facing increased costs

Two broad options were considered as the method for providing assistance to firms facing increased costs: **(1) a progressive obligation** and **(2) a transitional allocation of emission units**.

Progressive obligation

A progressive obligation introduces a requirement for selected participants in the NZ ETS to surrender emission units at a rate that starts at less than one NZU for one tonne of CO₂-equivalent emissions but that builds up to a one for one requirement over time.

The SEIP TAG concluded that a progressive obligation would not adequately target trade-exposed firms. Targeting the progressive obligation at trade-exposed firms was considered to be more difficult to administer in an NZ ETS employing an upstream point of obligation. As a consequence the SEIP TAG recommended no further work on this option.

Recommendation 1

The SEIP TAG recommends that a progressive obligation not be pursued further as an option for providing assistance to industry.

In summary, a transitional allocation of units was identified as the preferred method for providing assistance to firms facing increased costs under the NZ ETS. Consequently, the remainder of this report focuses on key design decisions around an allocation model.

C Eligibility

The SEIP TAG identified a number of steps to work through in defining who is eligible to receive units. Some criteria or tests are needed in order to determine which entities are eligible for an allocation of units. The necessary components of a test should be shaped by the rationale for allocation, which, as stated above, is to reduce the likelihood of economic regrets. The SEIP TAG agreed that a two-step process would be needed to determine eligibility:

1. defining which entities are trade exposed
2. identifying a ‘materiality threshold’ at which point the cost impacts of the NZ ETS are expected to be significant.

These factors are defined in more detail in the following sub-sections. However, a prior requirement is to define whether the basis for determining eligibility is defined at the firm, product, or process level, or specific components of these.

Defining the point of eligibility

The SEIP TAG noted the following issues in reaching a conclusion:

- it is products that are trade exposed as it is the characteristics of the product, rather than of the plant or firm, which determine whether it can be traded internationally and whether New Zealand firms can pass on costs in increased prices
- it is production processes that have emissions and result in emission costs
- individual firms can have more than one process and produce more than one product; defining eligibility at a firm level can lead to an allocation of units for products that would not be defined as eligible if produced by a firm with a different structure.

The SEIP TAG decided that the point of eligibility be based on measuring the emissions associated with the process of turning specified raw materials into a trade-exposed product or products.

Recommendation 2

The majority of the SEIP TAG recommends that eligibility be defined with respect to the process(es) of turning specified input(s) into trade-exposed product(s).

The above definition needs to provide additional specificity around the beginning and end points of eligible processes. This is needed in order to define the total number of emission units in the pool used for allocation, and to estimate the number of units that will be allocated to individual entities.

For example, an industrial process might involve the extraction of a raw material from the ground, transportation of this material to another site or sites, for transformation into different forms using one or more distinctly different processes. Eligible emissions could be defined for the whole process from ‘in the ground’ to final product or for distinct steps along the way.

The arguments for splitting the eligibility consideration into smaller distinct processes are that:

- this enables the removal of allocations on closure of a process, although it is noted that closure of a sub-process could be used to remove proportions of an allocation without needing to define the level of allocation solely to those sub-processes
- this minimises the number of units that would be allocated – by applying the intensity threshold for eligibility to the component parts of an industrial process. If the thresholds are ‘right’, this would be consistent with the objective of avoiding economic regrets at least cost.

The argument for a wider definition is that it provides greater assurance against leakage through greater generosity of allocation whereby a greater proportion of cost increases are offset.

The balance of views comes down to whether there is a perceived greater risk of getting the definition boundary wrong such that leakage might occur with economic regret, or of the Government allocating more allowances than it needed to, at a potential cost to taxpayers. During the SEIP TAG’s deliberations, industry members of the SEIP TAG supported a wide definition whereas officials on the SEIP TAG supported use of a narrower definition.

Recommendation 3

Industry members of the SEIP TAG recommend that a wide definition is used when defining the beginning and end points of an eligible process. Officials recommend that a more narrow definition is considered.

Defining trade exposure

As discussed above, a test for determining whether an entity is trade exposed was identified by the SEIP TAG as a first step for determining eligibility.

The SEIP TAG define trade exposure as:

“Firms that are subject to international competition in export markets and/or from imports (or the threat of imports), and the prices they receive for their goods and services do not reflect the cost of emissions”.

In the above definition international competition is taken to mean that the goods and services are traded and priced internationally, and the ability for New Zealand firms to pass on costs is constrained.

Therefore, a product is **trade exposed** if the costs of production increase in New Zealand because of the NZ ETS, but the cost increase cannot be passed on because price is set by plants in another country that do not face the same cost increase. There are two elements that need to be examined:

- 1) whether the product is traded between different countries and thus under competition from goods produced elsewhere
- 2) whether the product price currently includes a cost of emissions. This would be the case where the product price is set in countries that regulate greenhouse gas emissions. It could also occur if new investments were being made on the basis of anticipated future pricing of emissions.

The first question of whether a product is traded is relatively simple to identify. The second question, as to whether emission costs are incorporated into a commodity price, is far less certain, especially where there is the potential for investment decisions to be made on the assumption of future pricing.

Given the openness of the New Zealand economy and the fact that New Zealand is largely a price taker in respect to the goods it produces, the SEIP TAG concluded that the vast majority of New Zealand products could be considered to be trade exposed to some degree. The further issue of emissions being included in the price of a product is retained as an important principle without it being clear as to how this might be defined.

Recommendation 4

The SEIP TAG recommends that the definition of trade exposure be all New Zealand products except those where:

- there is no current international trade of the product across oceans or
- it is impracticable to ship the product between New Zealand and another country or
- an equivalent level of cost of emissions is included in the price of the competing products.

Following on from this discussion and recommendation, there was some discussion over whether eligibility criteria could change from one allocation period to another, and the circumstances which could warrant this happening. One example relevant to the above definition of trade exposure would be if it was decided at a future date that product prices were reflecting a cost of emissions when they had not previously.

The SEIP TAG acknowledged that the Government can review the eligibility of individual industries in the future. However, it was noted that there is considerable value to industry in certainty over future levels of allocation. This certainty of eligibility (while trade exposure remains) is critical to enable firms to make investment decisions. The SEIP TAG agreed that all

efforts should be made by the Government to ensure as much certainty around eligibility criteria as possible.

Recommendation 5

The SEIP TAG recommends that there be as much certainty around eligibility criteria and how they will apply in future allocation periods as possible.

- It is noted by the SEIP TAG that there may be some grounds on which criteria could be revised in future allocation periods but that the Government should take all efforts to ensure as few changes as possible.

Setting a materiality threshold

In addition to being trade exposed, the other component of the eligibility test put forward by the SEIP TAG is that the production process faces a material increase in costs. There are a number of ways by which this can be defined, all of which are trying to measure the size of the cost increase relative to some other factor. This is essentially an emissions intensity measure and possible factors considered by the SEIP TAG included:

- costs
- profits
- revenue.

Impacts on **profits** have the greatest consequences for a firm's viability. However, this vulnerability might simply result from a firm having low profits – a firm with low profits is vulnerable to any small increase in costs. Impacts relative to **costs** are also relevant – even if profitability is not at risk. If costs rise more in New Zealand than elsewhere, the plant becomes vulnerable to closure because of the opportunity to make greater profits elsewhere. Impacts relative to revenues is an alternative approach.

The SEIP TAG looked at the Australian (Green Paper) proposals for a **revenue-based** intensity threshold, although it was noted that the Australian proposals could be subject to change. Revenues, while potentially related to costs over the long run, are not the direct issue of concern and they would be subject to more significant variation over time, particularly as a result of volatility in commodity prices.

The SEIP TAG concluded that costs were the preferred measure. The group was of the view that concerns over lack of transparency (the Government being at an information disadvantage relative to revenues that might be more easily estimated via published commodity prices) could be addressed through company audits. The costs to be included in a cost-intensity test need to be defined, and specifically whether they will include raw material costs.¹

Industry members of the SEIP TAG were concerned that a cost-based intensity measure might not identify all vulnerable plants. Specifically, it would not discriminate between:

- a firm operating in a low-margin industry with a low-cost intensity but which would be significantly trade exposed and

¹ This is to place on the same basis those paying for raw materials and those companies simply processing raw materials on behalf of another company for which they are paid a tolling fee and co-operatives where the price of the raw material is difficult to determine.

- a firm operating in a high-margin industry with a high-cost intensity but which would not be significantly trade exposed.

Recommendation 6

The SEIP TAG recommends that cost is used as the factor for calculating emissions intensity and that tonnes of emissions per unit of costs is used as the basis for determining material impact.

- Industry members of the SEIP TAG recommend that a profit-based intensity test also be available to capture low-margin enterprises.
- Officials on the SEIP TAG do not recommend using a profit-based intensity test.

Further defining an intensity threshold

A cost intensity measure as recommended above could be defined as:

$$\frac{\text{tCO}_2[\text{direct}] + \text{tCO}_2[\text{indirect}]}{\text{operating cost \$},000\text{s}}$$

- The calculation of tCO₂ [direct] would cover direct fuel and industrial process emissions.
- The calculation of tCO₂ [indirect] for electricity should apply the same emissions factor [tCO₂/MWh] as identified for that portion of the allocation pool associated with electricity market price impacts. This emission factor may vary with allocation period and with carbon price.
- The costs to be included in a cost-intensity test need to be defined, and specifically whether they will include raw material costs.

Some industry members of the SEIP TAG suggested that the intensity threshold used for defining eligibility should include emissions and costs from activities that are not eligible for allocation to the SEIP sectors under the Act, for example costs in respect of purchased steam and liquid fuels. It should be noted in making this suggestion that broadening the scope of intensity threshold in this way, would not broaden the scope of emissions that can be placed into the fixed pool (these are specified in the s73(2) of the Act). Rather, it could increase the possibility for an individual firm to meet the materiality threshold and therefore for them to submit **eligible** emissions into the pool.

The SEIP TAG as a group had limited opportunity to discuss this option but are of the view that the suggestion warrants further consideration.

Specifying the level at which a cost-intensity threshold should be set is a difficult task. Specifically, it is not possible to define a level of cost increase that is sufficiently high to result in an economic regret, nor an intensity that would result in such an impact. Thus simplifying approaches must be adopted. The SEIP TAG considered a number of options for achieving this including:

- adopting the thresholds proposed for the Australian Carbon Pollution Reduction Scheme² (adapted for NZ\$) or simply using the list of industries that are decided in Australia to be eligible for free allocation. This was not regarded as appropriate

² Department of Climate Change (2008). Green Paper “Carbon Pollution Reduction Scheme”.

- using the approach previously adopted under the Negotiated Greenhouse Agreements scheme ie, establishing eligibility on the basis that emissions/energy costs were 20 per cent or more of total costs, and/or that EBIT would decrease by 10 per cent or more, and/or that the firm's return on invested funds would be reduced to significantly less than its WACC. The SEIP TAG considered that there were problems with all of these approaches and that none addressed the real problem of concern
- using natural break-points or discontinuities in a graph of intensities of all relevant product-process combinations – this depends on the availability of data and that such discontinuities exist. It is still an arbitrary choice
- defining a level on the basis of ex-ante considerations of firms and products likely to be trade exposed and setting thresholds in a way that would include all of these
- defining a threshold in a way that would make eligible a pre-defined number of firms.

None of these approaches are ideal and the process of defining a threshold is hampered considerably by the absence of relevant data at an appropriate level of disaggregation. Thus the SEIP TAG's conclusions are not definitive.

As a general principle, the SEIP TAG recommends that when making the decision as to the setting of materiality threshold, decision-makers should be informed as to the types of activities that are likely to qualify, based on the best available information.

In terms of the setting of a threshold, the SEIP TAG recommends that ideally both materiality and equity (around the margin of the threshold) be taken into account. The most important of these is materiality (as measured by the level of emissions intensity of costs). In addition, the SEIP TAG recommends that if robust data is available, decision-makers should seek to use any discontinuities in the series of emissions intensities when deciding on specific threshold(s). Placing thresholds around discontinuity points in the series is likely to reduce inequities caused by the creation of thresholds.

Recommendation 7

The SEIP TAG recommends that an intensity threshold is set through consideration of a level of emissions intensity of costs that is deemed to result in material impacts and a reasonable probability of a reduction in output.

- An additional factor to consider, if possible and if robust data is available, would be a discontinuity in a graph showing the range of intensities of all potentially eligible processes (after taking into account the targeted cost-intensity level).

Once a threshold is defined, the process can lead either to the definition within an allocation plan of the product-processes that are eligible for an allocation or just to the definition of the methodology that would be used to define those that are eligible.

Recommendation 8

The SEIP TAG recommends that the draft allocation plan includes a list of product/process combinations, or rules for determining start and end points of processes, for purposes of determining eligibility or both.

A single or tiered materiality threshold?

Following the release of the Australian Green Paper on the Carbon Pollution Reduction Scheme, the SEIP TAG considered whether New Zealand should adopt more than one materiality threshold that resulted in separate tiers of eligibility. The tiers could be used to define processes that were eligible for different rates of allocation eg, those with higher emissions intensities might be eligible for a higher level or rate of allocation. Thus, the Australian Green Paper suggests one tier eligible to receive units equal to 90 per cent of their eligible emissions and another tier eligible for 60 per cent. While the New Zealand legislation states that 90 per cent of 2005 emissions from eligible firms will make up the pool of units to be allocated, there is no requirement for these to be distributed evenly between firms.

There are clear pros and cons associated with using one, or more than one, threshold for determining eligibility. Within the context of a fixed pool of allocation, using more than one threshold means that some firms' contributions to the pool are allocated to other firms, simply on the basis of relative emissions intensity. Those firms that are 'losing' a slice of transitional assistance may consider they have been treated inequitably. On the other hand, the use of more than one threshold (as per the Australian proposals) would allow greater targeting of the pool to available allocation. Further, it would be likely to reduce the level of inequity caused around the margins of firms receiving transitional assistance and those not receiving transitional assistance.

Should a tiered approach be taken, some industry members of the SEIP TAG suggested that it may be necessary to revisit the choice of materiality threshold (ie, the choice of a cost intensity or a profit measure).

Recommendation 9

The majority of the SEIP TAG recommends that there be a single threshold.

A minority of the SEIP TAG, including officials, recommend further consideration of a small number of discrete tiers with more emissions intensive firms receiving a higher level of assistance.

Implementing the materiality threshold test

Implementing the materiality threshold test requires a decision on who is to be eligible and specifically whether there is a tag-along clause in which, for any given industry, if one plant or process is defined as eligible, all other plants in that industry are defined as eligible.

Industry members of the SEIP TAG considered that including such a tag-along clause would be fair. It would ensure that plants that had undertaken early actions to improve their energy efficiency or emissions intensity would not be penalised if, as a result, they were deemed ineligible for an allocation. However, government members noted some concerns that could result if there was a skewed distribution of plants within an industry with one (or a very small number of) emissions intensive plant(s) defined as eligible whereas the vast majority of plants would otherwise be ineligible because of relatively low emission intensities. This might be countered through using an industry average as the basis for the test or through an average of a number of higher emitting plants. It is noted that this issue applies to the eligibility of individual plants for allocations and for defining the industries that will be used to count the number of emission units in the pool used for allocation.

Should the allocation plan make no allowance for new entrants, the tag-along clause would be applied only to those operating in 2005.

Recommendation 10

The SEIP TAG recommends that the eligibility test be applied to the emissions intensity of costs of all plants producing a specified product in 2005. If 20 per cent or more of total national emissions associated with the production of that product come from plants that are eligible for an allocation because of the emissions intensity of their production costs, then 100 per cent of plants that produce that product are deemed to be eligible to receive an allocation.

Base years for determining eligibility

Comparison of any individual industrial process with the threshold will need to be undertaken for a specified time period. This needs to be **recent**, as it needs to reflect actual vulnerability to costs, and **historical**, to avoid disincentives to intensity improvement. The SEIP TAG recommends that an average intensity over a recent historical period be used. More specifically, the SEIP TAG recommends that the average intensity between 2005 and 2007 inclusive is used. It is recommended that firms have a choice of financial or calendar year.

It was noted that it is possible that a firm that was operating in 2005 and not trade exposed at that time, may face trade exposure at a later date. In such cases, that firm should have the right to seek eligibility for an allocation in subsequent allocation plans. As it was operating in 2005, the firm's 2005 emissions should be added to the pre-existing allocation pool. Allocation should then be made on the same basis as other incumbent firms.

Recommendation 11

The SEIP TAG recommends that the eligibility test is applied to the average emission intensity of costs for individual industries for the period 2005 to 2007 inclusive.

- The SEIP TAG further recommends that firms have a choice of financial or calendar year.

Thresholds to limit transaction costs

The SEIP TAG discussed two other possible thresholds that could be used to limit transaction costs in the process of defining eligibility. Both are based on absolute levels of emissions as opposed to emission intensity. They were:

- an upper threshold that was used to identify the most exposed firms. All plants that were trade exposed and with emissions above the absolute emissions threshold would be eligible and would not need to pass the intensity threshold
- a lower, de minimus, threshold that would make ineligible any plant that had emissions less than that threshold. This would be used to isolate emission sources which were never conceived as being the subject of an allocation. The example used in discussion was hobby potters made eligible if there was a tag-along clause and the ceramic industry was deemed eligible.

The eligibility sub-group's **preliminary recommendation** was that, in order to ensure administrative transactional efficiency, the upper absolute threshold in the materiality test should take priority. The implication of this is that an absolute threshold should be set that most

of the potentially eligible, trade-exposed firms would pass (while being certain that it is not so low that it would pass firms that are not energy/emissions-intensive). However, subsequently, the SEIP TAG considered that the upper threshold could send unfortunate signals through providing automatic allocations to the highest emitters. It was also thought that the emphasis in designing an allocation plan was on making the process of being tested for eligibility via the intensity threshold as simple as possible.

There were some concerns raised over the use of a de minimus threshold because of the potential impacts on small and medium-sized industries (SMEs). There was a suggestion that an alternative approach could use a financial barrier eg, an application fee that might (or might not) be reimbursed if the applicant was later deemed to be eligible. It was noted by the SEIP TAG that the 50,000-tonne threshold discussed in the Framework Document is considerably higher than would be adopted were a de minimus threshold to be introduced.

Recommendation 12

The SEIP TAG recommends that a de minimus threshold be considered once the draft allocation proposal is almost complete.

- The 50,000-tonne threshold discussed in the Framework Document is considerably higher than that envisaged by the SEIP TAG were a de minimus threshold to be introduced.
- Some members consider that a financial application fee could act as a de minimus threshold.

D Allocation

Choice of allocation model

The SEIP TAG considered a number of options for defining the number of units that should be allocated to eligible processes. The key issues included:

- the use of historical or updated data
- whether allocations should be made to new entrants.

Five options were identified, as set out in the table below.

Allocation Options

	Emissions-based	Output-based
Initial basis	1(a) Historical emissions A percentage of emissions in an historical year(s).	2(a) Historical output A percentage of output in an historical year(s) times an agreed benchmark emissions factor.
New entrant reserve	1(b) Historical emissions + new entrant reserve As above, plus a separate new entrant reserve.	2(b) Historical output + new entrant reserve As above, plus a separate new entrant reserve.
With Updating		2(c) Updated output A percentage of output in a recent year times an agreed benchmark emissions factor.

Option 1(a) and 1(b) (historical emissions) are frequently referred to as **grandparenting**. Option 2(c), an updated output methodology, is sometimes referred to as an **intensity-based allocation** within a cap.

It is important to reiterate that all of these options describe methodologies to allocate **units within a pool fixed at 90 per cent of eligible firms' emissions in 2005** (as set out in the Act). The fact that industry members have deliberated on allocation methodologies within this context should not be interpreted as being indicative of their support for the framework prescribed in the legislation.

At the outset, the SEIP TAG identified a number of criteria for evaluating the various allocation methodologies. These included assessing the extent to which a methodology:

- **is economically efficient** – evaluating the extent to which an option ensures there is an incentive to reduce emissions where this can be achieved for less than the cost of purchasing emission units
- **incentivises technical efficiency improvements** – evaluating whether an allocation methodology incentivises technical efficiency improvements (reducing the quantity of emissions per unit of output) as opposed to other approaches to emission reduction, including fuel switching and production shifts³
- **avoids or minimises emissions leakage** – this address the specific issue of whether an allocation methodology avoids or minimises emission reductions being achieved solely by shifting production to another country.
- **rewards early action** – it is noted that rewarding early action is largely an equity issue
- **provides certainty to those eligible to receive an allocation of units**
- **minimises administrative costs** – evaluating the administrative feasibility of a methodology and is highly correlated with data availability and reflects the expected complexities of one methodology over another.

An additional principle that was often raised in the group's discussions, was the concept that 'you take out what you put in' ie, there should be a correlation between what an eligible firm contributes to the fixed pool of units (based on their emissions in 2005) and what they receive in the form of an allocation of units.

The issues are discussed below followed by a set of recommendations. Officials on the SEIP TAG have abstained from making recommendations on allocation methodologies at this stage.

Historical

An **historical emissions approach (1a)** provides eligible firms with an allocation of units equal to a percentage of their emissions in an historical year(s). This is consistent with the approach used to define the overall pool of allowances.

Under a historical emissions methodology all emissions face an emissions cost equal to the price of emission units. Emission reductions are fully and appropriately rewarded and this approach provides efficient incentives for emission reductions. There are incentives to undertake all emission reduction options that can be achieved for less than the cost of an emission unit. To this extent it can be regarded as providing an efficient incentive for emission reduction.

³ The TAG made this distinction between types of efficiency improvements, not because it was interested in the form of emission reduction over another but because efficiency improvements derived from reduced production may be more likely to lead to emissions leakage and economic regrets.

Technical efficiency improvements are rewarded alongside all other emission reduction options.

- If a firm improves an existing plant’s efficiency, it requires fewer emission units and, if it has been given them, may have additional units to sell.
- If a firm is building a new plant, it will require fewer units for an efficient plant than for an inefficient plant. It does not provide positive incentives for investment in new efficient plant.

Emission leakage is discouraged to some extent under this methodology because, if a plant closes completely, the allocation of NZUs ceases. However, this approach provides no disincentive to reduced output that is short of plant closure.⁴

A significant strength of the methodology is that individual firms have considerable certainty over the number of emission units that they will be given each year.

However, a significant weakness is that there are no rewards for early action if a firm introduced emission reduction measures prior to 2005. Rather, firms that have taken steps to reduce emissions prior to this date are penalised; they receive fewer allowances than plants that have not reduced their emissions.

Data is likely to be readily available to undertake this approach and administrative costs would be likely to be low.

A variant on this approach **(1b) would include a separate new entrant reserve** that would provide a pool of units for allocation to new entrant plants that met the eligibility criteria. The issue of new entrants is discussed separately below.

Criterion	
Efficient incentives for emission reduction	✓✓
Incentives for efficiency improvement	✓
Disincentives for leakage	✓
Rewards for early action	×
Certainty	✓✓
Data availability	✓✓
Administrative costs	✓✓

An **historical output approach (2a)** would base future allocation on a percentage of historical output of some defined product, times an emissions factor. The emissions factor could be an industry average or a best-practice benchmark. For many New Zealand industries, it would function, in practice, in the same way as an historical emissions approach. However, for industries with several plants or firms, it would provide more units to the plants with lower emission intensities than they would receive under an historical emissions approach. A variant on this approach (2b) includes a separate new entrant reserve, discussed below.

It was noted that an output-based approach introduces considerable difficulties in defining the appropriate output and may require that the pool of allowances for allocation be split into many individual pools.

⁴ It is not clear how cessation of production of an individual product would be treated where only that product was defined as trade exposed.

Criterion	
Efficient incentives for emission reduction	✓✓
Incentives for efficiency improvement	✓
Disincentives for leakage	✓
Rewards for early action	✓
Certainty	✓✓
Data availability	✗
Administrative costs	✗

Summary of discussion on choice between 1(a) and 2(a)

The relative merits of an historical emissions-based approach (1a) compared with an historical output-based approach can be summarised as a choice between determining allocation decisions on an individual entity basis (related to their historical emissions) and an industry average basis – that is, an industry average emission factor should be calculated for each industry, and that average should then be employed to calculate the distribution of allocation to participants within the specific industry sector.

Comparing the two allocation methodologies, both options can be said to provide an economic efficiency incentive. Both options provide relative certainty to participants. The main advantage of an output-based approach is that it better rewards early action by firms and therefore can be argued to provide a more equitable distribution of units amongst participants (although there are some counter views to these equity arguments expressed below). The advantage of the historical emissions approach is that it better protects against leakage by providing allocations to all firms, regardless of their current efficiency.

The main disadvantage of using an industry average under option 2(a) relates to the availability of data and administrative complexity (although for a single firm operating over multiple sites and a range of products as well as a range of specifications within a ‘product’ it was felt that an ‘average’ approach may be more applicable). Furthermore, it was argued that an industry average does not take into account unique constraints on plant, such as fuel availability (eg, the availability of gas in the North Island vs. reliance on coal in the South Island). Further, if firms are aggregated at too high a level, the distinction between product grades and associated energy input requirements (eg, pulp industry) would be lost. On this basis it was argued by some that an industry average, in addition to being complex, is inequitable.

In summary, the majority of industry members of the SEIP TAG preferred a historical emissions-based methodology because of three perceived advantages:

- each plant is allocated solely on the basis of its own performance, on an historical basis
- the distribution is the least complex to understand and the most transparent to administer
- linkage to the principle of allocation being transitional assistance to avoid economic regrets: the financial exposure of an individual plant from the introduction of a carbon price is directly related to its emissions. An output-based system using an industry average will distort the level of assistance to avoid economic regrets to the benefit of some at the expense of others.

Moreover, in the context of a small and vulnerable emissions-intensive industry sector in New Zealand, industry members were of the view that there is no convincing argument that the numbers of individual plants is unmanageably large to justify not choosing option 1a. Indeed, it is likely that a substantial proportion of the larger industry participants already have adequate emissions inventory data that would facilitate prompt calculation of the distribution.

Updating

Under the updated output approach (2c), sometimes referred to as an intensity-based methodology within a cap, the output of a firm in a **recent year** would be multiplied by some benchmark emissions or energy intensity, and a scaling factor would be used to ensure that the total allocation remained less than, or equal to, the unit pool. A plant would receive an increased number of emission units if it increased its output, and a reduced number if it reduced its output.

This approach has an important impact on incentives for efficient reduction of emissions. It reduces the effective emission cost faced by all plants: each unit of output is penalised by requiring the surrender of emission units and, at the same time, is rewarded by the receipt of additional emission units. The result is there is a reduced incentive to limit emissions through reductions in output. However, incentives still remain fully for reductions in emissions via improvements in efficiency or fuel switching.

Using this methodology provides incentives for additional investment because there are additional units allocated for increased output. This may lead to improvements in emission efficiency rates but not necessarily to reduced total emission levels as new plants may be of greater capacity.

There is a stronger disincentive for leakage than under historical allocation, because all reductions in output are penalised.

However, under this methodology there is reduced certainty of allocation for individual firms compared to either the historical emissions or historical output-based methodologies. This occurs in the context of a fixed pool of emissions as specified in the Act. Within the constraint of the fixed pool, the total number of NZUs that can be given away is limited. Therefore, if a firm increases output, making it eligible for additional emission units next year (or how often the formula is updated), this will make fewer available to other firms. And if all firms are increasing output, it may be necessary to keep increasing output to maintain the level of allocation. This provides uncertainty to all participants.

Data requirements are also much higher for option 2(c) than for an historical approach, particularly if it requires the use of benchmark data at a process level, in combination with the output data. Data requirements are reduced if industry averages are used, although this requires some separation of the total pool of allowances into sub-pools to isolate changes in individual industries.

On the pro side, an intensity-based approach to allocation may be more equitable than an approach based on historical emissions in the context of the extended phase-out period for transitional allocation. Because allocation will continue further into the future, the relationship between emissions in some future year and those in the year chosen for allocation decisions will become more distant. Providing allocation to a firm that existed in 2005 but not to one that existed in 2009 may appear to be very arbitrary and unfair by 2020, for example.

Criterion	
Efficient incentives for emission reduction	–
Incentives for efficiency improvement	✓✓
Disincentives for leakage	✓✓
Rewards for early action	✓
Certainty	×
Data availability	×
Administrative costs	×

New entrants

The Act includes a principle (section 81b) that it is desirable to treat firms or individuals who are intending to begin operating within a sector or industry (new entrants) in a similar manner, with respect to the allocation of New Zealand units free of charge under any allocation plan, as firms or individuals who are already operating within that sector or industry (incumbents) and who are intending to grow their operations.

A new entrant reserve (NER) was not specifically included in the Government's original proposal for the design of the NZ ETS. The Government identified a number of reasons for this:

- the expected lower level of economic regrets associated with a plant not establishing than with the loss of an incumbent plant. This is because of lower social disruption of jobs not being created compared to job losses and that, unless there were inefficient capital markets, if a new plant was viable now, absent a price on emissions, it would be in the future if all (or most) countries had passed on the cost of emissions
- the allocation of emission units to incumbents does not change the entry decision for a new plant compared to a situation in which no-one is given emission units. This is because the entry decision should simply reflect whether the plant would be net present value (NPV) positive at the prevailing set of costs and revenues, and revenues will not change because product prices will not change
- giving allowances to new entrants reduces the costs of emissions for that new entrant. Because the quantity of units given to the entrant will be related to the level of actual emissions, decisions on the size of the plant will not take full account of emission costs.
- the phase-out period for allocation was over a shorter phase such that the equity issues were less pronounced.

However, though not as strong as the case relating to incumbents, it is recognised there is the possibility of some economic regret associated with a plant not establishing and this provides some rationale for a new entrant reserve.

Under the Act, the fixed pool (the total number of emission units available for transitional allocation) will not change with the number of new entrants. This means that the more units are given to new entrants, the fewer are available for incumbents. This issue was persuasive to the industry members in deciding against recommending a new entrant reserve, unless it was established using additional emission units over and above the pool defined from 90 per cent of incumbents' emissions in 2005.

One of the key concerns expressed by industry members with regard to a new entrant reserve was the issue of certainty to industry, either because it was not clear as to how any surplus or deficit in a new entrant reserve would affect the number of units available to incumbents, or because the number of units available to new entrants themselves depended crucially on how many other new entrants there were.

If a new entrant reserve is used, issues relating to distortion of the price effect from updating apply in the same way as they do for incumbents: if allocated NZUs are related to output, the marginal cost of emitting, and of production, is reduced. This distortion is limited if the basis for allocation to new entrants is related to capacity and the base year used to define capacity is fixed from then on.

In sum, the criterion of most importance to a majority of industry members in considering the merits of the various allocation methodologies was the need to provide a high level of certainty for recipients as to the number of units they will receive on a year-to-year basis. Strongly related to this is the concept that has prevailed throughout the SEIP TAG's deliberations on eligibility

and allocation methodologies, that a majority of industry members believe that what a firm receives in the form of an allocation of units should closely correspond to what it puts in.

These views led the majority of industry members to conclude that a methodology based on historical emissions (grandparenting) is preferred over the other options. It was also the major reason why a new entrant reserve was **not** recommended if it is to be taken out of the fixed pool. While many of the industry SEIP TAG members voiced support for an intensity-based methodology and a new entrant reserve if unconstrained by a fixed pool, they did not consider that such approaches were workable with this constraint.

It was generally acknowledged that a major disadvantage with an historical emissions-based approach is that it penalised firms who have made early investments in reducing emissions compared with those firms that have not. However, the perceived disadvantages of options that better address early action (specifically 2c) outweighed arguments for those options in the view of the majority of industry members.

Recommendation 13

A majority of industry members of the SEIP TAG recommend, with the constraint of a fixed pool of emission units for allocation as specified in the Act, that the basis for defining the number of units given to any individual entity is historical emissions (grandparenting) with no new entrant reserve.

Recommendation 14

Industry members of the SEIP TAG recommend that, if the Government wishes to provide an allocation of units to new entrants, this be done outside of the fixed allocation constraint.

Base year(s) for allocation

The SEIP TAG's recommendations on the choice of base year are drafted in the context of:

- recommendations 13 and 14 above in relation to provisions for new entrants
- an assumption that the historical emissions approach (1a) (grandparenting) is the allocation methodology chosen
- there being, in the view of some industry members, insufficient data currently available to accurately assess the impact of changing the base years for allocation. To this extent, industry members stress that any analysis is speculative until more accurate data is available to enable this analysis to occur. To date, the SEIP TAG is aware of a couple of factors that would have implications for the choice of base years (Methanex, Golden Bay Cement, growth in the dairy sector and potential retraction within the meat sector). However, this is insufficient to provide clear guidance as to the actual implications of choices of base years.

The SEIP TAG considered a period of base years prior to and post-2005 (2005 being the year which determines the size of the pool according to the Act).

Advantages associated with using base years before and including 2005

A new entrant reserve (NER) was not specifically included in the Government's original proposal for the design of the NZ ETS. The subsequent insertion in the Act (S 81) of wording requiring the Minister to have regard to the treatment of new entrants in a similar manner to incumbents, did not provide any increase to the size of the pool (fixed at 90 per cent of 2005

emissions). In the view of industry members, any allocation to new entrants should come from outside of the pool (Recommendation 14).

There is the potential, if the allocation model is based on years after 2005, that a de facto new entrant 'reserve' is created to the extent that eligible emissions grew after 2005. So long as a firm had eligible emissions within the 2005 period and its emissions grew faster than the average, it will be eligible for disproportionately more credits than it fed into the pool.

In the Government's Framework Document,⁵ it was proposed that earlier years could be selected. Further, it included some commentary as to the justification:

"A historical period is chosen to remove incentives to grow in order to gain additional units. Allowing firms to choose the most advantageous base year between 2003 and 2005 provides some opportunity to reward early action to reduce emissions. Emissions would be calculated based on corresponding data used to prepare audited financial statements. If such data is not available this approach may well need some adjustment."

As indicated above, the choice of an earlier year could allow recognition of early action. Choosing a later period negates this to a significant extent and implies that a firm that acted to reduce emissions in the period 2006–2007 (or at a minimum improved emissions intensity) would receive a lesser allocation than one who did not take action.

Advantages associated with base years from the period post 2005

The major advantage identified with applying a post-2005 period to base the allocation methodology on, is that data are likely to be more readily available and more accurate. Having said this, the SEIP TAG acknowledged that their knowledge of practical difficulties associated with obtaining older data is limited.

In summary, the SEIP TAG concluded that the period over which allocation should be based was average emissions taken from three consecutive years (of the recipient's choice) between 2003 and 2007.

Recommendation 15

The SEIP TAG recommends that allocations to individual recipients are based on average emissions taken from three consecutive years, of the recipient's choice, between 2003 and 2007, inclusive.

Addressing special circumstances

The SEIP TAG recognises that some individual recipients may be adversely affected due to the base years chosen. The following discussion and recommendations are based on an assumption that **recommendation 15** is adopted ie, that the base years for determining allocation decisions are 2003 to 2007.

The main example of special circumstances discussed by the SEIP TAG was a case where a firm reduced production during this period in order to upgrade the plant, or in response to other circumstances that did not reflect market conditions, resulting in significantly lower emissions than usual practice.

⁵ (2007) The Framework for a New Zealand Emissions Trading Scheme.

The SEIP TAG agreed it should be possible for a firm to submit special circumstances to the Government when allocation decisions are determined. It was more difficult, however, to reach agreement as to how these special circumstances should be defined. Furthermore, following on from the discussion on choice of allocation methodologies, the majority of industry members stressed the importance of the correlation between what a firm contributes to the fixed pool (based on their emissions in 2005) and the allocation they take out from the fixed pool. On this basis, some members stressed that under no circumstances should individual allocations be based on increased emission levels as a result of growth in production post 2007.

In summary it was agreed that special circumstances may apply in cases where an individual recipient can demonstrate that the chosen base years for the allocation decision do not reflect the recipient's *historical* business-as-usual emission levels because of a partial or full plant closure for maintenance or upgrading beyond normal practice. It is recommended that in such circumstances they may apply to use more representative historical years.

Recommendation 16

Industry members of the SEIP TAG recommend that there is provision for alternative criteria to be applied for firms with special circumstances.

Special circumstances shall be defined as cases where an individual recipient can demonstrate that these years do not reflect historical business-as-usual emission levels because of a partial or full plant closure for maintenance or upgrading beyond normal practice. However, under no circumstances should individual allocations be based on increased emission levels as a result of growth in production post 2007.

Plant replacement

Discussion focussed on the specific issue of closure of an old plant by a firm and opening of another, by the same firm, at a different site. It was considered that the rules should not penalise against this, for example:

- with no new entrant reserve, it could be treated as a plant closure and a new entrant. The firm would lose all entitlement to transitional allocation and this would incentivise the retention of an old and inefficient plant
- with a small new entrant reserve, and if the new plant is treated as a new entrant rather than as an incumbent, there is considerable uncertainty over future levels of allocation eg, if there were significant numbers of other new entrants.

Recommendation 17

The SEIP TAG recommends that if an historical emissions allocation methodology is adopted, that firms retain the same allocation if an eligible activity is being closed at one site and opened at another.

Closure rules

Closure rules are very important in terms of influencing decisions at the margin. The Act states that the entity that is eligible for transitional allocation loses this eligibility on closure. However,

defining closure is not necessarily straightforward, nor is it so that economic regrets only occur at closure – although they are likely to be greater.⁶

Approaches to allocation based on updated activity do not require closure rules – levels of allocation are determined by recently measured activity, whereby reducing activity to zero results in zero allocation. However, an historic allocation methodology requires more detailed rules relating to how to define closure versus partial closure (or reduction in output) and what to do about reduced output.

The SEIP TAG has not considered the issue of managing partial closure in any depth but it is noted there are a number of reasons why a plant might close temporarily and that these might be normal practice in any individual industry eg, plant upgrades or reductions in demand. It will be important to separate these from closures and to identify permanent closures that might be ‘disguised as’ temporary closures.

Recommendation 18

The SEIP TAG recommends that, for the purpose of determining whether a plant is still to receive an allocation of emission units, criteria should take account of:

- a) clear permanent plant closures for which plants should no longer be eligible
- b) temporary closures during which they should continue to receive an allocation
- c) closures for reasons that are initially defined as of a temporary nature but that occur for periods that are longer than would be considered normal in that industry. Under these circumstances allocations should cease and any allowances that have been allocated historically during this period of ‘temporary closure’ should be repaid.

E Electricity market price effects

The purpose of the electricity issues sub-group was to identify the electricity price impact of the introduction of the NZ ETS, and to develop a methodology by which the Minister could compensate eligible firms for the increase in the electricity price through the transitional allocation of NZUs.

The approach

The sub-group acknowledged that this issue of the impact of a “carbon-constrained” future and its affect on electricity prices was not new. A significant amount of work was undertaken in 2004–05 under the premise of the Government introducing a carbon tax, and more recently as part of the development of the New Zealand Energy Strategy.

The sub-group agreed that it would be beneficial to review the work that was completed as part of these processes to identify the key issues with determining the impact on electricity prices, and also to determine whether any of the previous work could easily be translated into the proposed NZ ETS environment.

It should be noted that initially the sub-group was considering an approach of determining the emissions of the marginal generating station as a proxy for the impact on eligible ‘energy intensive’ firms. However, based on the wording of the Act, it was agreed the task was not about assessing emissions, but rather about quantifying the electricity price impact. This impact

⁶ If a plant reduces output but does not close, it is more likely that it can increase output again later.

results from the NZ ETS design of imposing the cost of carbon upstream at the producer level, and allowing the price of carbon to flow through to consumers.

In reviewing previous analysis of options for determining the electricity price impact the sub-group's views were divided:

- some members of the sub-group felt there would be a significant impact on the price of electricity as generators sought to recover their cost of carbon across their portfolios
- some members of the sub-group referred to the work completed by Concept Consulting Group for the Electricity Commission on the Market Design Review, where the analysis showed the price of electricity tended to be capped by the long-run, marginal cost of the next generation investment.

There was, however, consensus in the sub-group that the outcome may be a combination of the options and on that basis it was decided to defer any final decision until the results of all modelling were available.

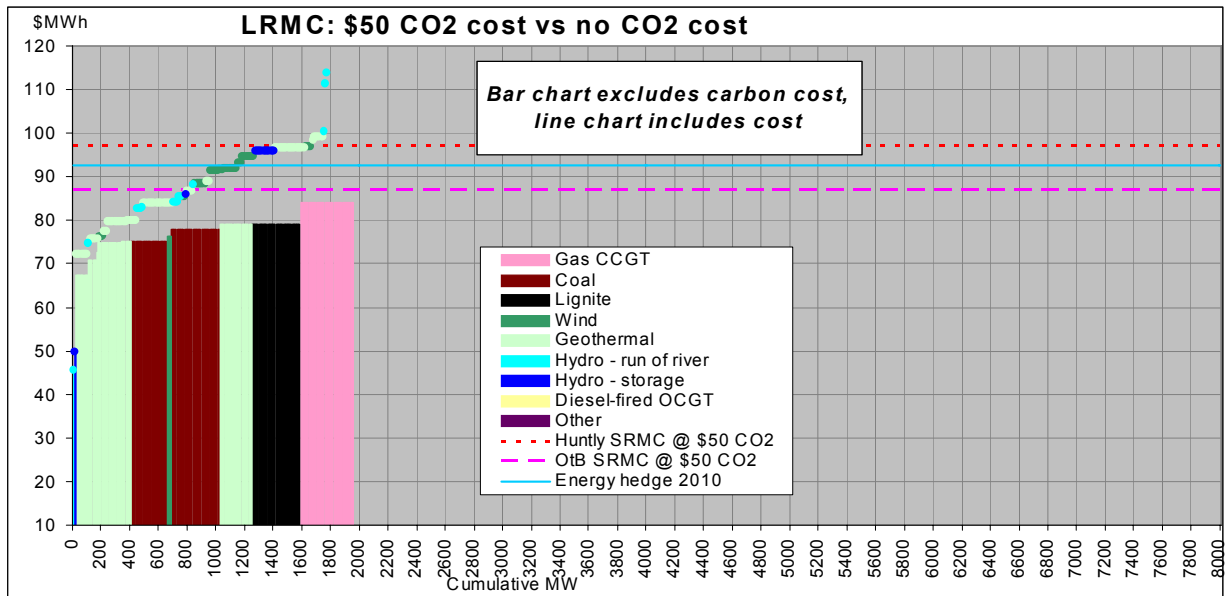
The methodology

The sub-group discussed at length the best approach to inform the methodology for allocation of NZUs to eligible firms. Some members of the sub-group believed the ability of thermal generators to recover the full cost of carbon would be constrained from 1 January 2010 by the long-run, marginal cost (LRMC) of the next tranche of generation being commissioned in that time. However, some of the group believed in the initial commitment period for the SEIP sectors (2010–2012), thermal generators would be able to increase wholesale prices to recover the full cost of carbon and that thereafter recovery would depend on the supply-demand gap and not the LRMC. It was agreed, therefore, to focus on the methodology during the initial commitment period for the SEIP sectors (2010–2012) as a priority, together with an indication of the likely methodology from 2013 on, assuming the review set for 2011 would take account of the historical outcome as well as the anticipated future investment in generation.

On this basis, the sub-group requested the Ministry of Economic Development (MED) to model the likely generation build sequence through to 2030 based on LRMC with a carbon price of \$0.00, \$20.00, \$40.00, \$60.00, \$80.00 and \$100.00/tonne CO_2 . The output from this modelling is to be used to inform an electricity market dispatch model based on short-run, marginal costs (SRMC) using the same range of carbon prices to determine whether thermal generation was constrained as the level of renewable generation in the market increased. Due to a number of constraints the SRMC modelling, the SDDP model⁷, is not expected to be completed until the end of October 2008.

Recent MED analysis of NZES supply curves, as shown below, tends to indicate that over time with a carbon price there will be a shift in the type of new generation built (ie, the cost of new renewable is cheaper than new coal and/or new gas generation inclusive of carbon). It also indicates that as the price of carbon rises, the SRMC of both existing coal and gas-fired thermal generation is significantly higher than the LRMC of the new renewable generation. This would tend to support the contention there is a constraint on the recovery of the cost of carbon until such time as the price of new renewable generation rises substantially.

⁷ The SDDP model referred to is the “Stochastic Dual Dynamic Programme” model, a current practice electricity market dispatch model, run in this case by Dr Tom Halliburton of Energy Modelling Consultants Ltd.



Note: This is a subset of the total supply curve, based on plant built in 'GEM' model runs covering the period 2008 to 2032. The GEM runs are from the NZES cost-benefit analysis.

On this basis some of the group considered that a simple comparison of two plausible long run supply curves (with and without the NZ ETS) was a sufficient and defensible way to determine any price uplift. In comparing the two LRMC curves (with and without the ETS), the uplift in price can be determined simply by assessing whether the trading scheme would, during the period between 2010 and 2012, result in renewable generation being built instead of thermal generation. If sufficient renewables (regardless of their cost) were being built irrespective of the trading scheme then there would potentially be no impact at all in the short term, and no electricity price impact. However, this is not consistent with the MED analysis (above) around the long-term generation mix, which shows a change in the generation investment decisions in a carbon-constrained and renewable preference world. By way of example, if thermal stations were to be built in the absence of a carbon price, but with a carbon price would no longer be built, the effect can be calculated as an absolute uplift in terms of \$/MWh.

Based on the above, the algorithm to determine the price increase could be:

$$\text{Price increase} = G(t) + (A*B) - \min(G(t), C) \text{ in } \$/\text{MWh},$$

That is, the difference between the two supply curves in the diagram.

$$\text{The dollar cost to a consumer} = [G(t) + (A*B) - \min(G(t), C)] * 2005 \text{ MWh}$$

In these formulae:

$G(t)$ = cost of the next new generation investment, currently assumed to be geothermal at time t (as load growth moves us up the geothermal supply curve)

A = the representative emission rate for the generation (eg, geothermal)

B = the observed cost of carbon in $\$/\text{tCO}_2$

C = the long-run cost of thermal generation in $\$/\text{MWh}$

Once the price increase has been determined, the price of purchasing a carbon credit can then be factored in, and therefore the electricity price impact is translated into a tonne/MWh figure, by which the Minister can allocate NZUs. It is important to note that given the expected variation

in the carbon market, a transparent price curve for the NZUs will need to be available for this part of the allocation methodology.

The core principle is that the allocation policy will need to adopt some assumptions about the supply curves, a baseline curve for the no-ETS counterfactual, and a family of curves for different carbon prices.

SRMC modelling will provide an alternative method for deriving the price increase due to carbon. However, because this modelling is not yet complete, the group agreed to defer the selection of a methodology for determining the price increment.

This is because the SRMC modelling output is expected to provide, on a monthly basis, the total differential cost at zero price for carbon and each of the selected prices of carbon; the generation mix that set that price and the total MWh of generation.

Based on the above, the algorithm to determine the level of allocation could be:

$$(\$A - \$B) / (MWh * \$C) = NZUs$$

Where:

\$A =	Total monthly cost (to consumers) with \$X.00/tonne carbon
\$B =	Total monthly cost (to consumers) with \$0.00/tonne carbon
MWh =	Total monthly MWh generated
\$C =	\$X.00/tonne carbon
NZUs =	Number of NZUs / MWh

This will hold true until the full recovery of the price of carbon is constrained by the LRMC of the next tranche of renewable generation. Note that these monthly NZUs will then need to be averaged in order to provide a single NZU factor to be applied for a given year or commitment period.

Recommendation 19

The SEIP TAG recommends that further analysis is completed to assist in determining a methodology for the allocation of emission units to compensate for the electricity price impact.

Next steps

Noting that the SRMC modelling and analysis will not be complete until after the issuance of the final SEIP TAG report to the Emissions Trading Group (ETG), the sub-group agreed it would meet again following the receipt of the results to confirm/amend its initial recommendations to the ETG, and produce an addendum to the report for completeness.

F Data issues

The need for comprehensive firm level data was identified by the SEIP TAG as a key requirement for understanding the implications of different eligibility and allocation methodologies.

The Statistics New Zealand (SNZ) dataset “Manufacturing Energy Usage Survey 2006” (MEUS) was able to provide detailed emissions data on a sector-by-sector basis, and in some cases, firm specific data was also supplied⁸. The sector data was used to help understand eligibility thresholds by displaying the number of firms and quantity of emissions at various threshold levels. Some of these firms also supplied their emissions data directly to the SEIP TAG which enabled the SEIP TAG to analyse the impact of different allocation methodologies on various types of firms and sectors. The detailed results of this analysis cannot be reproduced in this report due to firm confidentiality issues.

The MEUS data only covers stationary energy (SE). MED collects Industrial Process (IP) data for the purposes of greenhouse gas reporting, so was able to combine the MED IP data with the MEUS SE data in order to estimate total SEIP emissions for 2005. The total SEIP estimate ranges between 10.5mtCO₂ and 17mtCO₂ depending on the electricity emissions factor assumed and the allowances for other firms not covered by the MEUS survey.

The MEUS and MED data was also supplemented by EECA’s Energy Audit database which provided some detail regarding SME emissions, although this could not be viewed at a firm-by-firm level by the SEIP TAG due to confidentiality issues.

The SEIP TAG has also expressed interest in obtaining intensity data. SNZ has been able to supply some information around this by combining the MEUS data with Annual Enterprise Survey (AES) data. We now have sector-by-sector data for:

- tonnes CO₂ / \$1m Gross Output
- tonnes CO₂ / \$1m Intermediate consumption
- tonnes CO₂ / \$1m Value Added.

The SEIP TAG has also seen distribution curves showing intensity at a firm level (although individual firms have not been named for confidentiality reasons). This is not a comprehensive data set and so further work may be required in this space.

⁸ The sector by sector data was able to be provided with authorisation letters from the top 18 emitting firms. Some of these firms also supplied their data directly to the TAG.

Section III – Methodologies relevant to the drafting of regulations

The Methodologies (Regulations) sub-group was tasked with developing methodologies for the activities related to the:

- SEIP sectors, Schedule 3, Part 3 and 4
- opt-in for stationary energy, Schedule 4, Part 4
- other removal activities, Schedule 4, Part 2, Sub-part 1

The sub-group includes representatives from the energy and industrial sectors plus officials experienced in energy and emission reporting matters.

Point of obligation and opt-in

An upstream point of obligation is adopted in the Act as was previously outlined in the Government's Framework Document. In the stationary energy sector, large downstream users of coal or natural gas may choose to opt-in, and become the point of obligation for the coal or natural gas they purchase directly from a mandatory participant.

The NZ ETS framework needs to manage matters like: the export and import of fuels, downstream fuel sales, the potential for orphan carbon liabilities, and situations where the carbon from fuels is embodied in products such as methanol. When products permanently embed emissions or where products temporarily embed emissions and are exported, they do not result in emissions within New Zealand, and therefore, if certain criteria are met, the participant carrying out the embedding will receive an NZU for each tonne of emissions embedded. Complexities in downstream product flows in the gas market in particular, make it important to ensure any point of obligation other than at the miner creates no NZ ETS liabilities to unintentionally remain with the miner or any infrastructure owner (eg, Unaccounted for Gas derived from metering errors etc in the gas transmission system).

Emissions calculation

The methodologies sub-group began by exploring the three broad ways in which regulations could provide for participants to calculate their emissions. These approaches are discussed briefly in turn below:

1. Specify in regulations a detailed methodology for each SEIP activity, specifying the data or other information that participant must collect (eg, specifying sampling regimes) and setting out how that data is to be used to calculate actual emissions. This is similar to the 'measured approach' proposed for post-1989 forest land participants and the EU approach.
2. Group participants (eg, miners of certain types of coal) and provide a default emission factor by which each unit of production can be multiplied to determine obligations.
3. Create default emissions factors, but allow individual participants to apply for unique emissions factors, specific to their activity.

The methodologies sub-group briefly considered each of these options. It agreed that while the first option might lead to the most accurate result, developing appropriate and specific methodologies would be difficult, reporting against them would create significant compliance costs for participants, and the increased accuracy in reporting they would provide would be relatively small.

The sub-group favoured a more pragmatic and simple approach that did not place a high compliance cost on participants but provided them with the necessary level of flexibility. Therefore, the sub-group agreed that the third approach of using default emission factors but allowing firms to apply for a unique emission factor was the best approach, and accordingly developed methodologies on this basis.

Point and unit of measurement

The point of measurement will be specific to the activity. The methodologies sub-group looked at establishing the most efficient measurement point for each activity. The criteria used to determine the best measurement point included:

- least cost to the participant and the economy
- consistent with the New Zealand inventory
- pragmatic
- simple
- transparent
- verifiable
- scientific integrity
- best emissions coverage
- use of existing processes, and measurement points for other responsibilities such as Crown Minerals Act and Resource Management Act requirements.

Similarly, the unit of production/purchase will be specific to the activity being assessed, for example, mining coal is measured in tonnes whereas mining natural gas is measured in gigajoules.

Methodologies

The methodologies sub-group, after reviewing the provisions of the Act, has systematically examined each activity listed under the stationary energy, industrial processes and opt-in sections.

The group did not look at methodologies for the following activities as it was deemed the sub-group either did not have the required expertise or one-on-one conversations were being held between officials and the relevant participants ie, fugitive coal seam gas, refining petroleum, importing HFCs and PFCs, producing gold and producing cable using the nitrogen cure process.

In developing the above methodologies, the methodologies sub-group noted the importance of the unique emission factor (UEF) process to the work being undertaken. The UEF process will provide SEIP participants with the necessary flexibility to ensure that if the default emission factors provided for in regulations are significantly different they can apply for a UEF that better reflects their situation.

Recommendation 20

It is recommended that the table of methodologies by activity (in Annex [X]) produced by the sub-group form the basis of the methodologies for the SEIP regulations.

Recommendation 21

It is recommended that, at the end of a compliance period any coal in a stockpile or natural gas in temporary storage is excluded from the total obligations for a participant for that period.

Recommendation 22

It is recommended that, when calculating total emissions from the combustion of used oil, waste oil, used tyres or waste, all organic waste components are excluded if they have been captured at an upstream point (ie, forestry sector) or if the emissions are not included within the Kyoto Protocol.

Recommendation 23

It is recommended that, when the exposure draft SEIP regulations are released for public submissions, the methodologies sub-group should reconvene and review the regulations and provide officials with feedback on the regulations.

Removal activities

With respect to the other removal activities (in Schedule 4, Part 2 of the Act), the methodologies sub-group agreed that it was not appropriate to develop methodologies for each potential removal activity as the list could be large and the Act did not list activities but rather set out criteria that must be met. Therefore, the methodologies sub-group agreed that a process should be developed and the other removal regulations should detail the process a participant must follow in order to verify they are carrying out a removal activity and to verify the total emissions sequestered either permanently or exported. Officials are currently undertaking work to establish an appropriate process and will consult on the draft regulations in mid 2009.

Recommendation 24

It is recommended that the regulations for other removal activities specify a process that participants must follow in order to verify they are carrying out a removal activity and to verify the total NZUs they are entitled to.

In addition, the group has summarised its work in a final report, which is also attached for reference.

<http://www.climatechange.govt.nz/nz-solutions/stationary-energy-industrial-technical-advisory-group/index.shtml>

Annex I: Members of the SEIP TAG

- Carmen Blackler, Contact Energy
- Chris Baker, Saunders Unsworth
- Craig Palmer, Solid Energy
- David Fletcher, Anzco Foods
- Doug Watson, Fonterra
- Ewan Gebbie, Vector
- George Riddell, Business New Zealand
- Hans Buwalda, Fletcher Building
- James Flexman, Carter Holt Harvey
- John Carnegie, Genesis Energy
- Mark Storey, Emissions Trading Group
- Michael Rynne, Holcim
- Philip Millichamp, Ministry for the Environment
- Ray Deacon, Rio Tinto
- Roger Fairclough, Ministry for Economic Development
- Stuart Frazer, Frazer Lindstrom

Annex II: Terms of Reference

TECHNICAL ADVISORY GROUP STATIONARY ENERGY AND INDUSTRIAL PROCESS COMPONENT OF THE NEW ZEALAND EMISSIONS TRADING SCHEME

Background

The Government has decided in principle that stationary energy and industrial process emissions will be brought into the New Zealand Emissions Trading Scheme (NZ ETS) on 1 January 2010.

Including stationary energy and industrial processes in the NZ ETS presents a number of challenges which need to be worked through. Many of these challenges are highly technical in nature, and are attributable to issues such as the complex and specialised nature of industrial processes, complexities in markets and distribution networks for electricity and gas, associated issues of measurement and verification, and economic issues. The Emissions Trading Group (ETG) is therefore seeking a high degree of technical and specialist input from the relevant sectors in developing the policy to implement the stationary energy and industrial process components of the NZ ETS.

The General Manager⁹ (GM) of the Emissions Trading Group is establishing a Technical Advisory Group (TAG) to act as the principal tool for engaging the energy and industrial sectors on the technical design elements of this component of the NZ ETS. The TAG will comprise technical and policy specialists from the industry and energy sectors, science/technical community and government. The goal is to ensure the NZ ETS functions in a sensible and practical manner for the stationary energy and industrial process sectors.

The TAG will contribute to the development of the NZ ETS and via this to outcomes under the New Zealand Energy Strategy. A copy of the Government documents *The Framework for a New Zealand Emissions Trading Scheme* and *The New Zealand Energy Strategy* are attached for reference.

Membership

The TAG will comprise 12 or fewer technical and policy experts from within industry, government, and the scientific/technical community, with a Chair appointed by the General Manager ETG. Membership shall include:

- one member from the Emissions Trading Group
- one member from the Ministry of Economic Development
- one member from the Ministry for the Environment
- members with expertise/knowledge in electricity generation or the electricity sector more generally
- members with expertise/knowledge of issues relevant to major energy users
- members with expertise/knowledge of issues relevant to industrial process emitters
- members with expertise/knowledge of issues relevant to small and medium enterprises.

All members of the TAG will be appointed by the General Manager of the ETG. These members will be selected to provide specific technical and/or policy expertise rather than to represent particular interests or interest groups. In deciding the make-up of the TAG a balance of skills will be sought.

The TAG may invite others with relevant expertise to attend meetings from time to time and join sub-groups as necessary.

⁹ Note that this role may transfer to the General Manager, Central Government Policy Group, Ministry for the Environment, during 2008.

Role

The role of the TAG is to provide guidance and advice on technical design elements of the stationary energy and industrial process emissions components of the NZ ETS. The Terms of Reference of the TAG do not extend to those design features that are specifically addressed as provisions in the Bill, for example, the definition of emission obligations, the base year for allocation, and the phase out of assistance.

- (1) A key task of the TAG is to advise on options for providing assistance to industry. Specific issues related to this task are:
 - a) defining and evaluating different options for free allocation or other assistance
 - b) as part of the above, defining thresholds (size and scope) for assistance, rules for entry, trade-exposure tests, recognition of early action etc
 - c) defining activity data and emission factors to assess the basis for free allocation or other assistance.

Other technical design issues to be addressed by the TAG include:

- d) defining points of obligation and, in particular, advising on whether and how to administer opt-ins/carve-outs
- e) advising on specific issues about electricity – how to assess the impacts of emission prices on electricity prices, as an input to options for assistance.

Other roles of the TAG include:

- (2) peer review the findings of technical/policy reports and perform a general quality assurance role
- (3) participate in a series of wider stakeholder seminars/workshops
- (4) facilitate the delivery of a report to ETG outlining key technical considerations and recommendations for areas relevant to the stationary and industrial process sectors, including:
 - methodologies and processes for monitoring, reporting and verification of emissions
 - accounting for mitigation behaviour on site
 - work required for implementation.

In fulfilling its roles, the TAG will uphold the broad NZ ETS core design/objectives and allocation principles.

a) Secretariat

The TAG will be serviced by a special secretariat that will perform both an administrative role and an analytical role. Administrative functions include:

- (1) coordinating TAG meetings and recording minutes
- (2) compiling and distributing meeting papers
- (3) coordinating and managing a series of wider stakeholder workshops on the stationary energy and industrial process component of the NZ ETS
- (4) a general facilitation role and other roles.

Deliverables

The delivery of a report(s) to the General Manager ETG outlining key technical considerations and recommendations for areas relevant to the stationary energy and industrial process sectors as described above.

The Chair of TAG will be invited to report on a bi-monthly basis to the ETG.

Reports from the TAG will be forwarded to Ministers and the Climate Change Leadership Forum (CCLF).

Information made available to the TAG or produced by the TAG will be made publicly available at an appropriate time as defined by the Chair in consultation with the General Manager ETG

The ETG retain full privilege to accept or reject the recommendations of the TAG.

Meeting process

The TAG will meet on a monthly basis or more or less frequently as determined by the Chair. A quorum will be half plus one member.

Sub-groups working on specific tasks may be established.

Substitution of membership is allowable with the prior permission of the Chair.

In the absence of the Chair of the TAG, the Chair will appoint an acting Chairperson who will be a member of the TAG.

Members will notify the secretariat within a reasonable timeframe if they are unable to attend a meeting.

If a member is absent for more than three meetings without approval of the Chair, their position may be considered vacant.

Minutes of the meeting will be recorded and circulated to members within 10 working days of the meeting.

Once endorsed by the TAG, minutes of meetings will be publicly available.

Resources

In addition to the Secretariat's resources, some funding for independent analytical work (including joint funding) will be made available subject to budget constraints.

Duration

The TAG will submit a final report on the stationary energy and industrial process emission component of the NZ ETS by end of September 2008.

The TAG will be deemed to have fulfilled its role upon the delivery of this report, or on the decision of the GM ETG and will disband at that point.

Participation in good faith

The primary role of the TAG is the provision of independent technical and policy advice. Members are therefore expected to participate without prejudice to the policy outcome. Members of the TAG are required to act in good faith and on a 'no surprises' basis.

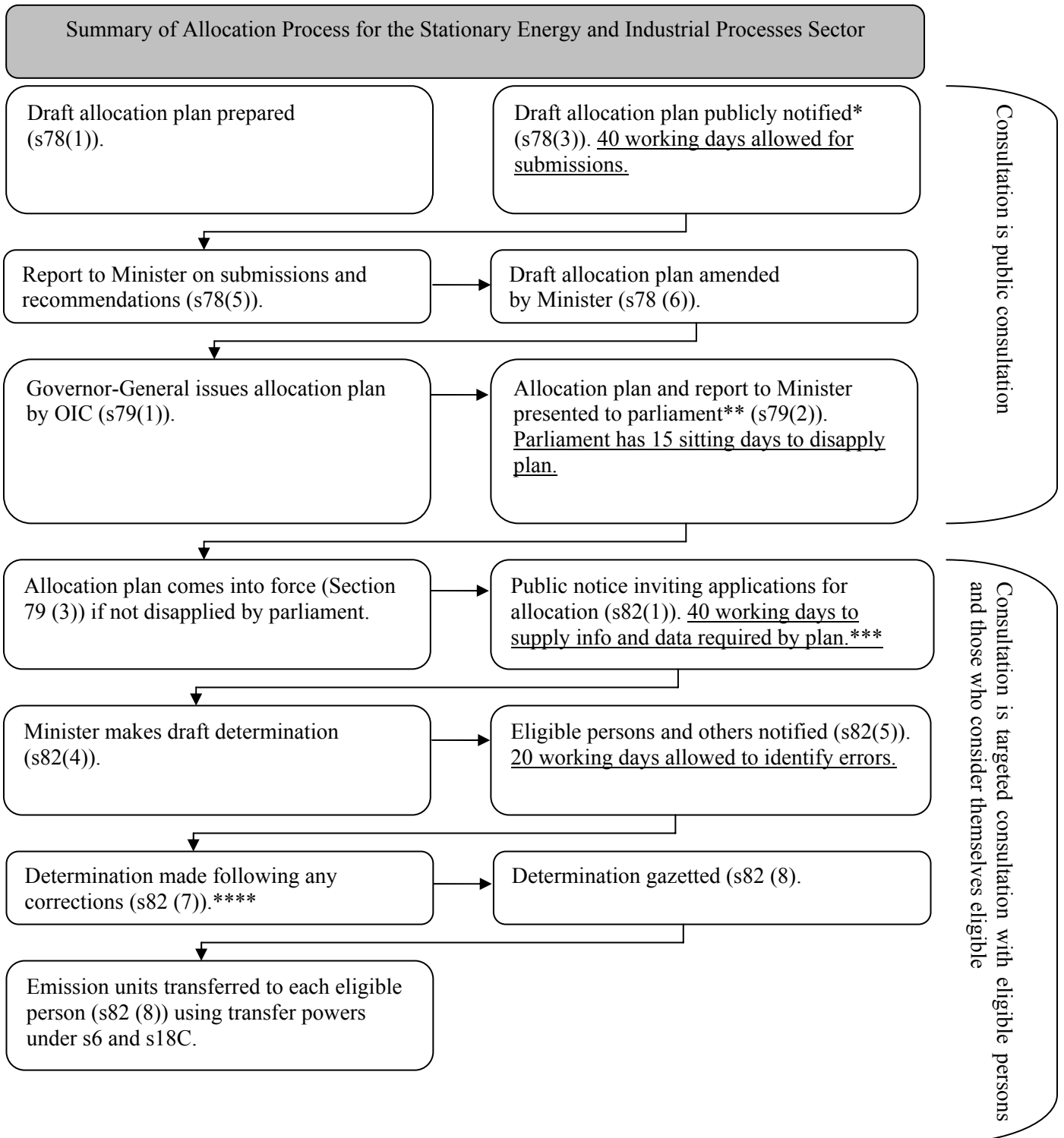
Information prepared for the TAG, or by the TAG, will be of interest to member organisations and wider stakeholders. Where information has been made available to members, they may only circulate it where prior approval has been obtained from the Chair.

Review/assessment of performance

The Chair of the TAG in consultation with other members of the group, will conduct a self assessment of performance after four meetings.

The results of the assessment will be forwarded to the General Manager ETG along with any recommendations for revising the terms of reference for the group.

Annex III



* Available on internet and at relevant Ministry's office.

** Note that this applies to industry, agriculture and fisheries sectors but not forestry.

*** A person must respond to be able to receive an allocation.

**** Note that after making the initial determination the Minister may request further information (s83) and/or may remake the determination under s84.

Annex IV: TAG SEIP Methodologies (Regulations) sub-group

Proposed Methodologies

Activity	“formula”	Point of measurement	Notes	Assumptions
Stationary Energy				
Importing coal	$\{ A - E + \text{stockpile adjustment} \} * CV * e.f.$ Where “stockpile adjustment” = opening stockpile – closing stockpile $\{ A1 - (A + A1 - B - E) \}$	A = tonnes of coal at customs declaration point A1= opening stockpile B = tonnes of coal from stockpile off-take (including own use) E = tonnes of coal exported CV = gross calorific value of coal e.f. = energy based emission factor by coal classification	coal classification includes: <ul style="list-style-type: none"> • lignite • sub-bituminous • bituminous 	<ul style="list-style-type: none"> • Homogeneous stockpile • Standard energy based emission factor for stockpile • Year one, opening stockpile reset to zero • Year one = year ending 31 Dec 2010
Mining coal	$\{ [C+D] - [X+E] + \text{stockpile adjustment} \} * CV * e.f.$ Where “stockpile adjustment” = opening stockpile – closing stockpile $\{ A1 - (A + A1 - C - E) \}$	A = tonnes of mined coal A1 = opening stockpile C = tonnes of coal at point of sale D = tonnes of coal for own combustion including free use E = tonnes of coal exported X = tonnes of coal sold to opt-in participant CV = gross calorific value of coal e.f. = energy based emission factor by coal classification	coal classification includes: <ul style="list-style-type: none"> • lignite • sub-bituminous • bituminous 	<ul style="list-style-type: none"> • Homogeneous stockpile • Standard energy based emission factor for stockpile • Coal seam methane calculation to be added • Year one, opening stockpile reset to zero • Year one = year ending 31 Dec 2010
Purchasing Coal (for mixed stockpile of opt-in obligation fuel and purchases from wholesaler)	$\{ [C+C1+\text{stockpile adjustment}] * C / (C+C1) \} * CV * e.f.$ Where “stockpile adjustment” = opening stockpile – closing stockpile $\{ A1 - (C+C1 + A1 - B) \}$	C = tonnes of mined coal at point of sale for which the purchaser has opted in C1 = tonnes of coal purchased where emission charge already applied (eg, obligation fuel) A1 = opening stockpile B = tonnes of coal from stockpile off-take CV = gross calorific value e.f. = energy based emission factor by coal classification	coal classification includes: <ul style="list-style-type: none"> • lignite • sub-bituminous • bituminous 	<ul style="list-style-type: none"> • Homogeneous stockpile • Standard energy based emission factor for stockpile • Assumes purchase ratio is applicable to stockpile also • Year one, opening stockpile reset to zero • Year one = year ending 31 Dec 2010

<p>Purchasing coal (for opt-in purchases only – ie, no purchases from wholesaler)</p>	<p>{ [C + stockpile adjustment] *CV *e.f. Where “stockpile adjustment” = opening stockpile – closing stockpile {A1 – (C + A1 – B)}</p>	<p>C = tonnes of mined coal at point of sale for which the purchaser has opted in A1 = opening stockpile B = tonnes of coal from stockpile off-take CV = gross calorific value e.f. = energy based emission factor by coal classification</p>	<p>coal classification includes:</p> <ul style="list-style-type: none"> • lignite • sub-bituminous • bituminous 	<ul style="list-style-type: none"> • Homogeneous stockpile • Standard energy based emission factor for stockpile • Year one, opening stockpile reset to zero • Year one = year ending 31 Dec 2010
<p>Importing natural gas</p>	<p>[F + storage adjustment] * CV * e.f. Where “storage adjustment” = opening storage – closing storage {G – (F + G – H)}</p>	<p>F = gigajoules of gas at customs declaration point G = gigajoules of gas opening storage CV = gross calorific value H = gigajoules of storage off-take e.f. = emission factor by gas type</p>	<p>gas type includes</p> <ul style="list-style-type: none"> • LNG • CNG • LPG • Imported (where e.f. is different to NZ spec gas). 	<ul style="list-style-type: none"> • Where natural gas volume is not gigajoules (ie, energy based), then e.f. needs to be multiplied by calorific value of gas type.
<p>Mining natural gas</p>	<p>{[I+K-L-E-Y1]*e.f_{raw} + [J*e.f_{vent}] + [M*e.f_{store}] – [(Y2)*e.f_{spec}</p>	<p>I = gigajoules of gas flared J = gigajoules of gas vented K = gigajoules of raw gas at point of valuation L = gigajoules of gas put into storage M = gigajoules of gas taken out of storage Y1 = gigajoules of gas sold to opt-in participant (raw gas) Y2 = gigajoules of gas sold to opt-in participant (including UFG) from pipeline e.f._{raw} = emission factor of raw gas e.f._{vent} = emission factor of vented gas e.f._{store} = emission factor of gas extracted from storage facility e.f._{spec} = emission factor for pipeline gas</p>	<p>gas classification includes:</p> <ul style="list-style-type: none"> • spec gas • Kapuni LTS gas • Kaimiro gas <p><i>Note: Formula is unaffected if the raw emission factor is a generic factor or by field</i></p>	<ol style="list-style-type: none"> 1) Point of valuation is gas only (does not include condensate) 2) Condensate is a Liquid Fossil Fuels obligation not SEIP 3) Generic emission factor for raw natural gas with 5 per cent tolerance of spec gas (sub-group initial recommendation) 4) Fields outside 5 per cent tolerance level (eg, Kapuni LTS, Kaimiro) apply for unique emission factor 5) Kapuni LTS and Kaimiro have known emission factors outside 5 per cent tolerance level of spec gas so specific emission factor will be listed in types of gas for these two fields 6) If fields don't apply for unique emission factor then subject to audit (and penalties)

				<p>7) Emission factor from storage facility may need to be measured and checked it is within 5 per cent tolerance level of spec gas</p> <p>8) Includes provision for Unaccounted for Gas (UFG) at same emission factor as pipeline spec gas</p>
<p>Purchasing natural gas (for which the purchaser has opted-in)</p>	$\{ [N - L] * e.f._{spec} \} + [M * e.f._{store}] + [O * e.f._{raw}]$	<p>L = gigajoules of gas put into storage M = gigajoules of gas taken out of storage N = gigajoules of spec gas at delivery point (including UFG) O = gigajoules of raw gas at delivery point e.f. _{spec} = emission factor of spec gas e.f. _{raw} = emission factor for untreated gas e.f. _{store} = emission factor of gas extracted from storage facility</p>		<ul style="list-style-type: none"> • As per proposed ETS, opt-in provision only goes one level • Assumes storage is underground, and difficult to measure what is in storage at any time, therefore uses in-out formula • Only one emission factor for spec gas at delivery point • Raw gas emission factor is by gas classification type (eg, Kaimiro, Kapuni LTS) • Includes provision for Unaccounted for Gas (UFG) at same emission factor as pipeline spec gas
<p>Using geothermal fluid for electricity generation and industrial heat</p>	$[(P) * e.f.]$	<p>P = tonnes of steam (includes tonnes of steam vented) measured at well head separator e.f. = emission factor by field</p>	<p>Geothermal fields for example:</p> <ul style="list-style-type: none"> • Wairakei • Tauhara • Ohaaki • Ngawha • Rotokawa • Mokai • Kawerau 	<ul style="list-style-type: none"> • Geothermal fields are mutually exclusive from each other (ie, completely independent) • Assumes that policy intent is not to capture small commercial installations

Combusting used and waste oil for electricity and industrial heat	$[R-R1] * CV * e.f$	R = tonnes of relevant used and/or waste oil from stockpile off-take R1 = used oil which has emission charge already applied upstream (obligation fuel) CV = gross calorific value (if applicable) e.f.= emission factor of waste type	waste type includes: <ul style="list-style-type: none"> used oil waste oil 	
Combusting waste for electricity and industrial heat	$[S-S1] * CV * e.f (CO2 \text{ only}) + S * CV * ef (CH4 \text{ and } N2O)$	S = tonnes of relevant waste from stockpile off-take SI = organic waste which has emission charge already applied upstream CV = gross calorific value (if applicable) e.f. = emission factor of waste type	waste type includes: <ul style="list-style-type: none"> used waste 	
Combusting used tyres for electricity and industrial heat	$[T] * e.f_{true}$ Where $e.f_{true} = \eta(\text{biomass}) * \epsilon(\text{gross})$	T=tonnes of relevant waste from stockpile off-take e.f. _{true} = emission factor of used tyres taking into consideration biomass content $\eta(\text{biomass}) = (1-\text{biomass content})$ where biomass content is 15 per cent $\epsilon(\text{gross}) = \text{emission factor of used tyres without biomass content accounted for}$	waste type includes: <ul style="list-style-type: none"> used tyres 	Need to account for biomass content of tyres
Refining petroleum				Not discussed as assumed – to be added
Industrial Process				
Producing iron	$[(AA * e.f) + AB - AC]*3.67$	AA = tonnes of mass reducing agent from stockpile off-take AB = tonnes of carbon ore AC = tonnes of carbon metal e.f. = emission factor of mass reducing agent		Any steel produced at the end of this process is deemed to be “emission free” as emissions already accounted for
Producing steel	$CE * 44/12$	CE = quantity of carbon electrode consumed in the electric arc furnace		Based on arc furnace process re: 2006 IPCC guidelines for National Greenhouse Gas Inventories
Producing aluminium	$[AD * e.f._{pitch}] + [AE * e.f._{coke}] + [AF * e.f._{anode \text{ butts}}] + [AG * e.f._{alumina}]$	AD = tonnes of pitch AE = tonnes of coke		

		<p>AF = tonnes of anode butts</p> <p>AG = tonnes of alumina</p> <p>e.f. _{pitch} = emission factor of pitch (measured)</p> <p>e.f. _{coke} = emission factor of coke (measured)</p> <p>e.f. _{anode butts} = emission factor of anode butts (calculated)</p> <p>e.f. _{alumina} = emission factor of alumina (measured)</p>		
Producing clinker (cement)	$[AH * e.f._{clinker}]$	<p>AH = tonnes of clinker produced</p> <p>e.f._{clinker} = emission factor of clinker</p>		Using “clinker” as this is terminology included in Bill, and is consistent with IPCC guidelines
Producing burnt lime resulting in calcinations of limestone	$[AI * e.f._{lime}]$	<p>AH = tonnes of clinker produced</p> <p>AI = tonnes of burnt lime produced</p> <p>e.f._{clinker} = emission factor of clinker</p> <p>e.f. _{lime} = emission factor of burnt lime produced</p>		
Production of glass using soda ash	$[AJ * e.f._{soda\ ash}]$	<p>AJ = tonnes of soda ash from stockpile off-take</p> <p>e.f. _{soda ash} = emission factor of soda ash</p>		
Production of gold	$[AK * e.f._{limestone}]$	<p>AK = tonnes of limestone from stockpile off-take</p> <p>e.f. _{limestone} = emission factor of limestone</p>		
Importing SF ₆				Not discussed in this forum as obligation does not start until 2013
Importing HFCs				Not discussed in this forum as obligation does not start until 2013
Importing PFCs				Not discussed in this forum as obligation does not start until 2013