A Technical Assessment of Incorporating Correction and Flexibility Mechanisms into the Gothenburg Protocol Revision Process

A Report of the TFEIP

Executive Summary

ES1: Background

The 1999 Gothenburg Protocol aims to reduce acidification, eutrophication and ground level ozone by setting absolute emissions ceilings for 2010 and beyond for SO_2, NO_X, NMVOC and NH_3. Work is currently underway to revise the Gothenburg Protocol, and this is expected to include more ambitious emission ceilings for these four pollutants, and introduce an emission limit/ceiling for particulate matter.

Recent developments in emission trends have highlighted the possible need for emission ceilings and/or the assessment of compliance to incorporate either correction or flexibility mechanisms. In order to inform the negotiations of the Convention on the options for including correction and/or flexibility mechanisms for compliance checking, the Executive Body requested the Task Force on Emission Inventories and Projections to provide technical advice on the issue. This report represents the work undertaken by an *ad hoc* group on Flexibility Mechanisms set up by the Task Force at its 24th meeting in Stockholm 2nd and 3rd May 2011. Representatives of the following Parties participated in the ad-hoc group: Finland, France, Germany, Ireland, the Netherlands, Spain, the United Kingdom and the European Union.

The following Correction and Flexibility mechanisms have been assessed for suitability of inclusion in the revised Gothenburg Protocol:

Relative Emission Ceilings

Accounting for Change and Uncertainty

- Accounting for New Sources
- Accounting for Significant Changes to EFs
- Split Ambition Targets

Time Based Mechanisms

- Three Year Average
- Delayed Compliance

Domestic Pollutant Swapping

Emissions Trading Scheme Variants

- ETS
- Bubble ETS
- Sectoral ETS

Short Explanation of Selected Mechanisms

Accounting for Change and Uncertainty
Where improvements introduce new sources or significant changes to emission factors, guidance would be published that might allow corrections to emissions for compliance purposes

Split Ambition Targets
Uncertainty ranges would be applied to the ceilings, and updated if/when improvements brought about significant changes to emission estimates

Three Year Average
An option to use a three year average for compliance purposes

Delayed Compliance
If exceeding ceilings in compliance year, an option to take more challenging ceilings with compliance at a later date instead

Domestic Pollutant Swapping
The option of allowing a Party to reduce emissions of one pollutant at the expense of another, for compliance purposes

This assessment has been undertaken from the perspective of national emissions inventory compilers, but also takes into account the possible additional burdens on activities within EMEP more generally. The following criteria were used in the assessment framework for each mechanism:

- Overview
- Simplicity and Transparency
- Associated Costs and Effort
- Practicality and Method of Implementation
- Adaptability
- Equity

ES2: Advantages and Disadvantages of Each of the Mechanisms

The following views have been compiled from a technical emissions inventory perspective. Whilst efforts have been made to take into account the impacts on other relevant groups, it will be important that all relevant stakeholders are included in any future discussions to obtain more comprehensive views.

Relative Emission Ceilings

- Absorbs many, but not all, impacts of future inventory development and improvement;
- Particularly well suited to new/developing emission inventories;
- Relative emission ceilings do not address significant revisions to the emission estimates which do not impact on the base year;
- Very simple to implement;
- No significant addition to the workloads for CEIP or the emission inventory review teams (compared to the current Stage 3 review process).

CONCLUSION OF THE TFEIP: This mechanism does have strong support from many of the TFEIP members, but it is recognised that it does not address all issues in its own right.
It is also noted to be familiar and easily implemented with little extra work by other organisations, and is well suited to young/developing emission inventories.

Accounting for New Sources

- Efficient way of mitigating impacts of unforeseen changes;
- Precise definition of "new sources" required;
- Only small burden increases for EMEP SB activities and CEIP;
- Increase in the burden for Parties associated with reporting, and the Stage3 review teams.

CONCLUSION OF THE TFEIP: This mechanism addresses issues associated with revisions very well, but is not popular with some members of the TFEIP because it requires inventory compilers to generate and work with two versions of the inventory.
Additional on-going work would also be needed by other EMEP organisations. It would be important to limit the number of "corrections" allowed to keep this additional burden to reasonable levels. However this would not be helpful for young/developing emission inventories.

Accounting for "Significant Changes" to EFs

- Efficient way of mitigating impacts of unforeseen changes;
- Difficult to define "significant changes" and therefore the breadth of the mechanism;
- Burden increase for EMEP SB activities and TFEIP (in maintaining EMEP/EEA Emissions Inventory Guidebook) could be substantial;
- Increase in the burden for Parties associated with reporting, and the Stage3 review teams.

CONCLUSION OF THE TFEIP: This mechanism addresses issues associated with revisions well, but it is particularly unpopular with some members of the TFEIP. There is potential for a substantial increase in the burden on inventory compilers (in terms of handling data, compiling IIRs and managing version control).
A certain amount of additional work would also be required by other EMEP organisations. It would be very important to minimise the number of "corrections" allowed to keep this additional burden to acceptable levels. However this would not be helpful for young/developing emission inventories.

Split Ambition Targets

- Requires the evaluation and negotiation of uncertainty ranges;
- Periodic update of uncertainty ranges could be time consuming, challenging and may then require negotiation;
- Little extra burden on Parties in terms of effort required for reporting.

CONCLUSION OF THE TFEIP: This mechanism is attractive to inventory compilers because it requires no additional work associated with compiling and reporting a national inventory, but still addresses issues that arise from inventory development.
However, it is recognised that setting of the ceilings and accompanying uncertainty ranges is challenging and that this would require work by other EMEP organisations.

Three Year Average

- Simple to implement with no significant additional burden on Parties;
- Simple to report, however, Parties using this option would achieve compliance a year later than other Parties;
- The emission inventory review process would be slightly more involved than the existing Stage 3 review, but for one year only.

CONCLUSION OF THE TFEIP: This mechanism is simple, and requires no significant additional work, and has general support from the TFEIP.
Policy makers may have issues with the delay of the resulting compliance year.

Delayed Compliance

- Delayed Protocol deadline of three years for non-compliant Parties may affect public perception;
- Additional burden for EMEP SB activities because Party-specific penalty rates would need to be agreed on when Parties are non-compliant;
- Encourages innovative, short-term reduction methodologies in order to comply with the reduced ceilings.

CONCLUSION OF THE TFEIP: This mechanism provides a solution of sorts, but requires additional work and is not as well supported by the TFEIP in general as other mechanisms.
Policy makers may have issues with the delay of the resulting compliance year.

Domestic Pollutant Swapping

- Feasibility of this mechanism will need to be assessed by effects modellers.
- Attempts to counter non-compliance with over-compliance rather than slackening ambition.
- No significant burden on Parties as it is simple to report in the IIR with a small additional section including the simple calculations;
- A significant additional burden on EMEP SB activities to quantify the complex relationships between required exchange rates for each Party and each pollutant;
- Parties would not have to emit under their ceilings in order to comply with the Protocol, which could have adverse effects on public perception.

CONCLUSION OF THE TFEIP: This is an effective but simple mechanism for emission inventory compilers, and it is therefore liked by the TFEIP members.
However, input would be needed from effects modellers to comment on whether it is practical (or even feasible) to determine exchange rates with to acceptable level of confidence. This may remove this mechanism from consideration.

Emissions Trading

- Additional burden for EMEP SB activities associated with defining the complex exchange rates taking into account long-range transportation of pollutants;

- Time required for designing and implementing a trading scheme is probably more than is available;
- The review process would need to verify all the trading, which should not be a significant burden as an efficient reporting database could be established.

CONCLUSION OF THE TFEIP: Whilst this mechanism has potential for some applications, it is complex and involved to implement. Timescales mean that this option is not considered realistic.

Further views from other stakeholder groups (e.g. policy makers, impacts modellers, legal experts etc.) will need to be arranged to obtain a more complete assessment.

ES3: Packages of Measures

Overall, it was considered sensible to consider a package of correction and/or flexibility mechanisms. At the same time, recognising the importance of ensuring environmental integrity, it is not considered desirable for the introduction of flexibility mechanisms to solely provide 'loopholes', allow too lenient an approach to compliance, or inadvertently encourage Parties to delay mitigating significant sources of emissions.

The TFEIP ad hoc group concluded that: the Three Year Average mechanism should be included in the revised Gothenburg Protocol as an option that Parties may elect to use , and recommend that it is added to whichever (if any) of the following packages of potential mechanisms considered the most suitable.

Following assessment of the individual mechanisms, a short-list of packages of mechanisms was considered:

Package 1a: Relative Emissions Ceilings and Domestic Pollutant Swapping Option

The feasibility of this package mechanism will need to be assessed by effects modellers. This provides a very robust package for countering uncertainty.

The acceptability of this package by WGSR is expected to be determined by advice from impacts modellers on whether it is possible to agree a set of pollutant exchange rates. It is thought that this may remove this mechanism from consideration.

Package 1b: Absolute Emissions Ceilings and Domestic Pollutant Swapping Option

This is same as Package 1a, but with absolute ceilings rather than relative ceilings.

Similarly, the acceptability of this package by WGSR is expected to be determined by advice from impacts modellers.

Package 2: Absolute Emissions Ceilings and Split Ambition Targets

This is popular with inventory compilers (TFEIP members) because the burden primarily falls on activities that would be organised through EMEP, to determine and manage suitable levels of uncertainty. There is the reassurance that the uncertainty levels could be re-negotiated if necessary.

The acceptability of this package will be determined by how well liked the concept of Split Ambition Targets is by the WGSR.

Package 3a: Relative Emissions Ceilings, Accounting for New Sources and Significant Changes to EFs

This provides effective mechanisms for countering uncertainties impacting on all Parties, but allowed amendments would need to be strictly controlled to be workable in practice. This can be seen as a logical extension of the approach used for GHG emissions.

Package 3b: Absolute Emissions Ceilings, Accounting for New Sources and Significant Changes to EFs

This package is only suited to addressing large changes that impact on all Parties.

ES4: Next Steps

Whilst the ad hoc group were able to identify advantages and disadvantages for each of these packages, it was not considered to be within the mandate of the group to recommend a particular package more strongly than the others.

The ad hoc group recommend that these potential flexibility packages be further discussed by the appropriate Convention bodies taking into account the identified strengths and weaknesses of each.

It is recommended that discussion focuses on the packages of measures identified in this report, and is organised as follows:

1. **Domestic Pollutant Swapping** packages should be considered first, by arranging for input from impacts modellers. They can advise on the feasibility and practicality of developing the pollutant exchange rates that are required for this mechanism. This should give a clear indication of whether Packages 1a and 1b are workable options. It may be that they can be quickly discounted from further consideration.

2. Discussion can then move on to **Split Ambition Targets**. There are specific advantages and disadvantages associated with this mechanism. However, it is thought likely that the key to identifying the level of support for this mechanism will be to focus discussions on the acceptability of the *concept* of Split Ambition Targets.

3. Having identified the general levels of support for Domestic Pollutant Swapping and Split Ambition targets, these can be compared with **Accounting for New Sources and Significant Changes to EFs**.

4. It is thought likely that consideration of **Relative and Absolute** emission ceilings (i.e. discussions pertaining to the merits of 1a vs 1b, and 3a vs 3b) can be left until after the main mechanism has been established, as indicated in steps 1-3 above.

It will be important to involve other stakeholder groups in these discussions (e.g. policy makers, impacts modellers, legal experts etc.), because the conclusions and recommendations presented here have been primarily drawn from a technical assessment undertaken from the perspective of national inventory compilers.

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1 Introduction

1.1 Background and Context

The 1999 Gothenburg Protocol aims to reduce acidification, eutrophication and ground level ozone by setting absolute emissions ceilings for 2010 and beyond for sulphur dioxide, nitrogen oxides, non-methane volatile organic compounds and ammonia. These ceilings were negotiated on the basis of the extent of the environmental impacts of air pollution issues in different locations, and the cost effectiveness of abatement options[1].

Work is currently underway to revise the Gothenburg Protocol, and this is expected to include more ambitious emission ceilings for these four pollutants, and introduce an emission limit/ceiling for particulate matter.

Recent developments in emission trends have highlighted the possible need for emission ceilings and/or the assessment of compliance to incorporate either correction or flexibility mechanisms. This is because emission projections (and emission reduction scenarios) are estimates and are often based on new technologies which are not currently in place, and therefore the reductions potential or cost effectiveness is not know with certainty but based on the current understanding.

In order to inform the negotiations of the Convention on the options for including correction and/or flexibility mechanisms for compliance checking, the Executive Body requested the Task Force on Emission Inventories and Projections to provide technical advice on the issue. The Task Force discussed the issue at its 24th meeting in Stockholm 2nd and 3rd May 2011 and set up an *ad hoc* group to prepare and agree the content of this report. This ad hoc group includes representatives from the following countries: Finland, France, Germany, Ireland, the Netherlands, Spain and the United Kingdom. Representatives from the EEA and the EU also made valuable contributions.

This report will be provided to the EMEP Steering Body (EMEP SB) prior to their meeting in September 2011. The EMEP SB may wish to consider recommending that the report is used to support the on-going work of the Working Group on Strategies and Review (WGSR), which will also meet in September 2011.

1.2 Emissions Inventory Development

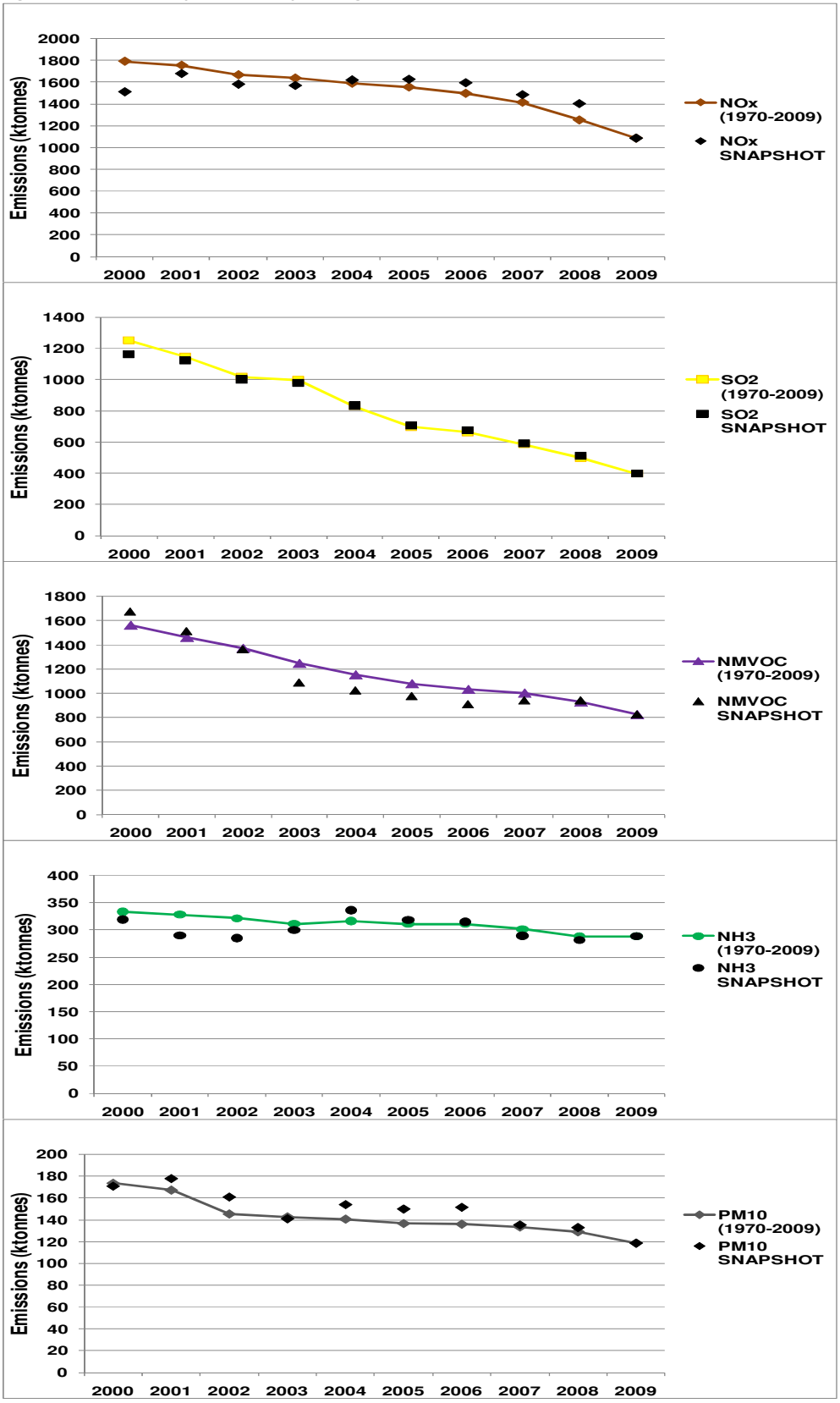
The methodologies and input data used to estimate emissions are revised with improved understanding of the science, and general developments and improvements made to the quality of the data. As a result, emission inventories are constantly being revised with time.

The following plots provide an example of the extent to which emission inventories develop on a year to year basis. The data has been taken from the United Kingdom's national inventory-considered to be a well developed and comprehensive emissions inventory. The plots show the current version of the timeseries, compared to "snapshots". These snapshots are the most current year from previous versions of the inventory i.e. the 2000 value from the 1970-2000 version of the inventory, the 2001 values from the 1970-2001 version of the inventory etc. The plots therefore provide an indication of how the current "best science" estimates compare with estimates that were considered to be the "best science" in earlier years.

[1] http://www.unece.org/env/lrtap/multi_h1.htm

Approaching 2009, the estimates converge because the time gap between the estimates is lower, and hence there are fewer differences between the datasets. However, substantial revisions are evident even in this well developed and comprehensive emissions inventory. It appears that even across the space of 3-4 years, estimates can change by 10% or more.

Figure 1.1a: The Impacts of Improving Emission Estimates with Time[2]



[2] Dore (2011) In preparation.

1.3 Correction Mechanisms

A **correction mechanism** provides a means to correct for a revision or an improvement/updating of information subsequent to the setting of the ceilings which has a material effect on a Party's ability to comply with its ceilings e.g. changes to emission factors.

Correction mechanisms can therefore account for issues which may not be reasonably predicted at the time obligations are defined, or which may be beyond the control of individual Parties. These issues arise because the scientific understanding of emissions calculations and the technical assessments of cost, effects and abatement potentials include assumptions and uncertainties that change with time. As a result, the original calculations can create challenges that are impractical, unavailable or simply not cost-effective.

In the current negotiations concerning the revision of the Gothenburg Protocol, it has been proposed that some form of correction mechanism(s) might be introduced in order to reduce, or remove, the impact of such occurrences.

A very important feature of correction mechanisms is that they can account for two distinct types of change:
"Pre-base year" changes: An example of this would be the inclusion of a new source in the emissions inventory, which existed in the real world when the modelling of impacts was undertaken. The inclusion of this source improves the emissions inventory, but importantly does not change the modelled impacts (because the source was already inherently incorporated into the impacts measurements that drive the modelling). So theoretically, incorporation of this source does not change the resulting impacts.
"Post-base year" changes: An example of this would be correcting the emissions inventory for the underperformance of a mitigation measure, which might only come to light several years after implementation of the measure. The result of this is higher emissions than were originally predicted, and there will be an increase in the resulting impacts.
In this example, the increased impacts may arise from a mitigation measure that was or wasn't within the control of the Party.

1.4 Flexibility Mechanisms

A **flexibility mechanism** gives a Party options in relation to compliance e.g. pollutant swapping, trading, etc. The addition of flexibility mechanisms to the revision of the Gothenburg Protocol might also be helpful for Parties, given the relatively high level of uncertainty associated with the ceiling setting process and the long time horizon over which they apply. However, some people consider the use of flexibility mechanisms inappropriate because it alters the concept of compliance with specified emission ceilings or targets, and they are seen as providing "get out" options for those not taking enough measures to reduce emissions.

Overall, it is sensible to consider a package of correction and/or flexibility mechanisms. At the same time, it is not considered desirable for the introduction of flexibility mechanisms to provide "loopholes" or allow too lenient an approach to compliance, or inadvertently encourage Parties to delay mitigating significant sources of emissions.

1.5 Scope of this Report

It should be appreciated that whilst this study has aimed to be comprehensive in the mechanisms that are considered, **it is beyond the scope of this work to assess the full details of all of the mechanisms**. For example, assessing the detailed options associated with introducing an emissions trading scheme for the CLRTAP pollutants would be a large study in its own right. Furthermore, **the assessment has been undertaken from the perspective of the emissions inventory community**. Whilst emissions inventories are the tools that are used for assessing compliance, the overall aim of the Gothenburg Protocol is to reduce the impacts that arise from emissions of air pollutants. Some of the flexibility mechanisms have the potential to alter the relationships between emissions and impacts (by influencing the cost effectiveness of abatement, altering the way that changes in the emission estimates are handled etc.). These are issues which cannot be considered here in detail.

This report draws on earlier work to assess different aspects of flexibility mechanisms including Kelly et al (2009, 2010)[3], and contributions to discussions in the international arena from a number of countries. The Terms of Reference for the study are included as Appendix 1.

The mechanisms that are included in this report are those which have been discussed in international fora, and those proposed by members of the TFIAM and TFEIP. These are indicated below in common groups:

Chapter 3: Relative Emission Ceilings
Chapter 4: Accounting for Change and Uncertainty
- Accounting for New Sources
- Accounting for Significant Changes to EFs
- Split Ambition Targets

Chapter 5: Time Based Mechanisms
- Three Year Average
- Delayed Compliance

Chapter 6: Domestic Pollutant Swapping
Chapter 7: Emissions Trading Scheme Variants
- ETS
- Bubble ETS
- Sectoral ETS

Chapter 8 provides conclusions drawn from the assessment of the different mechanisms, and makes a number of recommendations.

[3] Kelly et al (2009): http://www.policymeasures.com/resources/detail/flexibilities-v1/ , Kelly et al (2010): http://www.policymeasures.com/resources/detail/adaptive-policy-mechanisms/

2 Assessment Framework

The introduction of any correction or flexibility mechanism must ensure that the core objectives of the Gothenburg Protocol and the LRTAP Convention more generally, are still supported. That is, introduction of such mechanisms should, in the long run, still deliver reduction in the effects of acidification and eutrophication that is considered acceptable by Parties to the Convention. This should also be true for meeting ambient air quality standards. It is possible that this may not be the reductions originally envisaged at the outset of the revised Gothenburg Protocol. The mitigation efforts required should be balanced amongst Parties to the Convention, with priorities on the most cost-effective measures.

In practical terms, most of the mechanisms seek to reduce the uncertainties associated with estimates of historic emissions and emission projections. This may be addressing previously unknown sources, new information arising from scientific development, or allowing for the fact that mitigation measures may not deliver the emissions reduction that had originally been forecast. Trading mechanisms and Domestic Gas Swapping allow emission totals to be adjusted for compliance purposes. As a result, the successes of these schemes generally rely on there being enough over-compliance to offset any remaining exceedences.

In assessing the proposed mechanisms, several different aspects have been considered. These are indicated below. The focus is very much on the practicalities and effort required from the emission inventory perspective for implementation and operation of the mechanism.

Overview

Text under this heading provides a short description of the mechanism, and considers the issues which are/aren't addressed by the mechanisms. Different mechanisms are suited to addressing different issues. For example, allowing a three year average to be used does not take into account new sources, or significant revisions arising from improved scientific understanding. However, it is important that mechanisms are not seen to be introducing "loopholes", or encouraging more problems than they solve.

There may also be some "side-effects" which need to be considered. For example, does the introduction of the mechanism discourage continuous improvement of emission estimates?

Simplicity and Transparency

Mechanisms generally need to be simple if they are to be used. Furthermore, it is crucial that the mechanism is transparent so that emission estimates can be readily reviewed and quality assured.

Perceived clarity for the lay person is also a point of consideration.

Associated Costs and Effort

There may be additional costs and/or effort required. This relates not only to additional work required by the Party's inventory compilers, but also the UN/ECE and its various groups/boards/committees (which may be required to perform some kind of co-ordination role or drafting of guidance).

Identifying any additional effort required for reporting and review of emission inventories is a subject area of specific relevance to the TFEIP, and it is therefore included in some detail. For example:

- Is additional guidance material on the mechanism required?

- Does the mechanism require changes to the current Guidelines and/or reporting templates?
- Does the mechanism require additional work for CEIP and the Implementation Committee?
- Does the mechanism impact on the effort needed for the annual emission inventory review process?[4]

Some mechanisms have the potential to promote improved cost-effectiveness of emissions abatement. However, within the scope of this work, this issue can only be considered briefly.

Practicality and Method of Implementation

Some of the mechanisms are easier to put in place. Mechanisms such as trading schemes require considerably more infrastructure and consideration of the details. These practicalities need to be taken into account.

In addition to this, a mechanism may be implemented in different ways. For example, the mechanism may be written into the Protocol itself, or detailed in guidance for reporting emissions. It could also be implemented through Parties' guidance to the Implementation Committee when it assesses the compliance in relation to the ceilings.

We have been encouraged to include a consideration of the different options, but note that the authors are not experts in this field. Further views will need to be sought from experts better placed to provide input into discussions.

Adaptability

Text under this heading is intended to give an indication of how readily each mechanism could be updated. This can be evaluated in two different ways:

- How easily new science and understanding could be incorporated into the mechanism. This reflects technical adaptability.
- How well the method of implementation allows for updates. For example, would an amendment to the Protocol be needed? If so, this has consequences for the associated timeline, which would need to allow for negotiations, amendments and then time for the amendment to enter into force and therefore be effective.

Equity

Each of the mechanisms is assessed for equity - the extent to which any additional costs or burden is shared by countries in a manner that is perceived to be "fair" (this does not necessarily mean equal).

[4] The current detailed Stage 3 review process is not intended for compliance checking. The results of the review process can of course be used to inform the subsequent assessment of compliance by the Convention's Compliance Committee.

3 Relative Emission Ceilings

3.1 Percentage Reductions

For particulate matter, two possible approaches to defining emission limits or ceilings are presented in the draft Protocol text – an approach based on an absolute ceiling, or an emission limit based on a 'relative ceiling' concept whereby a required percentage reduction (or increase) from a base year is defined. We note that relative ceilings (i.e. percentage reduction targets) are not a correction mechanism per se, but do have the potential to address some similar issues to the mechanisms outlined in later sections. So percentage reductions have been included here, for potential application to all of the pollutants, and assessed in the same way as the other mechanisms.

Overview

The use of relative emission ceilings, rather than absolute ceilings, means that a percentage reduction or an increase on a base year must be achieved by the target year. However, different impacts can arise from the introduction of new source, or changing methodologies (or emission factors). These are considered below, and indicate that the use of a best science emissions inventory with targets calculated using percentage reductions does address some inventory revisions, but not all. However, as a general comment, percentage reductions are particularly appealing to Parties where national emission inventories are rather new, and are undergoing significant development and improvement. This is because many of the changes to the inventory would not have a significant impact on progress towards targets based on percentage reductions.

New Sources: If a new (i.e. previously unrecognised) source was added to the inventory, it would then be likely to have a relatively small impact on a Party's progress towards compliance. This is because most new sources are relatively small in absolute terms. In addition, they most commonly impact on both the emissions in the base year as well as the emission in the target year, and therefore have little impact on the overall percentage reduction. More precisely, if the new source was reducing at the same rate as the overall existing inventory, then there would be no net impact. If the new source was constant with time then there would be a negative impact on the progress towards compliance, but this is typically very small.
However, a new source that did not occur in the base year would have a negative impact on progress towards compliance. The significance of this would depend on the absolute size of the new source.

Methodology (or Emission Factor) Revisions:
If inventory developments resulted in changes to methodologies or emission factors, then the impact would depend on the details of the revision. If changes are made across the time series in a consistent way, then the overall impact is very small. However, where a revision causes an increase to emissions for years in the time series that does not include the base year, then this could make compliance more difficult for the Party. A recent example of this would be NO_X emissions from road vehicles of different Euro standards. It may therefore be sensible to combine this approach to setting targets with a mechanism that is well suited to addressing this particular issue.

Simplicity and Transparency

The use of percentage reductions is both very simple and very transparent, which makes it an attractive option. The only slight issue which can impact on transparency is the year to year revision of the base year emissions, which impacts on the absolute value of the emissions in the target year.

Associated Costs and Effort

The reporting process for emission datasets would remain unchanged, and therefore there should be no additional burden on Parties or the EMEP Centre on Emission Inventories and Projections (CEIP) in terms of their subsequent compilation and assessment of reported emissions data. Parties of course could add a table to their Informative Inventory Reports (IIRs) to indicate percentage reductions to date. This would allow progress to targets to be easily tracked.

The annual detailed (Stage 3) emission review process, performed in accordance with the methods and procedures for review (ECE.EB.AIR.GE.1.2007.16) should consider the emissions reported for both the base year and the target year. At present the review teams do assess time series consistency across all years of submitted data, but with a focus on data from the most recent year. Therefore the effort needed for this would be slightly increased compared to the levels of effort for the existing Stage 3 review process.

Practicality and Method of Implementation

Existing effects based modelling could be used to determine the emission reductions required to meet acceptable levels of impact, and express these as percentage reductions (a Party's relative ceiling is already contained in Annex II alongside the absolute ceiling). Some additional effort may be needed to consider whether newly introduced sources could give rise to less reduction of impacts than an absolute approach.

Views will need to be sought from experts better placed to provide input into discussions, but the TFEIP consider that incorporation into the Protocol text and/or annexes would be the most appropriate method of implementation for such a fundamental change in the calculation used to demonstrate compliance. Negotiating the percentage reductions for each Party would require similar levels of effort compared to using the current absolute ceilings approach[5], and the approach has already been successfully used under the Convention, for example in the Sofia Protocol[6]. The possibility of introducing mechanisms by inclusion in the guidelines could also be considered, if it simplifies the process or implies time savings.

Guidance or Protocol text could be drafted very quickly.

Adaptability

It would be possible to update the percentage reductions required for particular Parties in line with improved science or understanding of emissions. However, as a core requirement of the Protocol, Parties would need to take a decision on the desirability of doing this.. An appropriate amendment procedure could be defined in Article 13 on Amendments and Adjustments.

However, this mechanism is well suited to being combined with correction and flexibility mechanisms. Accounting for New Sources and/or Accounting for Significant Changes to EFs, detailed in Sections 4.1 and 4.2 respectively, are noted to fit with this mechanism particularly well, and even Split ambition Targets and others would also be possible.

Equity

Given that the basis for the calculation of the emission reduction targets would be using the same as the existing models, this approach must be seen as being suitably even-handed across the different Parties.

[5] In fact the levels of effort may be less, because estimating percentage reductions would be marginally more certain for Parties compared to absolute ceilings.

[6] The 1988 Protocol concerning the Control of Nitrogen Oxides or their Transboundary Fluxes

3.2 Percentage Reductions Variant (Kyoto Protocol)

Overview

The Kyoto Protocol to the UN Framework Convention on Climate Change applied a 'middle ground' approach to providing flexibility, i.e. an option sitting between the absolute and relative ceiling approaches. The Kyoto Protocol was agreed upon with defined percentage reduction targets set for 'Annex I' Parties. In brief – several years later, base-year emissions (in tonnes) were formally agreed for each Party, to which the defined percentage reduction was then applied to determine the absolute emission reduction required over the duration of the so-called 'Kyoto period'. The published guidance on calculation methodologies was also "frozen" to avoid any significant changes being introduced from improvements to the science (although it is important to note that the on-going research work to improve methodologies and the understanding of the science is maintained and is a continuous process).

This approach thus has the de facto result of converting a percentage reduction target into an absolute emission target. It also allows for improvements in the science and completeness of emission inventories over the years prior to the formal setting of the base year to be taken into account. Following this, the fixed values provide Parties with certainty in terms of the absolute reduction commitment needed. However, once the ceiling has been fixed, there may be scientific developments which cannot be taken into account.

Simplicity and Transparency

This mechanism is a marginally more involved than the very simplest approaches of absolute ceilings or relative ceilings. However, because the approach is well established, it has the advantage of being familiar to most people in the emissions fields.

Associated Costs and Effort

Little additional effort is required beyond the current systems that are in place. The costs and effort required for percentage reductions are considered in Section 3.1 above. The only difference for this mechanism is that an increased amount of effort would be desirable to undertake the Stage 3 review for the year during which the base year emissions are fixed and the percentage reductions are converted to absolute values.

Practicality and Method of Implementation

There is little difference to the issues considered in Section 3.1 above, but it may be possible to draw on the experiences from the climate change community to help with the implementation process.

Calculating emissions of air quality pollutants is more complex than for CO_2, and this means that significant revisions to the underlying methodologies are more likely. Furthermore, the "impacts" in the Kyoto Protocol are the CO_2 emissions themselves. For the Gothenburg Protocol there is the additional work required to determine the impacts arising from the emissions of air quality pollutants, which adds complexity and uncertainty.

Guidance or Protocol text could be drafted very quickly, by drawing on the experience from the Climate Change community. Several days would probably suffice.

Adaptability

This mechanism takes into account the developing understanding of emissions to a certain degree. However, given that reductions are likely to be written into the Protocol text, making revisions to reductions would be a very involved process and therefore undesirable.

Equity

This is mechanism is considered to be equitable, based on the same arguments as those outlined in Section 3.1.

4 Accounting for Change and Uncertainty

4.1 Accounting for New Sources

Overview

Under this correction mechanism the Parties (presumably through the EMEP SB and Executive Body) would decide whether any "new" sources could effectively be discounted from a Party's inventory for compliance purposes. The basis for this assessment would need to be clearly defined, but the premise is that the Party could not have known about, or quantified, the existence of this source when absolute ceilings were set. As a result it is permissible to correct best science emissions estimates, to give a dataset for compliance purposes only.

Simplicity and Transparency

The method behind this mechanism, that a decision is made to exclude some sources (for compliance purposes only) which meet specific criteria, is very simple. However, in practice it could become very complicated, and therefore not very transparent.

The term "new source" requires a precise definition before any technical guidance can be drawn up. Examples of different possible definitions include:

- Sources which are not currently known.
- Sources which do not have a methodology in the current EMEP/EEA Emissions Inventory Guidebook at the time the Protocol was adopted.
- Sources which are not included in the current GAINS model when used to determine emission ceilings.
- Sources not included in a national inventory when the emission ceilings were agreed.

These are explained in more detail in the following paragraphs:

Parties are presently recommended to use the Guidelines for reporting and methodologies provided in the EMEP/EEA Emissions Inventory Guidebook. However, the EMEP/EEA Guidebook does not presently provide a complete description of known emission sources (and nor is it designed to do so). Rather its purpose is to provide a description of 'default' methodologies for those sources where the underpinning science is considered sound enough to recommend a consistent European methodology. Many Parties thus already report emissions for more detailed emission sources and activities than are included in the current Guidebook. Some include emissions from sources which are not included in the Guidebook.

As an example, based upon recent scientific studies, the TFEIP is presently reviewing a new and potentially significant source of NMVOC emissions occurring from agricultural sources. If a methodology is in the future included in the EMEP/EEA Guidebook, it may, for example, lead to significantly higher NMVOC emissions being reported by Parties. This source is also not in the current GAINS version. So it is not clear whether this source (which, as of 2011, is scientifically known to exist) would still be considered to be a "new source".

The GAINS model that is used to inform the negotiation of emission ceilings is similarly not complete in terms of including all known sources of emissions. Nor are the source categories in the GAINS model necessarily as detailed as those in the EMEP/EEA Guidebook (although of course all main emission categories are included in the model). So a 'new source' could be considered to simply be any source that was not in the version of the GAINS model used to inform the setting of the revised Protocol ceilings.

As earlier noted, certain Parties have nationally-specific information available to allow them to provide emission estimates for detailed emission sources. It is considered good practice to do so. In contrast, other Parties may not yet include such sources in their current emissions inventory[7], or have even considered the fact that emissions arise from such activities occur in their country. A "new source" could therefore be defined as an emission source added to a national emissions inventory after the adoption of the Protocol (i.e. after the emission ceilings had been finalised).

This last option would be the most practical option from the perspective of the national inventory compilers. However, it should be noted that it is not necessarily equitable across the countries, and there are issues associated with pre-base year and post-base year emissions as explained in Section 1.2.

Text describing this mechanism would also need to clarify whether "new sources" included in this mechanism had to be collectively agreed by Parties (through discussions in a relevant EMEP forum), or whether an individual Party could unilaterally identify any source added to an inventory as a "new source" for inclusion in the mechanism. The TFEIP recommend the former option.

Associated Costs and Effort

Additional effort would be needed at the EMEP level to consider "new sources" and formally communicate information on what could be discounted from inventories for compliance purposes.[8]

Reporting and Review

The existing templates for data reporting could be adapted in a simple way to allow the reporting of both a 'best science' and 'emission totals for compliance purposes' (i.e. an emission total that excludes the agreed "new sources") in the same template. This would be done by requiring the reporting of best science emission inventories but including one additional line for "compliance corrections", which might be a positive or negative number. Entries in compliance corrections would require explanatory text, and referencing to the IIR. In this way best science and compliance emission totals can be easily presented, and there would be little extra burden on CEIP or the Implementation Committee.

However, explanations for all sources included in the inventory, including the new sources, and their inclusion or exclusion from the emissions inventory would need to be clearly accounted for in the inventory preparation as well clearly explained in the IIR. This would require additional work by the national compilers, because it creates a second version of the inventory, and potentially impacts on transparency of the inventory.

The review process would need to investigate the calculations and reasoning behind any "compliance correction" values. The level of additional work required compared to the current review process would depend on the number of new sources identified.

[7] Emissions inventory submissions under the LRTAP Convention should include notation keys where there is a known source that has not been quantified, but in practice this does not always happen.

[8] If this mechanism was used in combination with others (for example trading or domestic pollutant swapping), then it may be necessary to discount the "new sources" from all inventories, not just those Parties wanting to discount the source.

EMEP/EEA Emissions Inventory Guidebook
Following clarification of the term "new sources", some adjustments would be needed to the way in which version control of the Guidebook is conducted (i.e. if a 'best science' and a second 'compliance' version of the Guidebook need to be maintained separately). This should not, however, require much of an additional increase in resources required from the TFEIP – for whom the focus would remain on developing and improving a 'best-science' Guidebook version.

Practicality and Method of Implementation
This mechanism does provide a direct method for addressing any impacts from new sources that arise through emissions inventory development. However, to allow Parties to assess whether they were on course for compliance, information would need to be provided (presumably through discussions at the EMEP level) on "new sources" as they arose, and not defer this until the compliance year.

As explained above there are a number of challenges associated with defining the sources which this mechanism may be applied to. However, it does address one of the main issues raised by inventory compilers as being beyond their control- changes in emission estimates due to the development of science and understanding.

In terms of implementation, it would be possible to include relevant text in the Protocol. However, it may be more appropriate for the mechanism to be implemented through guidance on the way information on "new sources" should be treated, to be issued by the EMEP SB and approved by the Executive Body. This latter option is attractive as, given the procedural requirements, it would be easier to implement (or amend once in place).

Relevant text and guidance could be drafted fairly quickly once a definition of "new sources", and hence the scope of the mechanism, has been agreed. The order of a week should allow enough time for a first draft.

Adaptability
This mechanism requires a periodic review of information from the emissions inventory community. As such it is adaptable in nature.

If the mechanism was implemented through guidance approved by the Executive Body, then this could be amended fairly readily to redefine the sources that could be excluded from the compliance version of an emissions inventory.

Equity
The equity of this mechanism is determined by the definition of "new source" that is selected, and as explained above this is not straightforward. Consideration would need to be given as to which version of the inventory was actually being used to calculate targets and ceilings. There are numerous inventories which are far from complete, so this issue is relevant. Furthermore, there are inventories which currently include sources for which there is no methodology in the EMEP/EEA Guidebook.

Ensuring equity is complex when the existing emission inventories vary greatly in completeness and overall quality. But the use of the GAINS model to underpin emission ceilings negotiations does improve the consistency between the Parties, and therefore improves equity.

4.2 Accounting for "Significant Changes" to EFs

Overview

This correction mechanism is very similar to that outlined in Section 4.1, with the exception that rather than considering "new sources", Parties would collectively decide (through discussions in a relevant EMEP forum) where the impact on emission estimates caused by "significant changes" to emission factors could be addressed for compliance purposes.

It is expected that this mechanism would be used to address the impact of large changes in emission estimates caused by inventory developments, and not numerous small changes.

Simplicity and Transparency

The method behind this mechanism is simple. However, it is a very complex system to design and put in place.

The term "significant changes in emission factors" would require a precise definition, although it is difficult to see how this could be done in a simple way. For example, changes could be screened using a percentage threshold, but this would/could vary across the Parties. So a degree of inequity could be introduced. It is also possible that numerous small changes below the threshold value could result in a larger cumulative change than a single change above the threshold. It is therefore likely that the decision to include a particular change in emission factor would simply be a judgement collectively made by the Parties (presumably in an appropriate EMEP forum). As a result, it is difficult to see how the decision process to include particular revisions could be made to be transparent.

It is important to note that revisions to emission factors can also result in decreases to emission estimates. An 'equal principles' perspective could be used to require changes to the compliance assessment where Parties have benefited from unforeseen reductions in emissions, and not just increases. This would be a complex and sensitive issue to address.

Guidance issued by EMEP must be approved by the Executive Body before it can be used by the Parties and this process would provide an additional level of oversight and control.

Associated Costs and Effort

Additional effort would be needed at the EMEP level to consider the resulting impacts of inventory developments. Where considered appropriate, guidance would be issued on methodologies that could be used for compliance purposes, and how these differed from the best science methodologies. This guidance would be collectively drafted by Parties and issued through the most appropriate EMEP outlet. In some circumstances the guidance may be as simple as indicating the use of specific emission factors. However, it should be recognised that some situations may arise where it would be necessary for the guidance to be rather more detailed. This would not only require more effort at the EMEP level (and presumably the involvement of the TFEIP), but also potentially more work by the Parties, and during the review process.

Reporting and Review

For reporting data, a similar approach to that indicated in Section 4.1 above could be used, whereby minor changes are made to the existing reporting templates, meaning little extra burden on CEIP.

Details of compliance corrections would need to be reported in the IIRs. The increase in the amount of work required for compiling IIRs would depend on the details of the criteria set for revisions that could be included in this mechanism. Each revision included would need entries in the IIR to explain two methodologies and emission estimates for the same source, whilst retaining a high level of

transparency. The concept of needing to explain both best practice and compliance methodologies in an IIR is not appealing to Parties at all.

The introduction of best science and compliance methods for the same source could also give rise to a not insignificant additional burden on the review teams undertaking the Stage 3 review process. Differences between best science and compliance inventories would need to be investigated, which could be time consuming.

EMEP/EEA Emissions Inventory Guidebook
Changes would need to be made to the current version control management of the EMEP/EEA Emissions inventory Guidebook. This would ensure that methodologies acceptable for both best science and compliance purposes were clearly presented. This would result in an increase to the effort required to maintain the Guidebook.

Practicality and Method of Implementation
This mechanism has parallels with Accounting for New Sources explained above in Section 4.1, and the issues concerned with Practicality and Method of Implementation are similar (see above). In particular, to allow Parties to assess whether they were on course for compliance, guidance would need to be provided on issues as they arose, and not defer this until the compliance year. There are numerous ways in which changes could be screen and the following is just one example:

At the outset, some threshold criteria could be agreed by Parties through discussion in the appropriate EMEP forum. For example:

- Where an emission factor is revised by more than 20%, and this results in a revision to the total of more than 5%, then mechanism may be applied.
- Where an emission factor is revised by less than 10%, and this results in a revision to the total of less than 5%, then mechanism may not be applied.
- Revisions that fall between these two criteria would require approval from a designated international group before the flexibility mechanism may be used.

Relevant text and guidance could be drafted fairly quickly once these thresholds, hence the scope of the mechanism, have been agreed. The order of a week should suffice.

Adaptability
This mechanism has parallels with Accounting for New Sources explained above in Section 4.1, and the issues concerned with Practicality and Method of Implementation are similar (see above).

Equity
This metric is considered to be generally equitable because it is expected to deliver a similar percentage correction to specific sources across the different Parties.

There is still the potential for some Parties to benefit less than others. For example, a Party investing heavily in numerous mitigation measures which slightly underperform is unlikely to be captured by this correction mechanism. In contrast, a Party looking to achieve the same levels of emission reduction, but only investing in one mitigation measure that underperforms may be given a degree of protection by this mechanism.

4.3 Split Ambition Targets

Overview

Instead of considering uncertainty associated with the emission estimate, this correction mechanism applies a revision to the emission ceiling itself. The emissions ceiling is comprised of two components- a fixed value and an uncertainty range. Changes to this uncertainty range can take into consideration unforeseen circumstances that arise during the compliance period of the legislation. The uncertainty range is used in the form of a percentage uncertainty.

For example, a NO_X ceiling is initially specified as 100 ktonnes + 10% uncertainty range, which gives a maximum emission ceiling of 110 ktonnes. However, several years after setting this ceiling, an improvement is made to the underlying methodology which has a significant impact on the calculated and/or projected emissions. To account for this, the flexibility range is revised from 10% to 20%. This now gives a revised ceiling of 100 ktonnes + 20% = 120 ktonnes.

Revisions to the uncertainty range could be driven by either national or international issues, although for simplicity it is assumed here that only decisions collectively agreed by the Parties (presumably through discussion in an EMEP environment) would allow a revision to the uncertainty range. Revisions to the uncertainty range could account for the addition of sources to the inventory, ineffective international mitigation measures, other inaccuracies in the initial ceiling modelling technique etc.

Figure 4.3a: Fixed ceiling, with non-compliance for NO_X and NH_3

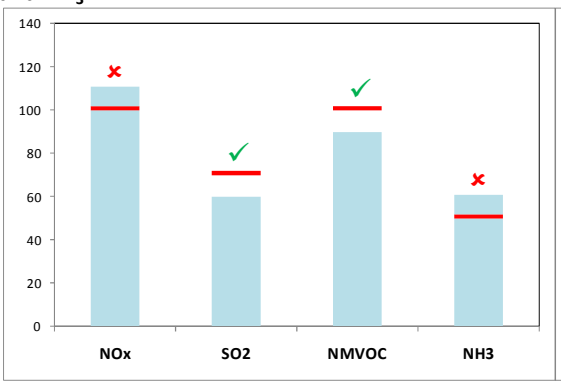
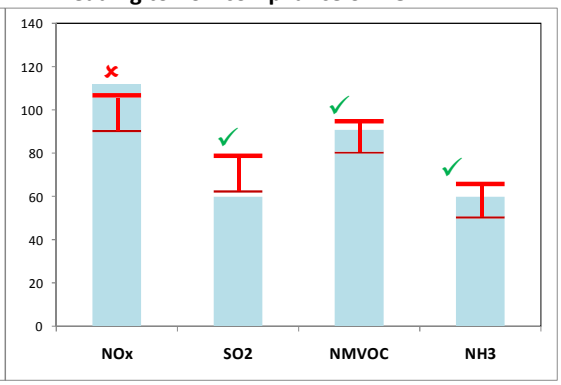


Figure 4.3b: Split Ambition Target mechanism leading to non-compliance of NOx



In the following sections, it is assumed that the percentage uncertainty assigned to pollutant ceilings may vary across the pollutants. This is a sensible assumption, given that there are differing levels of uncertainty associated with estimating different pollutants.

It is also assumed that there is no variation from Party to Party; however, it is certainly true that very large differences in uncertainty do exist between countries. It would be possible to allow for differences between Parties, although this would introduce more complexity than is necessary. But this might be seen as a way of ensuring equity and encouraging ratification of the Protocol by countries with rudimentary emission inventories.

Simplicity and Transparency

The mechanism is easy to understand for technical people, but perception by e.g. members of the public, may be that it is inappropriate and provides a “loophole”.

The mechanism is transparent in terms of calculating ceilings, and allowing Parties to demonstrate compliance.

Associated Costs and Effort

Effort would be required at the EMEP level at the outset to determine levels of uncertainty relevant to each of the pollutants. However, this would not be a particularly onerous task, requiring some negotiation with Parties, and drawing on information on uncertainties from GAINS modelling. It would also be possible to review how estimates of national emission totals have varied on a year to year basis across the last decade. This would provide an indication of the magnitude of changes that arise from methodology revisions.

The uncertainty range would require periodic review based on changes in the scientific knowledge. The uncertainty range could be reviewed every e.g. three years, but not necessarily changed each time it was reviewed.

Reporting and Review

This mechanism has very little impact on the effort associated with compilation and reporting, because the mechanism is applied to the emission ceiling rather than the emission estimates. Parties would therefore simply generate emission estimates and report them in the same way as is currently undertaken. However, revision to an uncertainty range would alter the emission ceiling and this change would need to be captured in the IIRs. Monitoring progress towards targets would therefore need to be updated. However, it is expected that the ceilings would not be reviewed frequently. So the additional burden on reporting would not be large.

Practicality and Method of Implementation

Guidance would need to be collectively agreed and published on the way in which this flexibility mechanism works, and in particular ensure effective dissemination of the uncertainty ranges. If a timetable for reviewing the uncertainty ranges was also provided at the outset, then Parties would have clear information on when potential changes to the uncertainty range may occur.

This would have the added benefit of allowing Parties to prepare supporting information on uncertainties, and changes to uncertainty by way of background information to feed into the review process.

This mechanism could be written into the Protocol text, or it could be issued as formal guidance by EMEP's implementation Committee. The latter would allow easier incorporation of amendments at a later date, if considered necessary. However, further views will need to be sought from experts better placed to provide input into discussions.

Some time would be needed to draft guidance or Protocol text. This is because this mechanism is a new concept for most, and the details of the mechanism would need to be presented very clearly. In addition, it is likely that there would be some time delay to allow for negotiations regarding the uncertainty levels assigned to different pollutants. It is expected that several weeks would be needed.

Adaptability

This mechanism is designed to incorporate periodic review, and as such is adaptable. It has been suggested that a review every three years is an appropriate timescale. However, if changes to the mechanism itself were needed (rather than the scheduled programme of review/update), then the ease of revision would depend on the way in which the mechanism had been implemented (see

comments above in Practicality and Method of Implementation). Furthermore, allowing the uncertainty ranges to be revised introduces potential changes which cannot be predicted.

Equity
The equity of this mechanism depends on the way it is implemented. There are cases where some Parties may be placed at a disadvantage. For example, Parties with new or developing emission inventories may consider the proposed uncertainty ranges to be too small (unless ranges were established for each Party and each pollutant). This Party would then have high levels of uncertainty compared to the flexibility ranges, which would make predicting compliance difficult.

This may be a reason for identifying individual uncertainty ranges for each pollutant for each Party, or identifying different uncertainty ranges for "developed" and "developing" emission inventories.

5 Time Based Mechanisms

The following flexibility mechanisms are associated with time based options- either averaging across several years, or delaying compliance.

5.1 Three Year Average

Overview
This proposed flexibility mechanism allows a Party to have their compliance with the 2020 ceilings assessed on the basis of a three-year average 2019-2021. The purpose of such a mechanism is to reduce the impact of one-off events that might increase the emissions in a single year (such as exceptional emissions from an industrial source, or a particularly cold winter).

This mechanism is popular with Parties as it protects against events which cannot realistically be predicted. It does so in a very simple way that requires little additional work. However, anecdotal evidence suggests that such a mechanism is unlikely to be used by many Parties because the size of the impact that it can deliver is typically very small, and unlikely to make a difference between compliance and non-compliance.

It has also been suggested that if this mechanism is used with relative emission ceilings, it may be sensible to also include the option of using a three year average for base year calculations as well as the compliance year. However, this would increase the complexity of the mechanism, and potentially impact on transparency.

Simplicity and Transparency
This mechanism is simple, and easy to understand. Calculations to demonstrate compliance are transparent.

Associated Costs and Effort
There is very little additional cost or effort required for this mechanism because it is so simple.

Reporting and Review
Very little change would be needed to the current reporting practices. An additional table could be included in IIRs to explain where Parties chose to take up this mechanism, and it would be sensible to encourage the reporting of contextual information.

There would be no changes to reported datasets, and therefore no additional burden on CEIP.

The current Stage 3 review process does consider all reported years, however, there is a particular focus on the most current year in the time series. The review process required here would be undertaken in the compliance year, for Parties drawing on this mechanism, and would need to consider the emissions estimates for the most recent three years in more detail. This would bring about a small increased burden relative to the existing Stage 3 review process, but only in the year when compliance is reviewed.

Practicality and Method of Implementation

This option is considered very simple to implement. Little explanatory text would be needed to include this in the relevant papers associated with reporting to the Protocol, and there would be no significant additional burden on Parties. It is assumed that relevant text would be incorporated into the Protocol itself. However, further views will need to be sought from experts better placed to provide input into discussions.

The use of a 2019-2021 average for compliance would mean that Parties using this mechanism would only be able to demonstrate compliance a year later than those not using the mechanism. This would cause a degree of inconvenience in terms of disseminating information on the number of Parties successfully complying with the Protocol ceilings. In addition, the staggering of compliance would interfere somewhat with any timetabling of the process to further update the ceilings for future years.

Guidance or Protocol text could be drafted very quickly.

Adaptability

The mechanism presented here is not adaptable. However, a degree of flexibility could be included. For example, it might be implemented in way that allowed the average of any three consecutive years including the target year to be used for compliance purposes.

It is not likely that there would be a need to change the details of the mechanism after it had been implemented. Doing so may also prove difficult, as it is assumed that the mechanism would be implemented by being incorporated into the text of the Protocol.

Equity

Whilst some countries may be more prone to extreme weather events, and therefore more likely to draw on this mechanism, there is considered to be little significant variation across the different Parties to the Protocol. Consequently this mechanism is considered equitable.

5.2 Delayed Compliance

Overview

Where a Party does not comply with their emission ceilings, this flexibility mechanism gives a new target year with more stringent ceilings. Typically, the more stringent ceiling is derived from the extent to which the Party exceeded the original ceiling. There are parallels with the system that is used in greenhouse gas emissions where adjustments are made to national inventories (corrections are applied to inventories, but a “conservativeness factor” is used which typically results in emissions being corrected to values higher than they would have been if best practice had been used in the first place).

This mechanism therefore provides Parties with more time to comply with ceilings, whilst also applying a penalty rate to the ceiling recalculations to ensure the lowering of the ceilings when a Party does not comply. This could potentially promote a faster rate of emissions reduction in the long run.

This mechanism is suited to national situations where mitigation measures have been taken, but the resulting impact on reducing emissions has been slower to develop than originally planned. It may also support the release of funds to invest in further abatement, where pending non-compliance proceedings are a plausible outcome.

Simplicity and Transparency

To ensure transparency, the year of the revised ceilings and the method used for calculating revised ceilings would need to be specified well before the compliance year (and preferably at the outset of the Protocol).

The approach that this mechanism takes is something that some people may not consider particularly appropriate, and may be difficult to present to non-technical groups and the public. It would be important to ensure that Parties cannot continually postpone the need to comply with emissions ceilings, and explain this to non-technical groups.

Associated Costs and Effort

At the outset a clear explanation of how the mechanism would work would need to be provided. For example, the year of the revised ceilings would need to be defined (e.g. three years after the original compliance year). The method of calculating the revised ceilings would also need to be clearly defined. It is assumed that this would draw on effects modelling to ensure that the overall impact of complying with the revised ceilings was more beneficial than complying with the original emission ceilings.

Reporting and Review

It is presumed that the method used for calculating revised ceilings would not be overly complex. So this could be added to an IIR if it is clear that compliance with the original ceiling is not going to be achieved. Predicting whether the Party was on track to comply with the revised ceilings would be more challenging, as it is assumed that short-term policies would be implemented to ensure compliance with the revised ceilings.

There would be a slight increase in the effort needed from Parties and the Stage 3 review team. This is because detailed IIRs and Stage 3 reviews would be needed for both the original ceiling year and the revised ceiling year (Parties using this mechanism are likely to comply with some of the original ceilings).

Practicality and Method of Implementation

This mechanism would need to be incorporated into the Protocol text itself, rather than be included in guidance issued by the Implementation Committee. However, further views will need to be sought from experts better placed to provide input into discussions.

This mechanism is applied at the end of the compliance period and would not affect the development of the country's emission inventory. The aim of this is to encourage innovative reduction developments to comply with ceilings, and to give time for long-term policies to take effect. However, (as with the use of the Three Year Average mechanism) deadline for compliance would be postponed for selected Parties. So an overall assessment of Parties' compliance would not be possible, and this is noted to be a key tool for dissemination to the public.

The justification of the penalty rates would need to be negotiated in some detail, as well as the form of the calculations used to set revised ceilings. As a result, it might take approximately a week to prepare some draft guidance or Protocol text for this mechanism.

Adaptability

To ensure transparency and allow effective planning and progress monitoring from Parties, the calculation methods to be used for revised ceilings would need to be presented at the outset. It is also assumed that the methods would need to be included in the Protocol text. As a result this makes the mechanism rather inflexible.

Equity

If it is assumed that the original emission ceilings are set in an equitable way, then this mechanism does not provide any particular bias across the Parties. Mitigation measures with delivery timescales longer than the effective period of the Protocol could be used, and this may be relevant for some Parties and not others.

6 Domestic Pollutant Swapping

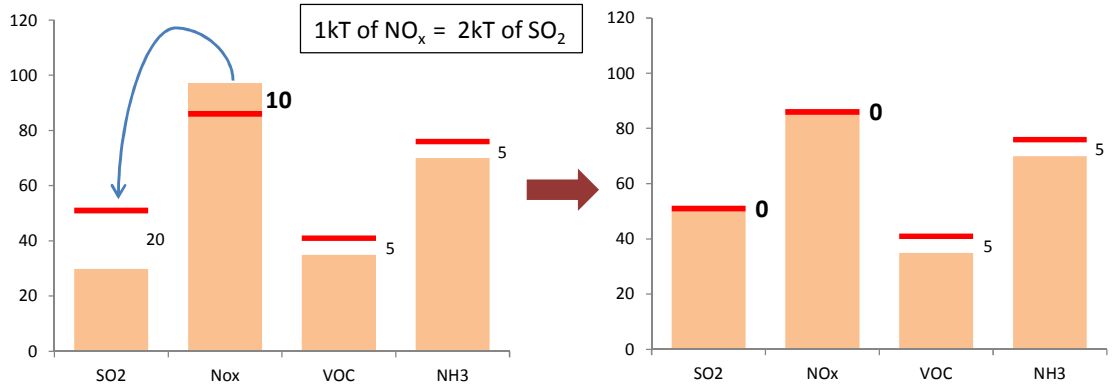
Overview

This flexibility mechanism enables a Party to 'swap' emissions from one pollutant to another with pre-defined exchange rates. This enables a Party that may not be compliant with all ceilings to redistribute their emissions across the ceilings to ensure compliance with more or all emission ceilings (whilst at the same time achieving a comparable effects outcome).

The predefined exchange rates between pollutants are typically set to ensure that it is disadvantageous to use the flexibility mechanism compared to implementing emission reductions to comply with the emission ceilings directly. This should avoid any significant "skewing", where a Party considered the most effective approach to reduce emissions of only selected pollutants by a substantial amount, and then "swapped" to ensure compliance across all pollutants. Exchange rates would also need to reflect the implications of the virtual transfer between acidification, eutrophication and ground-level ozone – in line with the Gothenburg Protocol.

Figure 6.1a below provides a schematic illustration of this flexibility mechanism.

Figure 6.1a: Domestic Pollutant Swapping enables compliance



Simplicity and Transparency

This mechanism has the potential to be simple and transparent if a simple set of exchange rates can be agreed. However, determining these exchange rates is very complex. The exchange rates would need to be country-specific so as to ensure that areas with specific pressures are not exploited. For example, a country that is producing a substantial amount of transboundary SO_2 should not be able to solve this problem by reducing NMVOC emissions.

Trying to ensure that this mechanism does not impact on delivering a comparable effects outcome is challenging, and is the main point of concern with this mechanism.

Associated Costs and Effort

A study would need to be undertaken to investigate possible exchange rates between pollutants for each Party. It is presumed that a degree of negotiation would then be required before these could all be collectively agreed by the Parties.

Determining Exchange Rates

Some pollutant exchange rates do already exist, and have been used for different applications. The underpinning science behind such exchange rates is often heavily debated by experts. However, given that the exchange rates used in this mechanism should be disadvantageous compared with options that reduce emissions directly, it is likely that the existing metrics are not particularly well suited to this application.

The situation with ozone formation is particularly complex. The effect on ground level ozone of changes in emissions of one pollutant compared to another varies depending on the conditions in that area (i.e. whether the chemistry is NOx or NMVOC limited).

It is also important to consider that changes in emissions of SO_2, NOx, NMVOC and NH_3 would be expected to have different impacts on ambient PM, which has much greater quantifiable health impacts than ground level ozone. Similarly, the location at which a single pollutant is emitted (e.g. from road transport or a power plant located in a rural area) can have very different impacts on health and the environment, further complicating the scientific basis of agreeing on an exchange rate.

The fact that the Gothenburg Protocol attempts to address acidification, eutrophication, ground level ozone as well as impacts on human health means that agreeing a set of exchange rates for a country that are meaningful becomes very complex.

There are other possible approaches to determining a set of exchange rates. A monetary valuation approach may be more appropriate (with prices based on environmental effects). The scheme, once exchange rates are established, is simply implemented at the compliance testing phase, and may promote improved abatement cost-effectiveness for Parties.

Another alternative is to specify impacts ceilings for each pollutant. So, for example, a Party would have a NO_X emission ceiling of e.g. 100 ktonnes for photochemistry, and NO_X ceiling of e.g. 80 ktonnes for acidification. The more challenging acidification ceiling could be achieved through contributions from reductions in other acidifying pollutants.

As mentioned above, exchange rates should be set so that it is advantageous to reduce emissions rather than use the mechanism. It may even be sensible to include a cap. This would then ensure that issues such as exceedances of limit values under the Air Quality Directive do not arise.

Review of exchange rates would be a complex issue. Parties would prefer certainty from the outset of the Protocol, and therefore would have a preference for having exchange rates that were not revised. However, scientific advancements across the period of the Protocol are likely to suggest that ongoing revisions to the exchange rates are needed, if they are to be underpinned by the latest scientific knowledge and modelling. On balance it would seem sensible not to revise the exchange rates.

Reporting and Review
Recalculations of ceiling compliance would be transparent and simple to follow. These recalculations would be an addition to the current inventory. The most favourable use of the mechanism could be calculated and used for each Party by reporting this in a simple table/graphic in the IIR with a full explanation of the pollutant swaps. The review of these calculations would also be simple.

Practicality and Method of Implementation
As explained above, the initial task of setting the exchange rates would be very complex as there are many different factors that need to be taken into account. It should be recognised that the use of exchange rates adds another layer of uncertainty, which is generally not desirable. However, once exchange rates have been agreed, the mechanism is fairly straightforward to put in place.

If the exchange rates are not to be revised during the Protocol, then less flexibility/adaptability is required. The mechanism can therefore be detailed in the Protocol text. However, further views will need to be sought from experts better placed to provide input into discussions.

The guidance or Protocol text for this mechanism would be involved due to the complexity of the mechanism. In addition, significant input from several stakeholder groups would be required. It is therefore expected that several weeks would be needed to prepare some draft guidance text.

Adaptability
This mechanism has the advantage that each Party can choose the degree to which it takes up the gas swapping. The impacts can therefore be tailored to the particular needs of the Party (although see the comment below on the reasons for a capped scheme).

As mentioned above, this mechanism is likely to be incorporated into the Protocol text itself, and would therefore not be particularly flexible. This is not considered a drawback - Parties would want certainty from this mechanism.

Equity
This mechanism would be advantageous for countries that have successfully implemented measures to reduce emissions in the majority of pollutants, but found it challenging to meet all of their emission ceilings.

"Capped" Variant
It is worth noting that some of the concerns associated with this mechanism could be addressed by using a variation which restricts the amount of gas swapping to a level that is considered acceptable. A capped domestic pollutant swapping mechanism would have the advantage of allowing Parties to make some adjustments to their emission ceilings for compliance purposes, but restricts the amount of swapping within a range that the exchange rates are considered to be applicable to.

7 Emission Trading Scheme Variants

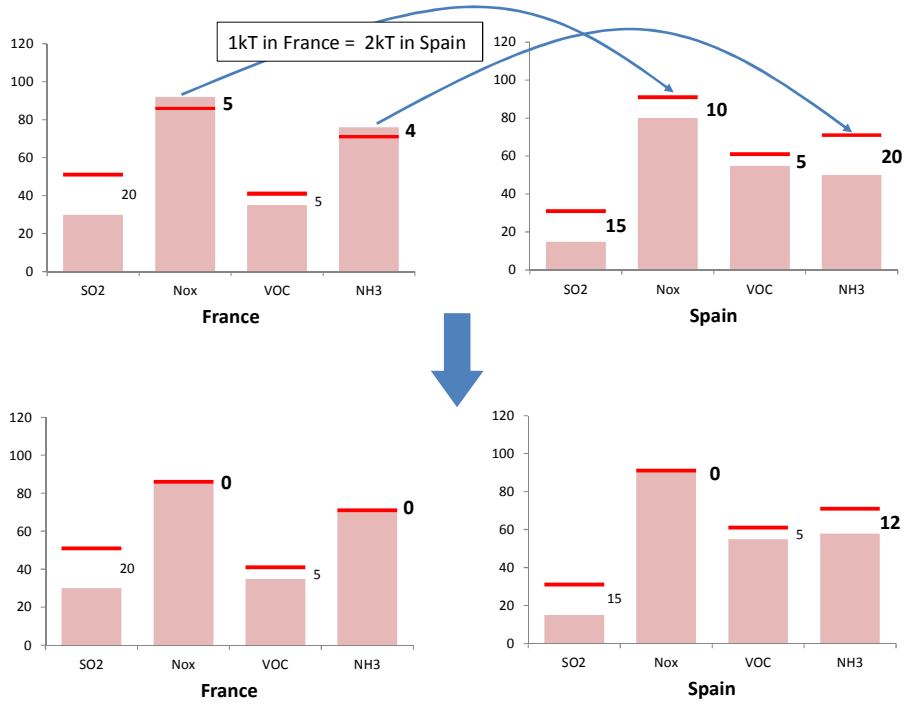
7.1 Unrestricted Emissions Trading

Overview

This flexibility mechanism is based on the same principles as Domestic Pollutant Swapping (Section 6), but countries can off-set their over-compliance with other Parties. If one country emits above its ceiling, it can transfer these emissions to a different country that has emitted less than its own ceiling. Unlike greenhouse gases, the impacts of air pollutants depend upon the location of the emissions. Thus exchange rates could or would be used to address geographical issues such as the change in proximity to vulnerable ecosystems, the distance between countries, as well as issues indicated in the Domestic Gasp Swapping mechanism (for example that emissions reduction should be generally favoured over the option of trading).

Technically this mechanism is not really a trading scheme. It is better described as "*ex post* compliance phase gas swapping on an international scale". But it is included in this Section for simplicity. Trading schemes (Sections 7.2 and 7.3) are typically more dynamic systems, with more regular exchanges/sales. Figure 7.1a below provides a schematic of this mechanism.

Figure 7.1a: Emission Trading Variant, allows Parties to trade emissions to promote ceiling compliance



Simplicity and Transparency

Whilst the premise for this mechanism is simple, it could rapidly become complex, with several adjustments being made to a best science emissions estimate. This would then start to impact on the transparency.

In practice, designing a trading scheme is very complex. A number of issues are considered under Practicality and Method of Implementation.

Associated Costs and Effort

Work would need to be undertaken to design a specific trading scheme for the Gothenburg Protocol, and this would require funding. There would then be additional costs associated with the implementation and operation of such a scheme. This would be a substantial undertaking. Another important consideration is that it would also take a substantial amount of time to design and implement an appropriate scheme. The current timetable suggests that this mechanism may be ruled out on this basis alone.

Reporting and Review

Inventory recalculations, once the swaps are decided on, would need to be added to the IIR to report on compliance and this could be done to a certain level of transparency. However, full transparency can only be assessed when taking into account the results of all parties. The review process could therefore be complex.

The creation of a model to verify the final, re-arranged, emissions could be undertaken. It would take some time to create and input the data into such a model, but the biggest difficulty would be tracing the source of any discrepancies. Evidently this mechanism would require considerable Europe-wide collaboration and support.

Practicality and Method of Implementation

The design of a trading scheme is involved and there are also a number of details which would need to be considered and decided on. For example, whether there was any limitation on the geography of the trading (see Section 7.2 Bubble Emissions Trading), whether the scheme would allow trading from any sources (see Section 7.3 Sectoral Emissions Trading), how the scheme interacted with existing trading schemes, the requirements for a secure central emission registry to log transactions, the time window that trading would be allowed, the remuneration for “buying” emission credits, whether emission credits for some pollutants were in high demand and other in no demand at all etc.

The formulation of potential exchange rates adds an additional level of complexity to this mechanism. Assuming that countries can only swap like-for-like pollutant emissions, the exchange rates would have to take into consideration the geographical location of the receiving and trading Party as well as the distance between them. It would be sensible for exchange rates to decrease with increasing distance between the two Parties involved in the trading. This is also before any pricing considerations for the transaction between two Parties would be taken into account i.e with an exchange rate system the purchase price of emission credits sourced from a neighbouring Party would be expected to be higher than for credits sourced from a more distant Party.

The fact that countries could swap with a number of different countries would lead to a relatively extensive discussion period before countries decide on their final readjusted emissions totals.

These are just some of the issues with this mechanism, and it can be argued that it is not suited to inclusion in the Gothenburg Protocol.

The guidance or Protocol text for this mechanism would be involved due to the complexity of the mechanism. In addition, significant input from several stakeholder groups would be required. It is therefore expected that several weeks would be needed to prepare some draft guidance text.

Adaptability

The nature of this mechanism is that it allows Parties to select (to a certain extent) the level to which their emissions are affected. As such it is adaptable to national circumstances.

However, the scheme itself will require clear and fixed rules to operate the trading. So the scheme itself would not be easily updated or changed.

Equity

To date the metric that has been used for compliance is simply whether emissions are lower than the specified ceilings. With this mechanism, the absolute extent to which the emissions ceilings are exceeded becomes important because it determines the mass of pollutant that needs to be traded. As a result, it is considerably easier for smaller countries to comply with their ceilings. This is because smaller countries would only need to obtain few emission credits compared to a larger country with a similar percentage exceedence.

To guarantee that emissions trading do not affect the environmental objectives, it would be necessary to identify what exchange rate among Parties is appropriate. This would probably make it significantly more difficult to reach an agreement. The advantages of this mechanism may not compensate for its complexity and shortcomings.

7.2 Bubble Emissions Trading

This is a variant on the Emissions Trading flexibility mechanism whereby trading would be restricted to being within a specific geographical area. The logic to this is that it has the potential to remove the need for exchange rates between countries that correct for the differing impacts of the same amount of emissions due to geographical location. As a result, the trading should be simplified and more transparent.

The individual bubbles would need to be defined, and collectively agreed by the Parties. The infrastructure to support each of the trading schemes within these bubbles would then need to be put in place. All of this would require funding.
It may be that geography then has a significant impact on the availability of emission credits for a particular Party.

Work has been undertaken previously to investigate the practicability of this mechanism.[9]

Besides the problems described in 7.1, this mechanism may pose an additional one of lack of equity, given that it may be possible to use this flexibility mechanism in certain regions, whereas in other certain regions it may not be allowed.

7.3 Sectoral Emissions Trading

This is a variant on the Emissions Trading flexibility mechanism whereby trading would be restricted to particular sectors, and trading only within a sector. This scheme allows effective alignment with cost benefit studies, and has the potential to reduce the complexity of such studies.

Limiting the sources which are included in the trading scheme would be simpler and more transparent. However, there may be substantial variability across the different Parties in the extent to which they have the potential to be involved in, and benefit from, the trading scheme.

[9] TNO (2006, 2007).

Work has been undertaken by the European Commission to assess the practicalities associated with this mechanism.[10]

8 Conclusions and Recommendations

A number of correction and flexibility mechanisms have been assessed for inclusion in the Gothenburg Protocol by the TFEIP ad hoc group. It is important to understand that the assessment has been specifically undertaken for the purpose of inclusion with the Gothenburg Protocol. For example, some mechanisms may be considered excellent options, but are not supported here simply because e.g. there is not enough time available to implement the mechanism.

Each of the mechanisms considered in this report have a variety of advantages and disadvantages, and a short summary is provided on each individually below. The intention was to use this information to compile packages of measures. However, it has become obvious during the compilation of this report is that **there is no clear consensus on a package of mechanisms** that could be recommended by the TFEIP ad hoc group. In fact, there is no clear consensus on many of the individual mechanisms. It is therefore challenging to include definitive conclusions and recommendations.

Findings relating to individual measures are considered below in Section 8.1. Potential packages of measures are presented in Section 8.2. **The overarching recommendation is that these packages are considered and discussed further by appropriate Convention bodies, taking into account the identified benefits and disadvantages of each.**

8.1 A Summary of the Advantages and Disadvantages of Individual Measures

The following views have been compiled from a technical emissions inventory perspective. Whilst efforts have been made to take into account the impacts on other relevant groups, it will be important that all relevant stakeholders are included in any future discussions to obtain more comprehensive views.

Relative Emission Ceilings

- Absorbs many, but not all, impacts of future inventory development and improvement;
- Particularly well suited to new/developing emission inventories;
- Relative emission ceilings do not address significant revisions to the emission estimates which do not impact on the base year;
- Very simple to implement;
- No significant addition to the workloads for CEIP or the emission inventory review teams (compared to the current Stage 3 review process).

CONCLUSION OF THE TFEIP: This mechanism does have strong support from many of the TFEIP members, but it is recognised that it does not address all issues in its own right.
It is also noted to be familiar and easily implemented with little extra work by other organisations, and is well suited to young/developing emission inventories.

[10] Entec (2010).

Accounting for New Sources

- Efficient way of mitigating impacts of unforeseen changes;
- Precise definition of "new sources" required;
- Only small burden increases for EMEP SB activities and CEIP;
- Increase in the burden for Parties associated with reporting, and the Stage3 review teams.

CONCLUSION OF THE TFEIP: This mechanism addresses issues associated with revisions very well, but is not popular with some members of the TFEIP because it requires inventory compilers to generate and work with two versions of the inventory.
Additional on-going work would also be needed by other EMEP organisations. It would be important to limit the number of "corrections" allowed to keep this additional burden to reasonable levels. However this would not be helpful for young/developing emission inventories.

Accounting for "Significant Changes" to EFs

- Efficient way of mitigating impacts of unforeseen changes;
- Difficult to define "significant changes" and therefore the breadth of the mechanism;
- Burden increase for EMEP SB activities and TFEIP (in maintaining EMEP/EEA Emissions Inventory Guidebook) could be substantial;
- Increase in the burden for Parties associated with reporting, and the Stage3 review teams.

CONCLUSION OF THE TFEIP: This mechanism addresses issues associated with revisions well, but it is particularly unpopular with some members of the TFEIP. There is potential for a substantial increase in the burden on inventory compilers (in terms of handling data, compiling IIRs and managing version control).
A certain amount of additional work would also be required by other EMEP organisations. It would be very important to minimise the number of "corrections" allowed to keep this additional burden to acceptable levels. However this would not be helpful for young/developing emission inventories.

Split Ambition Targets

- Requires the evaluation and negotiation of uncertainty ranges;
- Periodic update of uncertainty ranges could be time consuming, challenging and may then require negotiation;
- Little extra burden on Parties in terms of effort required for reporting.

CONCLUSION OF THE TFEIP: This mechanism is attractive to inventory compilers because it requires no additional work associated with compiling and reporting a national inventory, but still addresses issues that arise from inventory development.
However, it is recognised that setting of the ceilings and accompanying uncertainty ranges is challenging and that this would require work by other EMEP organisations.

Three Year Average

- Simple to implement with no significant additional burden on Parties;
- Simple to report, however, Parties using this option would achieve compliance a year later than other Parties;
- The emission inventory review process would be slightly more involved than the existing Stage 3 review, but for one year only.

CONCLUSION OF THE TFEIP: This mechanism is simple, and requires no significant additional work, and has general support from the TFEIP.
Policy makers may have issues with the delay of the resulting compliance year.

Delayed Compliance

- Delayed Protocol deadline of three years for non-compliant Parties may affect public perception;
- Additional burden for EMEP SB activities because Party-specific penalty rates would need to be agreed on when Parties are non-compliant;
- Encourages innovative, short-term reduction methodologies in order to comply with the reduced ceilings.

CONCLUSION OF THE TFEIP: This mechanism provides a solution of sorts, but requires additional work and is not as well supported by the TFEIP in general as other mechanisms.
Policy makers may have issues with the delay of the resulting compliance year.

Domestic Pollutant Swapping

- Feasibility of this mechanism will need to be assessed by effects modellers.
- Attempts to counter non-compliance with over-compliance rather than slackening ambition.
- No significant burden on Parties as it is simple to report in the IIR with a small additional section including the simple calculations;
- A significant additional burden on EMEP SB activities to quantify the complex relationships between required exchange rates for each Party and each pollutant;
- Parties would not have to emit under their ceilings in order to comply with the Protocol, which could have adverse effects on public perception.

CONCLUSION OF THE TFEIP: This is an effective but simple mechanism for emission inventory compilers, and it is therefore liked by the TFEIP members.
However, input would be needed from effects modellers to comment on whether it is practical (or even feasible) to determine exchange rates with to acceptable level of confidence. This may remove this mechanism from consideration.

Emissions Trading

- Additional burden for EMEP SB activities associated with defining the complex exchange rates taking into account long-range transportation of pollutants;
- Time required for designing and implementing a trading scheme is probably more than is available;
- The review process would need to verify all the trading, which should not be a significant burden as an efficient reporting database could be established.

CONCLUSION OF THE TFEIP: Whilst this mechanism has potential for some applications, it is complex and involved to implement. Timescales mean that this option is not considered realistic.

8.2 Packages of Measures

Following the assessment of individual measures, the TFEIP ad hoc group have considered ways in which the measures might be combined to form different packages of measures. It is recognised that there is still a significant amount of discussion needed to determine a preferred option, but the packages below are presented as being worthy of consideration.

Optional/Compulsory

Some mechanisms are inherently compulsory, and others would be best implemented on an optional basis. A clear distinction is made below between mechanisms in the different packages that are that are optional, and those which are not.

Three Year Average

The TFEIP ad hoc group consider that this **option** should be included, and added to whichever of the following packages is considered the most suitable.

The following packages of measures are designed to provide the capacity to respond to uncertainty and to drive the process forward in the knowledge that some provision has been made for the challenges of setting long-term horizon policies in a complex scientific arena.

1. Domestic Pollutant Swapping

Package 1a: Relative Emissions ceilings and Domestic Pollutant Swapping option

The feasibility of this package mechanism will need to be assessed by effects modellers. This provides a very robust package for countering uncertainty.

The acceptability of this package by WGSR is expected to be determined by advice from impacts modellers on whether it is possible to agree a set of pollutant exchange rates. It is thought that this may remove this mechanism from consideration.

Package 1b: Absolute Emissions ceilings and Domestic Pollutant Swapping option

This is same as Package 1a, but with absolute ceilings rather than relative ceilings.

Similarly, the acceptability of this package by WGSR is expected to be determined by advice from impacts modellers.

2. Split Ambition Targets

Package 2: Absolute Emissions ceilings and Split Ambition Targets

This is popular with inventory compilers (TFEIP members) because the burden primarily falls on activities that would be organised through EMEP, to determine and manage suitable levels of uncertainty. There is the reassurance that the uncertainty levels could be re-negotiated if necessary.

The acceptability of this package will be determined by how well liked the concept of Split Ambition Targets is by the WGSR.

3. Accounting for New Sources and Significant Changes to EFs

Package 3a: Relative Emissions ceilings, Accounting for New Sources and Significant Changes to EFs

This provides effective mechanisms for countering uncertainties impacting on all Parties, but allowed amendments would need to be strictly controlled to be workable in practice. This can be seen as a logical extension of the approach used for GHG emissions.

Package 3b: Absolute Emissions ceilings, Accounting for New Sources and Significant Changes to EFs

For the reasons indicated above, this package is only suited to addressing large changes that impact on all Parties.

It is thought likely that the acceptability of both of these packages of measures (3a and 3b) will be judged against the level of support/dislike shown for domestic pollutant swapping and split ambition targets.

8.3 Next Steps

This report will be provided to the EMEP Steering Body (EMEP SB) prior to their meeting in September 2011. The EMEP SB may wish to recommend that the report is used to support the on-going work of the Working Group on Strategies and Review (WGSR), which will also meet in September 2011.

It is recommended that discussion at WGSR on flexibility mechanisms focuses on the packages of measures identified in Chapter 8.2. In particular, it is recommended that discussion is organised as follows:

1. **Domestic Pollutant Swapping** packages should be considered first, by arranging for input from impacts modellers. They can advise on the feasibility and practicality of developing the pollutant exchange rates that are required for this mechanism. This should give a clear indication of whether Packages 1a and 1b are workable options. It may be that they can be quickly discounted from further consideration.

2. Discussion can then move on to **Split Ambition Targets**. There are specific advantages and disadvantages associated with this mechanism. However, it is thought likely that the key to identifying the level of support for this mechanism will be to focus discussions on the acceptability of the *concept* of Split Ambition Targets.

3. Having identified the general levels of support for Domestic Pollutant Swapping and Split Ambition targets, these can be compared with **Accounting for New Sources and Significant Changes to EFs**.

4. It is thought likely that consideration of **Relative and Absolute** emission ceilings (i.e. discussions pertaining to the merits of 1a vs 1b, and 3a vs 3b) can be left until after the main mechanism has been established, as indicated in steps 1-3 above.

9 Acknowledgements

The TFEIP Co-Chairs would like to thank representatives from the following countries who contributed to the ad hoc group, and this report in particular: Finland, France, Germany, Ireland, the Netherlands, Spain and the United Kingdom. Our thanks also go to representatives from the EEA and the EU who also made valuable contributions.

Appendices

10 Appendix 1: Terms of Reference for the TFEIP Ad Hoc Group on Flexibilities

Drafted by: Chris Dore
22/06/2011

10.1 Background

The understanding and science of estimating national emissions is constantly developing. This development can lead to revisions of inventories which potentially impact on whether a country complies with national ceilings or targets. It is therefore sensible to consider mechanisms in formal reporting which increases the certainty of assessing whether a country is on track to meet its obligations in terms of compliance.

The UN/ECE is considering such "flexibility mechanisms" and has asked the TFEIP to undertake a technical assessment of different options. These may be incorporated into the revision of the Gothenburg Protocol, or issued as guidance etc.

10.2 Objectives and Purpose

The TFEIP Ad Hoc Group on Flexibilities will consider a wide range of different flexibility mechanisms. Each mechanism will be assessed on a technical basis, using the following criteria:

- The issues which are/aren't addressed by the mechanism;
- Cost and practicalities of implementation (including implications for other LRTAP bodies, such as the Implementation Committee), reporting and review- (for both the UN/ECE and Parties);
- Simplicity;
- Transparency;
- Adaptability, in terms of ease which a mechanism might be updated; and
- Equity.

Recommendations will then be made from a technical perspective regarding the suitability of each of the different mechanisms for incorporation into the Gothenburg Protocol.

10.3 Expected Output

The Ad Hoc Group will write a report for submission to the EMEP SB (meeting 5-7th Sept). It is hoped that this will then be passed to WGSR for consideration at their next meeting (12-16th September). The EC have also requested that the report be available by mid July (when key personnel take Summer holidays), and this is therefore the most pressing deadline which the work will aim to deliver to.