



Too hot to handle? The emission surplus in the Copenhagen negotiations

Policy Studies



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Abstract

This report presents the effects of various strategies of dealing with surplus emission allowances or assigned amount units (AAUs), often known as ‘hot air’, in the Copenhagen negotiations. The environmental, financial and negotiation consequences of this ‘hot air’ are analyzed. This high-profile topic in the Copenhagen negotiations is relevant, in particular, with respect to the Russian negotiation position, as this country is by far the largest holder of AAUs. It is concluded that not addressing the surplus problem and waiting for future evolution of the carbon market is not a feasible outcome of the negotiations, as the sheer size of the surpluses of old and new hot air would jeopardize the environmental integrity of any future agreement. Cancelling emission surpluses against Russia’s will is a viable option, although it might well lead to them opting out of this climate treaty, with potential negative effects for broader international relations. However, there are various options for an effective compromise available. Based on discussions with negotiators, three of these options have been selected and analysed in this report. These are, in decreasing order of environmental outcome, but in increasing order of political viability: I. Stricter Annex I targets; II. Strategic reserve for Russia; III. Institutionalising optimal banking. It is suggested that policymakers consider all three options in their search for a compromise regarding the surplus emission issue in the Copenhagen negotiations. In addition, the option of cancelling all emission surpluses against Russia’s will by for instance voluntary buyer countries’ restrictions on the use of surpluses for compliance should be pursued for strategic purposes in the Copenhagen negotiation context.

Keywords: Emission surplus, Assigned Amount Units, Pledges, hot air, UNFCCC, future commitments or reductions, greenhouse gas emissions, climate change

Rapport in het kort

In dit rapport worden verschillende strategieën besproken voor het omgaan met het overschot aan emissierechten uit de Kyoto periode en mogelijke toekomstige emissieoverschotten die verhandeld kunnen worden. Deze strategieën worden geanalyseerd op milieu-, financiële- en strategische onderhandelingsconsequenties. De analyse is gebaseerd op een kwantitatieve analyse met behulp van het geïntegreerde klimaatbeleidsmodel FAIR.

Het overschot aan emissierechten, vaak ook 'hot air' genoemd, is een belangrijk onderwerp in de Kopenhagen klimaatonderhandelingen. Vooral de positie van Rusland is van belang omdat dit land verreweg het grootste overschot aan emissierechten heeft. Conclusie van het rapport is dat het probleem van de surplus emissies zonder meer opgelost moet worden in de onderhandelingen, omdat de grote omvang van de surplus emissies anders de uitkomsten van het hele akkoord in termen van effectieve, door doelbewust milieubeleid bereikte emissiereducties teniet kan doen. Ook kan het niet aanpakken van de surplus emissies leiden tot zeer lage prijzen in een toekomstige koolstofmarkt. Het zonder meer annuleren van de verkooprechten van deze overschotten tegen de wil van Rusland kan aan de andere kant leiden tot een terugtrekking uit het klimaatverdrag van dit land. Hoewel er goede argumenten zijn om deze optie binnen de strategische onderhandelingscontext overeind te houden, moeten de potentiële negatieve effecten op bredere internationale betrekkingen met Rusland van zo een terugtrekking niet onderschat worden.

Meerdere compromissen zijn echter mogelijk. Gebaseerd op gesprekken met onderhandelaars zijn in dit rapport drie van deze opties geselecteerd en nader onderzocht. Dit zijn, in afnemende volgorde van milieueffectiviteit en toenemende volgorde van politieke haalbaarheid:

- I. Strictere doelen voor alle Annex I landen. Alle overschotten worden geabsorbeerd door hogere emissiereductiedoelstellingen van alle Annex I landen. Het meenemen van de overschotten uit de Kyoto periode naar de toekomstige periodes is in dit geval toegestaan, maar de doelstellingen van de Annex I landen worden zo opgesteld dat hierdoor deze hot air wordt geabsorbeerd en nieuwe overschotten in de toekomst worden voorkomen.
- II. Strategische reserve voor Rusland. Een strengere doelstelling voor Rusland en andere landen met een emissiesurplus, gekoppeld aan het instellen van een 'strategische reserve' gelijk aan het verschil tussen de huidige voorgestelde doelstelling en de strengere doelstelling. Dit strategische fonds kan gebruikt worden als in de toekomst een tekort van emissierechten ontstaat bij deze

landen doordat de economische groei groter is geweest dan op dit moment wordt verwacht. Het verhandelen van de Kyoto hot air in de toekomst is niet toegestaan in dit voorstel, alleen eigen gebruik om te voldoen aan de doelstelling is mogelijk. De kans op toekomstige hot air wordt kleiner, maar indien deze ontstaat, kan dit nog steeds verhandeld worden.

- III. Vastleggen van 'optimal banking' voor Rusland. Het institutionaliseren van de toekomstige handel van Kyoto hot air waarbij het aantal te verhandelen emissierechten wordt beperkt maar waar tegelijkertijd de toekomstige Russische inkomsten worden gemaximaliseerd.

Alle drie de onderzochte opties zijn potentieel interessant voor beleidsmakers op zoek naar een compromis in de kwestie van de surplus emissies. Optie I laat de hoogste emissiereducties zijn, maar is in de huidige onderhandelingscontext vermoedelijk het minst haalbaar. Optie II en III zijn mogelijk eerder politiek haalbaar, omdat ze rekening houden met de potentiële financiële opbrengsten van 'hot air' voor Rusland en andere surplus-houdende landen. Vooral optie III, die redelijke emissiereducties realiseert bij een optimale financiële opbrengst voor Rusland, lijkt een aantrekkelijke route naar een compromis. Om een optimaal onderhandelingsresultaat te bereiken moet ook de optie van het volledig annuleren van de surplus AAUs tegen de zin van de surplus houdende landen, door bijvoorbeeld vrijwillige restricties van het gebruik van surplus AAUs door kopende partijen voor halen van hun doelstelling, overeind te houden.

Trefwoorden: Overschot emissierechten, AAUs, hot air, reductievoorstellen, UNFCCC, toekomstige verplichtingen, broeikasgas emissies, klimaatveranderingen.

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Summary

This report presents an analysis of, and discussion on, the environmental, financial and negotiation consequences of various strategies of dealing with surplus emission allowances or assigned amount units (AAUs), often known as ‘hot air’. Our analysis has been based on a quantitative assessment with the integrated assessment model FAIR. ‘Hot air’ is a high-profile topic in the Copenhagen negotiations, in particular, with respect to the Russian negotiation position, as this country is by far the largest holder of AAUs.

It is concluded that not addressing the surplus problem and waiting for future evolution of the carbon market is not a feasible outcome of the negotiations, as the sheer size of the surpluses of Kyoto hot air (about 6% of 1990 Annex I emissions) and new hot air from the 2013-2020 period (about 5% of 1990 Annex I emissions) would further jeopardise the environmental integrity of a future agreement, and is likely to undermine the robustness of any future climate agreement: The more ambitious reduction proposals (high pledges) by the Annex I countries lead to an aggregated reduction of 19% below 1990 levels, which is far less than the 25 to 40% reduction required to meet the two-degree climate target. Under full cancellation of all hot air, the total reduction would increase to 21%, and the carbon price to 24 USD/tCO₂ (see Table S.1). Unrestricted transfer of unused Kyoto hot air (and allowing new hot air to be created and traded), however, would decrease the total reduction to 13%, and bring the carbon price down to as low as 5 USD/tCO₂.

Moreover, cancelling emission surpluses against Russia’s will – though theoretically possible due to provisions in the Kyoto protocol and in terms of emission reductions a positive solution that should be pursued for strategic negotiation purposes – does not seem to be a feasible outcome of the negotiations either, as this might well lead to Russia opting out of a climate treaty, with potential negative effects for broader international relations, in particular, in the field of energy.

Fortunately, various options seem to be available for compromise. Based on previous discussions with negotiators, three of these options were chosen for analysis in this report, in decreasing order of environmental outcome, but in increasing order of political viability,

I. *Stricter Annex I targets*. Absorbing the surpluses by stricter emission reduction targets for all Annex I parties. Banking of Kyoto AAUs is allowed, but targets for individual parties

in Annex I are adjusted accordingly, to absorb the Kyoto hot air and prevent new hot air from being created.

- II. *Strategic reserve for Russia*. A stricter emission reduction target for Russia and other surplus-holding countries coupled to a non-tradable ‘strategic reserve fund’ (defined as a difference between current pledge and a new stricter emission target) from which Russia could assure their compliance in case of higher emission growth than foreseen. Banking of Kyoto AAUs is not allowed.
- III. *Institutionalising optimal banking*. Institutionalising an ‘optimal banking strategy’ for Russia that maximises their financial revenues, while limiting the amount of AAUs that can enter the market.

Results for the three negotiation options are summarised in Table S.1.

I. Annex I stricter targets

In terms of emission reductions, stricter targets for all Annex I countries would be the best way to absorb surplus AAUs. In such a case, the creation of new emission surpluses would be prevented, while Kyoto hot air would be needed by surplus holding countries for compliance with their own targets. If overall Annex I reduction targets were to be set at 30%, the total reduction effectively would amount to 25%, due to Kyoto AAUs (the minimum out of the 25 to 40% emission reduction for Annex I countries needed to meet the two-degree climate target), FAIR calculations showed a carbon price of 25 USD/ton CO₂, relatively high costs for Annex I countries (69 billion USD), as well as high revenues for Russia and non Annex I countries (25 and 11 billion USD, respectively). Politically, however, this solution seems far from feasible, given the far lower present pledges by Russia and the other Annex I countries, as well as the lack of political will for stricter targets in the Annex I countries.

II. Strategic reserve for Russia

In exchange for a new stricter emission target and cancelling Kyoto hot air, Russia could obtain a non-tradable ‘strategic reserve fund’ (defined as a difference between current pledge and a new stricter emission target) from which Russia could assure their compliance, in case of higher emission growth than foreseen. The possible new hot air (as the difference between the stricter emission target and baseline emissions) could be allowed to be traded. Although Russia would be confronted with a higher emission target and cancellation of Kyoto hot air, in this case, it would profit from trading new hot air, and from assured compliance through the strategic

2020 Scenario	Change in emission relative to 1990 levels		carbon price Global USD/tCO ₂	Total net revenues		
	Russia & Ukraine	Annex I incl. Russia & Ukraine		Annex I excl. Russia & Ukraine	Russia & Ukraine	non-Annex I
		%		Billion US dollars		
<i>Current high pledges</i>	-24	-19				
<i>Full banking Kyoto hot air</i>		-13	5	-14	11	-6
<i>Cancellation all hot air</i>		-21	24	-51	12	9
<i>Negotiation option I: Annex I stricter targets (Kyoto AAUs allowed)</i>	-53	-25	25	-69	25	11
<i>Negotiation option II: Strategic reserve for Russia (Kyoto AAUs not allowed)</i>	-41	-22	24	-51	12	9
<i>Negotiation option III: Institutionalising optimal banking (Kyoto AAUs limited)</i>	-24	-19	15	-36	19	0

Results as calculated with FAIR, taking the ambitious reduction targets or high pledges as a basis for calculations.

reserve fund. In terms of overall Annex I emission reductions, the result would be lower than in case I, but the political feasibility of this proposal seems higher than that of stricter targets for all Annex I countries – as Russia would receive a compensation package in return for accepting a higher target and giving up the Kyoto hot air.

III. Institutionalising optimal banking

Clearly, Russia would profit from selling its AAUs to the market. However, the number of AAUs in the market would also put a downward pressure on carbon prices. Therefore, an ‘optimal banking strategy’ would limit the number of AAUs in the market, optimising financial revenues for Russia. This report shows that, taking the current Russian high pledge as a basis, financial revenues for Russia would be the highest if all Kyoto hot air is cancelled and all new hot air would enter the market. In such a case, overall Annex I emission reductions would amount to 19%. Politically, this option seems attractive for Russia. For other countries, however, the option probably would only be acceptable if accompanied by guarantees, ensuring that Russia would not go beyond this amount. This could be done either by legally limiting Russian AAU sales to this amount, or alternatively under a voluntary abstention of buying countries to purchase more than this limited number of AAUs. Politically, this option seems quite attractive, as it couples maximal financial revenues for Russia to limiting the number of AAUs.

The investigated options show various degrees of balance regarding the two key variables that need to be reconciled in the surplus emission issue: effective, climate-policy induced emission reductions through the creation of a functioning carbon market on one hand, and financial revenues from AAUs for surplus-holding countries on the other hand. Therefore, it is suggested that, in the negotiations, all three options should be considered as potential directions towards a feasible compromise for all parties involved. Also, the option of cancelling emission surpluses against the will of Russia by for instance voluntary buyer countries’ restrictions on the use of surpluses for compliance should be pursued for strategic purposes in the Copenhagen negotiation context.



Introduction

One of the politically sensitive topics in the present Copenhagen negotiations is how to deal with emission surpluses ('Assigned Amount Units' or AAUs), which are often referred to as 'hot air'. This hot air in the first Kyoto commitment period (1990-2012) originates from the economic downfall in the so-called 'Economies in transition'; the nations that emanated from the dissolution of the Soviet Union in the 1990s, and former Eastern-Bloc states that now are part of the European Union. All of these nations experienced a major economic decline after the abolishment of the communist system, at the end of the 20th century. As a result of this decline, these Economies in Transition easily will meet their Kyoto target of zero emission growth by the end of the 1990-2012 period, even without having to install specific emission reduction policies. In some of these countries (such as the Ukraine), emissions even declined by as much as 60%, compared with 1990 levels. For Russia, the maximum decline was about 40%.

Under the present Kyoto regime, countries with surplus emissions can sell these AAUs to other Annex I countries through International Emission Trading, which is one of the market-based mechanisms that constitute the carbon market. They can also bank these surplus AAUs, to use them for compliance purposes in a following commitment period, after 2012, or to sell them, possibly at a higher price than could be obtained before. Partly due to the current economic crisis, which also hit hard in the Economies in Transition, the existing surpluses are likely to continue to exist for a long time beyond the 2012 Kyoto period. Moreover, with the present emission reduction targets for these countries, set for the year 2020 ('pledges')¹, additional surpluses will arise.

The potential environmental, financial and negotiation consequences of these surpluses are huge. The surplus emission rights that can be transferred to the period after 2012, and the possible new surplus emissions, would not only substantially reduce the need to enhance efficient emission reduction policies in those countries where these surpluses are generated, but also have substantial negative consequences for the carbon price in the market as a whole – and, therefore, also negatively affect emission reduction policies in other Annex I countries. In addition, the lower price of surpluses of the Economies in Transition would also substantially reduce the price of CDM credits, in turn,

affecting the financial revenues from CDM and emission trading for non-Annex I (developing) countries.

Taking the importance of the emission surpluses to the Russian negotiation position as a guideline, we first looked at the potential size of the surpluses in relation to overall Annex I emission reductions (Chapter 2). Subsequently, we examined the potential consequences for the carbon market, if Russia were allowed full banking and trading of old and new AAUs (Chapter 3). Chapter 3 also presents an analysis of possible consequences of the other extreme; cancelling emission surpluses against Russia's will. Chapter 4 presents three options for compromise, in more detail. Finally, based on the findings of this report, Chapter 5 provides some recommendations for the negotiations.

¹ For an overview of the pledges, as of November 2009, see Appendix A.

2

The size of the problem: Surplus of Assigned Amount Units compared to overall Annex I reductions

So far, in the build-up to the Copenhagen negotiations (as of November 2009), various Annex I countries have announced domestic emission reduction targets (or QELROs, ‘Quantified Emission Limitation and Reduction Objectives’) that they would be prepared to set if a Copenhagen treaty were to be signed. Many countries have made these targets dependent on the exact outcome of the negotiations, and have set a ‘high’ and a ‘low’ reduction target. Table 2.1 shows a simplified overview of the so-called Annex I ‘pledges’. A more comprehensive overview of pledges can be found in Appendix A. Current pledges made by Annex I countries add up to a combined 11 to 19% in greenhouse gas emissions, under 1990 levels, by 2020 (European Commission, 2009b) (Appendix A).

Emission surpluses consist of ‘old’ surpluses under the Kyoto period and ‘new’ surpluses that would be created depending on the relation between a country’s current pledges and the expected baseline emissions. Emission surpluses originate, as outlined, from the Russia-Ukraine-Belarus region, as well as from the new Member States of the European Union.

However, because of the overall target and emission trading system set up in the European Union, new Member States will have to deal with their surpluses internally, and under the EU target. The discussion, therefore, focuses on the Russia-Ukraine-Belarus region.

Hot air from the five-year Kyoto period amounts to 13 Gt CO₂ eq (see Table 2.2 and Appendix C). It represents about 6% of 1990 Annex I emissions if consumed for compliance purposes at a constant rate over the period 2013-2023¹. Compared to the current Annex I pledges of 11 to 19% emission reduction by 2020, this would mean that, in case the Copenhagen treaty would allow the banking of the ‘Kyoto AAUs’ post-2012, and there would be no restrictions on the sale of AAUs, Annex I countries would only have to cut emissions by 5 to 13% to meet their targets. This is well below IPCC’s recommended

¹ Based on similar calculations of the European Commission (2009a), assuming that the surplus AAUs under the Kyoto Protocol are consumed for compliance purposes at a constant rate over the period 2013-2023. More specifically, a total of 1.3 Gt CO₂ AAUs (= 13 / 10) would be available each year up to 2020. This would represent about 6% of 1990 emissions of this group, including the USA (about 19 Gt CO₂ in Table C.2)

Annex I country pledges

Table 2.1

Party	Information relating to possible QELROs by 2020			reference year	Status
	Low pledge	high pledge			
European Community	-20%	-30%		1990	Adopted by legislation.
USA	0%	-7%*		1990	economy-wide reduction target of Waxman/Markey bill
Japan	-15%	-25% ^c		2005 (low) and 1990 (high)	Officially announced
Belarus	-5%	-10%		1990	Under consideration
Russia	-20%	-25%		1990	Officially announced
Ukraine	-20%	-20%		1990	Under consideration

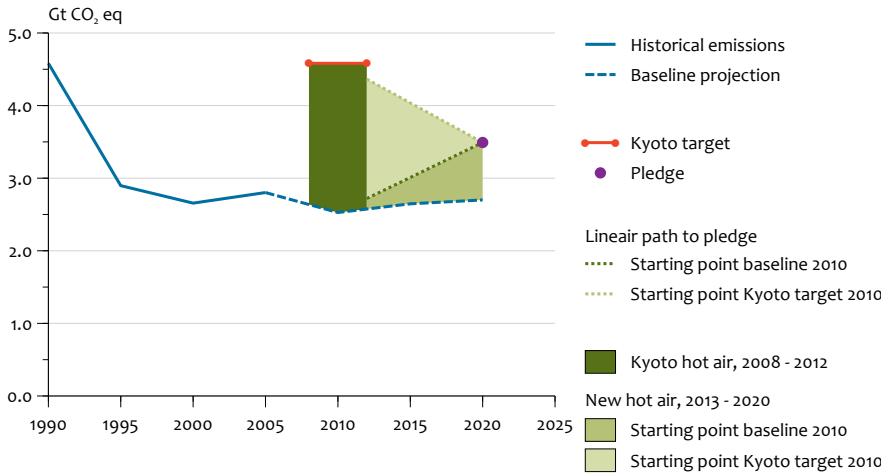
Information relating to possible quantified emission limitation and reduction objectives (QELROs) of the low-pledge and high-pledge commitments of individual Annex I countries, for the year 2020. Source: informal paper of the UNFCCC of 6 November 2009

Hot air (Gt CO ₂ eq)	Central Europe	Ukraine Belarus	Russian Federation	Total
Kyoto period (2008-2012)	2.8	3.1	7.2	13
Copenhagen period (2013-2020)**	0.0	1.9	2.2	4

* Calculated as the sum of the surpluses of the five-year period 2013-2017, and the three-year period 2018-2020.

**The baseline emissions by 2010 are taken as the starting point for the emission pathway (2013-2020).

Calculated cumulative hot air or surplus AAUs in the Kyoto period (2008-2012) and the Copenhagen period (2013-2020)* using our baseline emissions including the impact of the economic crisis (Appendix B). For detailed calculations, see Appendix C.



Emissions in the Russia, Ukraine and Belarus region for the 1990-2020 period, using UNFCCC emission inventory data for the 1990-2005 period, and baseline emissions for the 2006-2020 period. The figure also includes the two emission pathways for the 2013-2020 period, applying two options for the starting point (baseline emissions or Kyoto target). It further shows the Kyoto and new hot air.

reduction range for meeting the two-degree target, of 25 to 40% below 1990 levels. Our calculations for Kyoto hot air are comparable with the estimates reported in the Point Carbon report (Point Carbon, 2009), but higher than those of the European Commission (2009a), as the latter did not include the impact of the economic crisis (see Appendix C).

In addition, ‘new’ hot air of about 4 Gt CO₂ eq (see Table 2.2) might be created during the 2012-2020 period, the amount of which depending on the assumptions made for this period. For calculation of the ‘new’ hot air, three factors are important (in decreasing order of impact).

1. What is taken as the starting point for the emission pathway in the 2013-2020 period: the Kyoto target or the current (2010) baseline emissions?
2. Which pledges are taken as the basis: the low or the high pledges (reduction targets by 2020)?
3. How is the current economic crisis accounted for?

1. Starting Point

Starting from the Kyoto target, for the emission calculations for the period after Kyoto, which would be well above the present emissions for countries such as Russia and the Ukraine, would have a large influence on the newly generated surpluses over the whole period from 2013 to 2020. Figure 2.1

illustrates this effect. If Russia, the Ukraine and Belarus would start from their Kyoto targets and linearly decrease to their pledged targets for 2020, the amount of hot air in this target period would increase by 60%, and exceed the amount of hot air belonging to the Kyoto period.

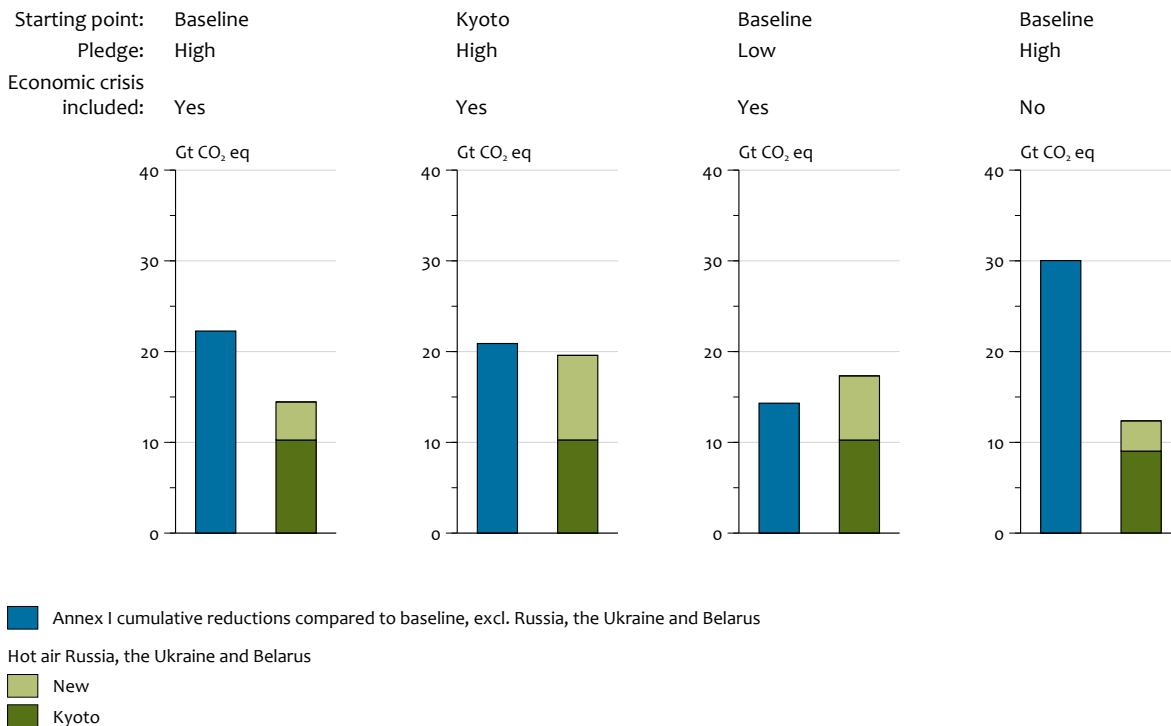
2. Pledges

With high or low pledges differing by up to 5%, for countries such as Russia and the Ukraine, taking one or the other as a basis for the calculations of new hot air, substantially also influences the distance to the projected baseline emissions, and, therefore, the amount of new hot air created.

3. Economic crisis

Similarly, the way the current economic crisis is accounted for – a quick or rather slower recovery – has a substantial influence on the baseline emissions, influencing both the Kyoto and new hot air.

Figure 2.2 shows the effects of high and low pledges and starting points on the reductions against baseline for Annex I excl Russian & Ukraine for the period 2013-2020, and the Russian, Ukraine and Belarus emission surpluses for the Kyoto period (2008-2012) and for the new period (2013-2020). The effect of including and excluding the economic crisis in the



Cumulative reductions (difference between baseline emissions and reduction target), in 2013-2020 period, for all Annex I countries excluding Russia & the Ukraine (including Belarus), and the hot air from Russia, the Ukraine and Belarus from the Kyoto period (2008-2012) and for the new period (2013-2020).

baseline emissions is also shown.² In the worst case (low pledges/ incl. crisis/ starting point baseline), the surpluses are far larger than the total emission reduction pledges of Annex I countries.³ But even in the most optimistic case (high pledges/ excl. crisis/ starting point baseline), surpluses are still equal to about half of the emission reductions of Annex I countries⁴. Because of the sheer size of the surpluses, the importance of hot air to the negotiations is paramount. .

² See Appendix C for the exact basis of the calculations (for the default calculations), and Appendix E for the methodology of the FAIR integrated assessment model.

³ Our maximum new hot air estimate of about 13 Gt CO₂ eq, for the 2013-2020 period is still below the Point Carbon study estimate of 16 Gt CO₂eq, mainly due to their lower baseline emissions by 2020 (impact economic crisis).

⁴ Changing the starting point has an effect on the Annex I excl Russia & Ukraine reductions because of the surplus emissions from Central European countries for the period 2013-2020.

3

Two extremes explored: Potential consequences of full banking and trading of surplus AAUs or full cancellation of hot air

3.1 Model analysis

One option to deal with the emission surpluses of Russia, the Ukraine and Belarus¹ would be to allow all old and new surpluses to be banked and traded at their discretion. The other extreme, using existing provisions in the Kyoto treaty, would be to cancel all old and new hot air, against the will of these countries. Table 3.1 gives an overview of the financial and emission reduction consequences of both options, based on calculations using the integrated assessment model FAIR. The abatement costs for each scenario were calculated based on the marginal abatement costs and the actual reductions. They represent the direct additional costs due to climate policy, but do not capture the macro-economic implications of these costs. We assumed that emissions could be traded freely between Annex I and the more advanced developing countries, and the use of the Clean Development Mechanism (CDM) for the other developing countries². Appendix E describes the model in more detail.

For the calculations, the minimum of the Kyoto target and the baseline were used as starting point for the Copenhagen period (2013-2020), together with the high pledges for the Annex I countries and with a baseline that incorporates the effects of the economic crisis. Non-Annex I countries were

assumed to reduce their emissions with 10% below baseline levels³ (Den Elzen et al., 2009b).

Table 3.1 shows that the effect on the carbon price of including or excluding emission surpluses is huge. A full cancellation of hot air will result in a carbon price of 24 USD/tCO₂, whereas full banking and trading of all old and new surpluses will result in a carbon price of only 5 USD/tCO₂. In the case of partial cancellation of hot air, the carbon price would amount to 15 USD/tCO₂ (cancellation of Kyoto hot air) or 9 USD/tCO₂ (cancellation of new hot air, or disallowing Russia and the Ukraine to trade surplus AAUs). The effect on total emission reductions of Annex I countries is equally large: full cancellation of hot air would lead to an overall emission reduction of 21% in those countries, whereas full banking and trading of hot air would limit their reductions to 13%.

Perhaps surprisingly, however, the net revenues for Russia and the Ukraine in both cases would be the same: selling all hot air at a very low carbon price under full banking and trading, would generate the same net revenues as not selling any at all, because of the system coupling to JI/CDM. In the full cancellation case, the higher revenues of JI/CDM would almost completely compensate the loss in hot air revenues (Table 3.2).

Non-Annex I countries, in this way, would also benefit from cancellation: instead of a net cost under full banking and trading (because of their domestic costs for meeting their reduction target, and limited gains from CDM, due to the

1 In the FAIR model, the Ukraine and Belarus are treated as one region. Hence, there where in this report 'Russia and Ukraine' is mentioned, Belarus is included.

2 Because of the project basis of CDM (trading between participating and non-participating regions) and implementation barriers such as properly functioning institutions and the project size (small projects are economically less viable due to the relatively high transaction costs), only a limited amount of the abatement potential is assumed to be operationally available on the market.

3 For the allocation of the overall non-Annex I reduction, we assumed that the more advanced countries in the group will reduce their emissions by 20% below baseline, and those at a lower level of development by 10%, while the least-developed countries would be exempt from emission reduction efforts all together.

2020	Environmental reduction consequences*		Financial consequences			
	Final emissions	Emission target 2020	carbon price	Total (net) revenues		
	Annex I incl. Russia & Ukraine	Russia & Ukraine**	Global	Annex I excl. Russia & Ukraine	Russia & Ukraine	non-Annex I
Scenario	% change relative to 1990 levels		USD/tCO ₂	Billion US dollar (costs*** as % GDP)		
<i>I.1 Allow transfer</i>						
<i>full banking/trading</i>	-13	-24	5	-14 (-0.03)	11 (-0.60)	-6 (-0.02)
<i>I.2 Forbid transfer</i>						
<i>a. Full cancellation of Kyoto hot air and new hot air</i>	-21	-24	24	-51 (-0.12)	12 (-0.65)	9 (-0.04)
<i>b. Cancellation of Kyoto hot air</i>	-19	-24	15	-36 (-0.09)	19 (-1.04)	0 (0.01)
<i>c. Cancellation new hot air</i>	-14	-41	9	-22 (-0.05)	13 (-0.75)	-4 (-0.02)

*as percentage of total reduction (excluding sinks)

** joined emission target for Russia and the Ukraine

*** negative values indicate costs and positive values represent gains

Financial consequences for Russia and the Ukraine for two extreme cases, 2020

Table 3.2

	Full banking and trading carbon price: 5 USD/tCO ₂		Full cancellation of hot air carbon price: 24 USD/tCO ₂	
	Amount of credits (Gt CO ₂ eq)	Net revenues* (Billion USD)	Amount of credits (Gt CO ₂ eq)	Net revenues* (Billion USD)
<i>Hot air</i>	1.8	9.1	0.0	0.0
<i>Sinks</i>	0.1	0.7	0.1	3.4
<i>JI</i>	0.3	1.4	0.5	10.9
<i>Total trade</i>	2.2	11.2	0.6	14.3
<i>Total financial revenues</i>		10.8		11.8

* Including the domestic costs

low carbon price), under full cancellation, their revenues from CDM would amount to some 9 billion USD. Hence, it also would be in the interest of non-Annex I countries if hot air were to be cancelled, as this would lead to large financial flows from Annex I countries (excluding Russia and the Ukraine) to non-Annex I countries (see Figure 3.1).

Because of the effect of the total amount of AAUs in the market on the overall carbon price, the net revenues of these emission surpluses for Russia, the Ukraine and Belarus go up to a maximum. Figure 3.2 shows carbon price development and net revenues generated by the surpluses, as a function of the amount of old and new hot air released. From the figure, it is clear that cancellation of Kyoto hot air and full use of new hot air, would create the highest net revenues for Russia, the Ukraine and Belarus (at 19 billion USD).

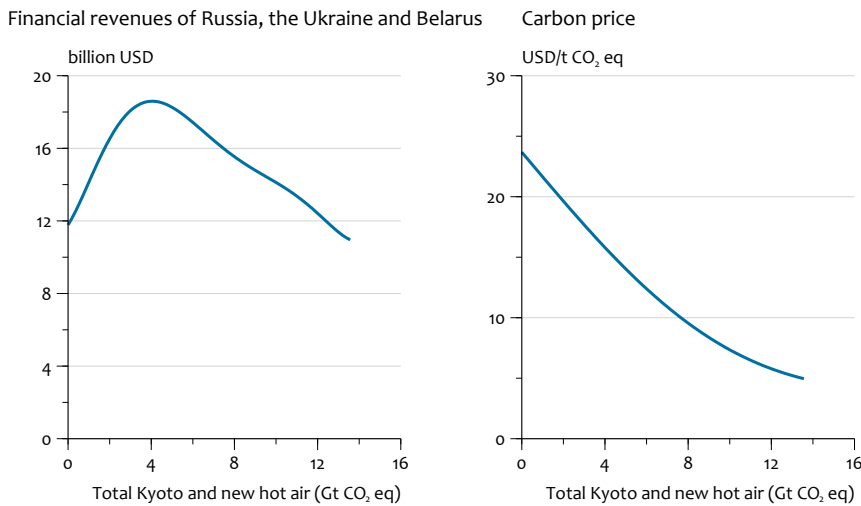
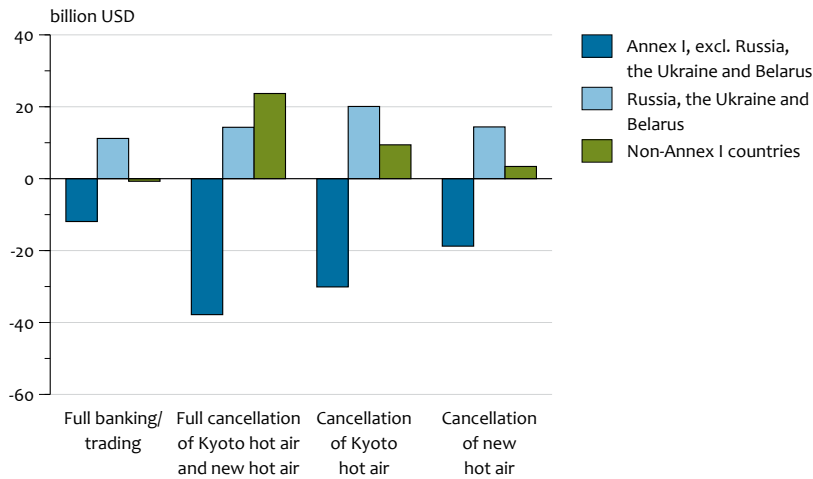
3.2 Potential consequences of cancelling emission surpluses against the will of Russia

Cancellation of emission surpluses against the will of Russia, the Ukraine and Belarus, is likely to be regarded by these countries as a hostile gesture, because it would negatively affect financial revenues, potentially resulting from a treaty (CIEP, 2009). Therefore, it should be seen as last-resort option in the strategic negotiations.

Korppoo (2009) and Korppoo and Spencer (2009a; 2009b) presented an outline of the Russian perception of the Copenhagen negotiations and the role of hot air in the Russian position. They stated that, although at the highest level of the Russian administration there is little motivation to actively engage in the Copenhagen talks, Russia views its AAU surpluses as a rightful and strategic asset and, therefore, seems unlikely to agree to a deal in Copenhagen which would completely divest it of its AAUs. This, together with accounting for Russia's vast forests as sinks and maintaining the special treatment as a transition economy, the way AAUs are dealt with could be a 'make-or-break' issue for Russia regarding a Copenhagen agreement.

Although Russia has more reasons to participate in a climate agreement than the financial revenues of hot air alone, not in the least that of the fear to be marginalised on the world stage by exclusion from a Copenhagen agreement, it cannot be ruled out that a 'hostile' cancellation of all emission surpluses would lead to Russia opting out of the treaty. This might be followed by a similar move by the Ukraine and Belarus.

The potential consequences of such an opting out should not be underestimated. Although Russian participation is not essential for the majority of present global CO₂ emissions to be covered, Russia, as a country with some of the largest fossil reserves, worldwide, and a major geopolitical player that is actively engaged in exerting its influence, particularly,



The revenues for Russia and the Ukraine (left), and the international carbon price (right) for different amounts of Kyoto and new hot air available for trading

in the countries of the Former Soviet Union, it would be perfectly equipped to undermine the environmental effectiveness of any Copenhagen agreement. For instance, Russia could reduce its gas tariffs to compensate for diminishing sales due to carbon pricing in treaty countries, or shift part of its gas exports to non-treaty countries. In this way, existing energy relations, such as the EU – Russian gas ties, could be seriously affected. Hence, all options for compromise should be explored, before turning to this last resort. Nevertheless, for strategic negotiation purposes this option certainly should be kept on the table as a way to achieve a feasible compromise.

4

Three possible options for compromise assessed

4.1 Introduction

Various possible directions could be taken for a compromise on emission surpluses. A compromise can be sought either by dealing with the surpluses themselves, or by a more encompassing deal that could involve a trade-off with sinks, or by even more complex arrangements beyond climate change alone – similar to the EU support for Russian entry into the World Trade Organization (WTO) in exchange for Russian ratification of the Kyoto protocol¹. Possible deals that involve swaps between various non-related issues within the climate negotiations themselves – such as emission surpluses and sinks – can only evolve during the final stages of the negotiations, when there is a basis of other issues that already have been settled.

The options for compromise around the issue of emission surpluses are varied. They include ‘greening’ the surpluses by requiring their revenues to be used in domestic emission reduction projects, absorbing the surpluses by making higher pledges, absorbing surpluses by introducing discounting rules, voluntary restrictions for countries buying AAUs, or limiting possibilities for banking of surpluses (Korppoo and Spencer, 2009a). Based on previous discussions with negotiators², we examined three potential options, in more detail. These are:

1. *Stricter Annex I targets.* Absorbing the emission surpluses by stricter emission reduction targets for all Annex I parties. Banking Kyoto AAUs and trade in AAUs is allowed (section 4.2);
2. *Strategic reserve for Russia.* A stricter target for Russia only, coupled to a ‘non-tradable strategic reserve’ based on the difference between a high economic growth scenario (current pledge) and a more realistic emission projection including efficiency measures. Possible new hot air can

1 Although the benefit from the latter will be hampered by the Russian dissatisfaction about the still outstanding WTO membership. Many other Russian interests could be explored as part of a climate-external compromise on the hot air issue such as e.g. energy efficiency or Russian territorial claims to the North Pole.

2 Mainly members of the Dutch negotiation delegation to Copenhagen

be traded in this option, and the reserve can be used for compliance only, in case of higher emission growth than foreseen. Banking of Kyoto AAUs is not allowed (section 4.3);

3. *Institutionalising optimal banking.* Institutionalising an ‘optimal banking strategy’ for Russia. Banking of Kyoto AAUs and new AAUs is restricted, based on an ‘optimal banking pathway’ for Russia that maximises their financial revenues, while limiting the amount of AAUs that can enter the market (section 4.4)

4.2 Absorbing the emission surpluses by stricter emission reduction targets for all Annex I parties

In the first option, the targets for Annex I countries are increased to absorb hot air. Banking all or (a portion of) Kyoto AAUs is allowed, but targets of individual parties in Annex I are adjusted accordingly. As Russia and other surplus-holding countries would also profit from the sale of the surpluses, they should increase their reduction targets more than other Annex I countries. They can use part of the Kyoto AAUs for compliance.

For this option, to absorb the Kyoto hot air, a 30% reduction level for the total of Annex I countries is necessary. For the differentiation of the aggregated reduction of 30% for Annex I countries, this scenario uses the concept of comparability of efforts, which is based on the notion of equal treatment of countries in similar circumstances. More specifically, the reductions for the individual Annex I countries are based on the calculated, average reduction targets from six different approaches for defining comparable mitigation efforts for Annex I countries, based on Den Elzen et al. (2009a).³ In this scenario, the total aggregated Annex I reduction target for 2020 is 30% below 1990 levels. As Kyoto AAUs can be banked, it also reduces the real environmental impact of the 30% reduction target for the whole group of Annex I countries,

3 The reduction targets of the individual Annex I countries are based on the average outcomes of six approaches for comparable effort (like equal marginal costs, or equal costs as % of GDP).

2020	Emission reduction consequences*		Financial consequences			
	Final emissions	Emission target 2020	carbon price	Total (net) revenues		
	Annex I incl. Russia & Ukraine	Russia & Ukraine**	Global	Annex I excl. Russia & Ukraine	Russia & Ukraine	non-Annex I
Scenario	% change relative to 1990 levels		USD/tCO ₂	Billion US dollar (costs as % GDP)***		
<i>Option 1. Deeper targets</i>						
<i>All Annex I countries deeper targets (Kyoto AAUs allowed)</i>	-25	-53 [†]	25	-69 (-0.16)	25 (-1.39)	11 (-0.05)
<i>Option 2. Strategic reserve</i>						
<i>Non-tradable strategic reserve (Kyoto AAUs not allowed)</i>	-22	-41	24	-51 (-0.12)	12 (-0.66)	9 (-0.04)
<i>Option 3. Optimal banking (discount/restrict transfer)</i>						
<i>optimal banking/trading (Kyoto AAUs limited)</i>	-19	-24	15	-36 (-0.09)	19 (-1.04)	0 (0.00)

*as percentage of total reduction (excluding sinks)

** joined emission target for Russia and the Ukraine

*** negative values indicate costs and positive values represent gains

[†] This target becomes about 9% below 1990 levels, when accounting for Kyoto AAUs

Pros and cons of strategy deeper targets

Table 4.2

Pros	Cons
<ul style="list-style-type: none"> - Fair, all Annex I countries have deeper targets based on comparability of effort - Strengthens the environmental effectiveness, with the highest overall Annex I emission reduction of 25% below 1990 - Strengthens the integrity of the carbon market, with the highest carbon price - Developing countries highly benefit from financial flows 	<ul style="list-style-type: none"> political feasibility low given current status of pledges

by 5%, to 25% below 1990 levels (the minimum out of the 25 to 40% emission reduction range for Annex I countries, which is needed to meet the two-degree climate target). The new hot air is absorbed by setting Russian and Ukraine reduction targets at 20 and 15%, respectively, below their baseline emissions (scenario 1 in Table 4.1). Russia and the Ukraine absorb part of the Kyoto hot air, for compliance. The remainder is sold to other Annex I countries, and in this way absorbed by their more ambitious reduction targets.

Table 4.1 shows the main environmental and financial consequences of this scenario, as well as for the other two options examined in Sections 4.3 and 4.4. Figure 4.1 shows the financial flows between Annex I countries, Russia and the Ukraine, and non-Annex I countries.

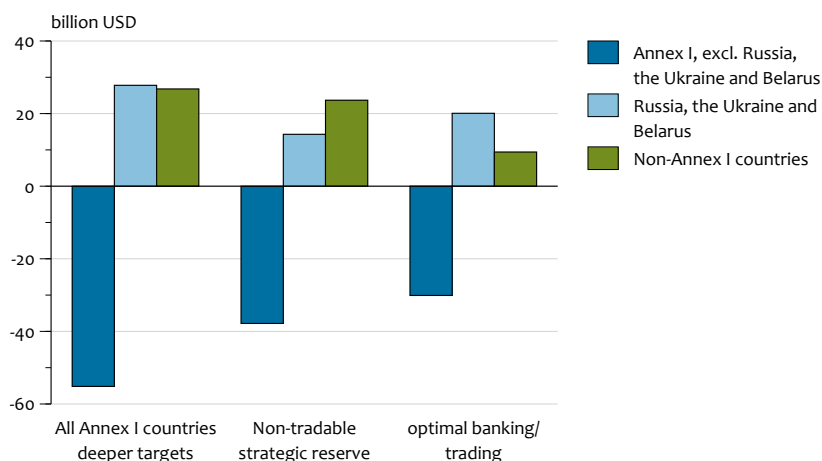
Key findings for option 1:

- Increasing Annex I targets raises the environmental effectiveness, significantly, to 25% below 1990 levels. Due to the banked Kyoto AAUs (about 6% of 1990 Annex I emissions) the original reduction target of 30% will not be met. Also, larger emission amounts will be reduced domestically. This comes with large increases in costs for all Annex I countries except Russia and the Ukraine. Russia and the Ukraine profit highly from this scenario, because of the higher demand in combination with higher financial flows (see Figure 4.1), and the higher carbon price of the equivalent of 25 USD/tCO₂. In addition the non-Annex I countries benefit highly, due to their financial revenues from selling carbon credits.

- Table 4.2 gives some pros and cons of this option. Although environmentally the option scores high because of the relatively high emission reductions that are realised, its political feasibility seems low, given the current status of the national pledges – which seems to leave little room for higher targets.

4.3 A stricter target for Russia, coupled to a non-tradable 'strategic reserve'

The second option is a stricter emission reduction target for Russia and other surplus-holding countries, coupled to 'non-tradable strategic reserve'. Russia could use this strategic reserve for compliance, but it cannot be traded. In return, Russia is not allowed to bank Kyoto AAUs. The reserve is based on the difference between the current pledge and a more ambitious pledge. Russian's current pledge of 25% below 1990 levels can be reached with a 1% annual emission growth between 2012 and 2020, in line with the 1.1% seen for 2000 to 2007 (Korppoo and Spencer, 2009b). A more ambitious pledge would be the baseline emission scenario including the impact of the economic crisis, leading to about 35% below 1990 levels for Russia. Therefore, the reserve could be based on the difference between the 25 and 35% below 1990 levels. For Russia, this strategy is on the safe side, under a high economic growth, by using the reserve for compliance.



Pros and cons of strategy with a non-tradable strategic reserve fund

Table 4.3

Pros	Cons
<p>Russia and the Ukraine are not deprived of their AAUs relatively environmentally sound: emission reduction as high as 16% the integrity of the carbon market improves, as most hot air is effectively cancelled. developing countries experience limited gain from financial revenues.</p>	<p>how will strategic fund be used, in the future?</p>

Key findings for option 2:

- A scenario with a non-tradable strategic reserve leads to an emission reduction of up to 22% (see scenario 2 in Table 4.1), and to an increase in carbon price on the market. The non-Annex I countries will benefit, somewhat, from financial gains from emission trading and CDM. Evidently, such a case would lead to the high costs for Annex I countries excluding Russia and the Ukraine; these countries would gain more, compared to their gains under the allowed transfer scenarios.
- Table 4.3 shows some main advantages and disadvantages of this option. For this option, the possibilities of giving up Kyoto hot air and adopting a deeper target are balanced against the possibilities of trading new hot air and achieving assured compliance through an earmarked strategic reserve fund. Uncertain, in this option, is how such a strategic fund in the future would be used – in the future, could surpluses from such a fund still end up on the market or not?

4.4 Institutionalising an ‘optimal banking strategy’ for Russia

Obviously, it would be in the interest of Russia, Ukraine and Belarus, financially, to have as many as possible old and new emission surpluses at their disposal, to be traded or banked at their discretion. However, as shown above, flooding the market with all of these AAUs, would not be wise, as this would result in a very low carbon price, seriously undermining the development of an international permit market. Such a situation of low price and a dysfunctional market is unlikely to occur, since this is also clearly not in the interest of the sellers themselves – Russia, the Ukraine and non-Annex-I countries.

A rational reaction for Russia, the dominant seller on the market, would be to exercise market power by limiting the supply of hot air and bank it for later use. Strategic trading of their surpluses would be to trade cancel Kyoto hot air and all new hot air, which would maximise these countries’ financial revenues⁴ (see Section 3).⁵

Therefore, the third option examined here is based on institutionalizing an ‘optimal banking strategy’ for Russia. This optimal banking strategy for Russia can be institutionalized for instance by legal restriction of the banking of Kyoto AAUs, a voluntary restriction of the use of new AAUs by buying countries and greening of AAUs is institutionalised and limited allowed.

Key findings of option 3:

- Optimal banking (scenario 3 in Table 4.1) would result in net revenues for Russia and the Ukraine of 17 billion USD. The carbon price in this scenario would be 15 USD/tCO₂, and overall emission reductions for the Annex I countries would amount to 19%. Optimal banking would be achieved by cancel Kyoto hot air and all new hot air.

4 This was also concluded in earlier cost analyses of the Kyoto Protocol after the withdrawal of the United States, showing optimal revenues for Russia and the Ukraine, if only between 0 and 50% of all surplus emissions would be sold (e.g., Böhringer, 2001; Buchner et al., 2002; Den Elzen and De Moor, 2002; Eyckmans et al., 2001; Jotzo and Michaelowa, 2002).

5 A policy of optimal banking would, ideally, also have to consider permit prices in future period commitments to be intertemporally optimal. As targets for the future commitment periods and beyond are yet unknown and uncertain, optimal banking is here interpreted as maximising revenues in the Copenhagen 2013-2020 period.

Pros	Cons
<ul style="list-style-type: none"> - optimal financial revenues for Russia and other surplus-holding countries - relative environmental effectiveness in terms of emission reductions - various ways to implement (e.g., voluntary buyers abstention, discounting, greening) - market price of about 15 USD/tCO₂ - developing countries experience limited gain from financial revenues. 	<p>lowest emission reduction gains of the three examined options</p>

- Table 4.4 lists some main pros and cons of this option. Following an optimal banking pathway is in the financial interest of surplus-holding countries and, therefore, appears attractive to them. Ensuring that not more hot air enters the market than suggested by the optimal banking pathway, either through legal provisions or voluntary abstention by buying countries, could make this option also very interesting to the other parties involved. Therefore, of these three options, this is perhaps the one that is most politically feasible. A disadvantage of this option might lay in the relatively low environmental gains, compared to the other two options.

5

Robustness of results

This section presents an analysis of the extent to which the results are dependent on key assumptions in the FAIR model that are, banking variants, the baseline, reduction pledges, amount of sinks used for compliance and trading, and starting point. We compared the results from the changed settings with the optimal banking (scenario II.3 as defined in Section 5.3).

Impact of banking – The impact of the two extreme variants of banking – full banking and full cancellation of hot air – on the Annex I emission reductions and carbon price, is shown in the Figures 5.1. These cases are extensively presented in Chapter 3. The carbon price in these banking scenarios varies between 5 and 24 USD (for detailed results, see Table 5.1).

Impact of starting point – The starting point highly affects the surplus emissions for the 2013-2020 period and, therefore, has a large effect on the environmental effectiveness and the carbon market (see also Figure 2.2). The surplus emissions would cause a decrease in the total emission reduction from 19 to 8% below 1990 levels, if the Kyoto level was used as a

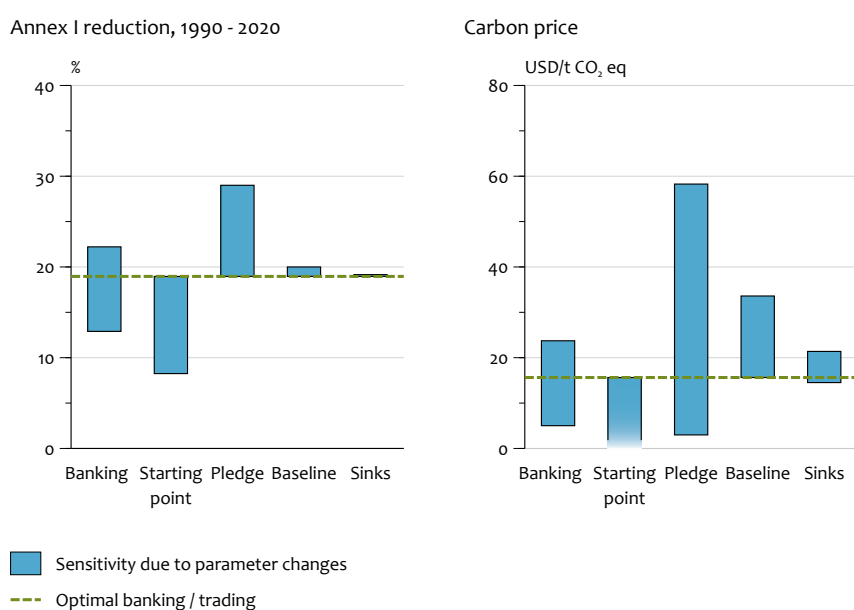
starting point for the Copenhagen period (2013–2020). These surplus emissions would also flood the carbon market, that is, the supply of carbon credits would exceed the demand, and carbon prices would become very low to zero (see also Figure 2.2).

Impact of pledges – High pledges are used in the default case. Some countries also entered low emission reduction targets next to their high pledges. In the comparable effort scenario Annex I countries as a group reduce around 30% against 1990 levels. Changing from high pledges to low pledges, or a comparable effort regime, significantly changes the Annex I emissions, to between 13% and 30%. For the low pledge scenario, also an optimal banking strategy is applied (using the same limitations), by limiting the use of hot air, and thereby increasing the financial revenues for Russia. The impact of the different pledges on the carbon price is high, that is, between 3 to 58 USD/tCO₂.

Impact of baseline (economic crisis) – In the default calculations, we assumed a baseline which includes the impact of the

Robustness of environmental and financial consequences, 2020

Figure 5.1



Key factors with their impact on Annex I emission reductions (left) and carbon price (right), compared to the reduction level of 19% and price level of 15 USD/ tCO₂ under optimal banking.

2020	Emission reduction consequences		Financial consequences			
	Final GHG emissions	Emission target 2020	carbon price	Total net revenues		
	Annex I incl. Russia & Ukraine	Russia & Ukraine	Global	Annex I excl. Russia & Ukraine	Russia & Ukraine	non-Annex I
Scenario	% change relative to 1990 levels		USD/tCO ₂	Billion US dollars (costs as % GDP)		
<i>Default</i>	-19	-24	15	-36 (-0.09)	19 (-1.04)	0 (0.00)
<i>Banking:</i>						
<i>a. full banking/trading</i>	-13	-24	5	-14 (-0.03)	11 (-0.60)	-6 (-0.02)
<i>b. Full cancellation of Kyoto and new hot air</i>	-22	-24	24	-51 (-0.12)	12 (-0.65)	9 (-0.04)
<i>Starting point</i>						
<i>a. Baseline emissions (default)</i>	-19	-24	15	-36 (-0.09)	19 (-1.04)	0 (0.00)
<i>b. Kyoto-target</i>	-6	-16	0			
<i>Pledge:</i>						
<i>a. low pledge</i>	-13	-12	3	-5 (-0.01)	3 (-0.14)	-1 (-0.00)
<i>b. comparable effort</i>	-30	-53	58	-132 (-0.31)	20 (-1.12)	-46 (-0.20)
<i>Baseline:</i>						
<i>a. Baseline with crisis (default)</i>	-19	-24	15	-36 (-0.09)	19 (-1.04)	0 (0.00)
<i>b. Baseline without crisis</i>	-20	-24	34	-99 (-0.21)	32 (-1.56)	17 (-0.07)
<i>Sinks</i>						
<i>no sinks</i>	-19	-24	21	-50 (-0.12)	17 (-0.94)	6 (-0.03)
<i>double sinks</i>	-19	-24	15	-31 (-0.07)	15 (-0.84)	-1 (-0.01)

economic crisis. Not including this impact would not only slightly lower the total emission reduction for Annex I countries, due to less hot air (see Figure 5.1), but more importantly, would also increase the carbon price by 80%, to up to 34 USD/tCO₂.

Impact of sinks – In the default calculations, we assume amount of sinks of about 300 Mt CO₂ for the Annex I countries. Varying the total amount of sinks from zero to double the current amount of sinks, has a very small effect on the total Annex I emissions, and a limited effect on the carbon price, that is, ranging from 15 to 21 USD/tCO₂.

Key findings of sensitivity analysis:

- The reduction targets of Annex I countries, their so-called pledges, have by far the greatest impact on reducing the emissions and economic efficiency, i.e. carbon price.
- The starting point highly affects the amount of surplus emissions, and if the Kyoto target level is chosen, surplus emissions could even exceed the total Annex I reduction, bringing the Annex I emissions to about 6% below 1990 levels, which is slightly more than the overall Annex I Kyoto target. It also leads to very low carbon prices.
- Different options for banking hot air and use of new hot air also influences the Annex I emission reductions, ranging between 13% and 21% below 1990 levels.

6

Surplus emissions: main findings and recommendations for the negotiations

This report analyses and discusses the environmental, financial and negotiation consequences of various strategies for dealing with surplus of emission allowances or assigned amount units (AAUs). It provides a quantitative addition to recent reports on surplus emissions by Korppoo and Spencer (2009a; 2009b) and Point Carbon (2009).

Applying the modelling approach of this report to the reality of the climate change negotiations in Copenhagen, some limitations are evident. In the first place, the model assumes a situation in which twenty-six regions worldwide trade carbon permits with each other. Clearly, such a situation of a global carbon market is far from being implemented yet.

Another key assumption in the model is that Russia, the Ukraine and Belarus are one region, and that this region tries to maximise its financial revenues within the modelling context in a rational way. Obviously, this assumption does not correspond with reality either. The three countries have their own political interests, and try to obtain these individually. The experience of the Kyoto period, so far, shows that Russia has been far from an active player trying to maximise its financial revenues from existing hot air. Rather, the country has stated not to sell its hot air credits up to 2012, but to bank all AAUs for possible future use in the next climate agreement due to take effect from 2013.

Russia also has a complex relationship with climate change as a political issue, making its behaviour as a rational economic player within the bound rationality of the climate change context far from obvious. In the past, climate change in Russia has met with little interest from politics and public life, and Russia's ratification of the Kyoto protocol could only be achieved through a deal involving EU support for Russian WTO access. Only recently Russia acknowledged that climate change mitigation measures could have a positive impact on its economy (Korppoo, 2009). Russian behaviour in the Copenhagen negotiations is, therefore, hard to predict. It might well be that the country will aim to accomplish a similar

horse-trading deal as regarding the Kyoto Protocol (CIEP, 2009).

It is shown in this report that ignoring the surplus problem and waiting for future evolution of the carbon market is no feasible negotiation outcome, as the sheer size of the surpluses of Kyoto hot air (about 6% of total 1990 Annex I emissions) and new hot air from the 2013-2020 period (about 5% of total 1990 Annex I emissions) would jeopardise the environmental integrity of a future climate agreement. Depending on the impacts of the economic crisis, the chosen starting point, and 2020 reduction targets of countries, there could be a supply of surplus AAUs of between 11 and 13 Gt CO₂ eq, for the Kyoto period (including the surplus from new EU Member States), and between 4 and 10.5 Gt CO₂ eq, for the 2012-2020 period.

In addition, depending on the assumptions made regarding economic crisis, starting point and 2020 targets, surplus emissions range from half of the total Annex I emission reductions (compared to their baseline) for the Copenhagen period, to an amount in excess of the total emission reductions agreed on by Annex I countries. Furthermore, surplus emissions could lead to carbon prices of as low as 5 USD/tCO₂.

Cancellation of all AAUs against the will of Russia and the other surplus-holding countries is one option that should be kept on the table for strategic negotiating purposes. However, applying this option as a last resort might well lead to Russia opting out of the climate treaty. The potential negative consequences for broader international relations of this approach, in particular in the field of energy, should not be underestimated.

Three feasible negotiation options

Based on discussions with negotiators from the Dutch delegation to Copenhagen and climate policy advisors, three potential negotiation options are examined in this paper.

These are, in decreasing order of environmental result and increasing order of political feasibility:

- I. Absorbing the surpluses by stricter emission reduction targets for all Annex I parties. Banking of Kyoto AAUs is allowed, but targets for individual parties in Annex I are adjusted accordingly to absorb Kyoto hot air and prevent new hot air from being created.
- II. A stricter emission reduction target for Russia and other surplus-holding countries, coupled to a 'non-tradable strategic reserve' (defined as a difference between current pledge and a new stricter emission target) from which surplus-holding countries could assure their compliance in case of higher emission growth than foreseen.
- III. Institutionalising an 'optimal banking strategy' for Russia and other-surplus holding countries that maximises their financial revenues, while limiting the amount of AAUs that can enter the market.

Key findings of the analysis of the three negotiation options

I. Annex I stricter targets – In terms of emission reductions, stricter targets for all Annex I countries would be the best way to absorb surplus AAUs. In such a way, the creation of new emission surpluses would be prevented, while Kyoto hot air would be needed by surplus-holding countries to comply with their own targets. If overall Annex I reduction targets were to be set at 30%, the total reduction, effectively, comes to 25%, due to the Kyoto AAUs (the minimum out of the 25 to 40% emission reduction range for Annex I countries, needed to meet the two-degree climate target). FAIR model calculations show a carbon price of 25 USD, relatively high costs for Annex I countries (69 billion USD), as well as high revenues for Russia and non-Annex I countries (25 and 11 billion USD, respectively). Politically, however, this solution of setting stricter targets for Annex I countries seems far from feasible, given the much lower present pledges by Russia and other Annex I countries, as well as the lack of political will, in these countries, to do so.

II. Strategic reserve for Russia – In exchange for a new stricter emission target and the cancelling of Kyoto hot air, Russia could obtain a non-tradable 'strategic reserve fund' (defined as a difference between current pledge and a new stricter emission target) from which Russia could assure their compliance, in case of higher emission growth than foreseen. The possible new hot air (as the difference between the stricter emission target and baseline emissions) could be allowed to be traded. Although confronted with a higher emission target and cancellation of Kyoto hot air, Russia could profit from trading new hot air, as well as from assured compliance through the strategic reserve fund. In terms of overall Annex I emission reductions, the result from this proposal would be lower than from case I, but the political feasibility seems higher.

III. Institutionalising optimal banking – Clearly, Russia would profit from selling its AAUs on the market. However, this number of AAUs on the market also would put a downward pressure on carbon prices. Therefore, an 'optimal banking strategy', in limiting the number of AAUs in the market, would optimise financial revenues for Russia. This report shows that, taking Russia's current high pledge as a basis, their financial revenues would be the highest when all Kyoto hot air would

be cancelled and all new hot air would enter the market.

In such a case, overall Annex I emission reductions would amount to 19%, compared to 21% emission reduction in the case of full cancellation of all hot air. Politically, this option seems attractive for Russia. For other countries, however, the option probably is only acceptable if there are guarantees that Russia would not go beyond this amount. These guarantees could be given either by legally limiting Russian AAU sales to this amount, or alternatively through a voluntary abstention by buying countries from purchasing more than this number of AAUs. Politically, this guarantee makes this option seem quite attractive, as it couples maximal financial revenues for Russia to limiting the number of AAUs.

The options investigated show various degrees of balance regarding the two key variables that need to be reconciled in the surplus emission issue: effective, climate policy induced emission reductions through the creation of a functioning carbon market on the one hand, and financial revenues of AAUs to surplus-holding countries on the other hand. Although option I shows the best environmental outcome, politically it is probably least feasible in the current negotiation context. Options II and III seem to offer better political perspectives, as they take into account the potential financial revenues of hot air to surplus-holding countries. Option III might be the most attractive route towards a compromise, as it still realises substantial emission reductions while maximising financial revenues for surplus-holding countries. Therefore, it is suggested that in the negotiations all three should be considered as potential directions towards a feasible compromise for all parties involved. However, as a strategic negotiation option, the possibility of cancelling all hot air against the will of the surplus-holding countries by for instance voluntary buyer countries' restrictions on the use of surpluses for compliance should be pursued for strategic purposes in the Copenhagen negotiation context.

Appendix A Low and high reduction proposals

With climate negotiations underway, towards the upcoming Copenhagen climate conference, various developed countries have announced their pledges for national reduction targets for 2020. The pledges that have been proposed by these

Annex I countries, including the low and high reduction estimates, are presented in Table A.1, based on an informal note from the UNFCCC presented in November 2009 (www.unfccc.int), the European Commission (2009b), and Den

Information relating to possible quantified emission limitation and reduction objectives

Table A.1

Party (in alphabetical order)	Information relating to possible QELROs by 2020		Reference year	Inclusion of LULUCF CO ₂	Inclusion of mechanisms	Status
	Low	High				
Australia	-5 to -15%	-25%, which includes -20% cap and trade and -5% government purchases of international credits (REDD)	2000 (-25% relative to 1990; without LULUCF CO ₂ the target would be about -5% to -10% compared to 1990 levels) ^a	Yes	Yes	Officially announced
Belarus	-5 to -10%	-15%	1990	TBD	Yes	Under consideration
Canada	-20%	-20%	2006 (+ 23% compared to 1990 with LULUCF CO ₂ , -3% without LULUCF CO ₂)	TBD	TBD	Officially announced
Croatia	6%	6%	1990			Under consideration
European Community (EU-27)	-20%	-30%	1990	No for -20% Yes for -30%	Yes ^b	Adopted by legislation
Iceland	-15%	-15%	1990	Yes	TBD	
Japan	-15%	-25% ^c	2005 (low) and 1990 (high)	No	No (low) and Yes (high)	Officially announced
Liechtenstein	-20%	-30%	1990	No	Yes	Officially announced
Monaco	-20%	-20%	1990	TBD	TBD	Officially announced
New Zealand	-10%	-20%	1990	Yes	Yes	Officially announced
Norway	-30%	-40%	1990	Yes ^d	TBD	Officially announced
Russia	-20%	-25%	1990	TBD	TBD	Officially announced
Switzerland	-20%	-30%	1990	Yes	Yes	Consultation in progress
Ukraine	-20%	-20%	1990	TBD	Yes	Under consideration
United States	0%	-7% ^e	1990	Yes	Yes	economy-wide reduction target as contained in the Waxman/Markey bill

^a The national UNFCCC reported GHG emissions including LULUCF CO₂ of 524 Mt CO₂ in 2000, therefore, a 25% reduction would lead to 393 Mt CO₂, which is about 4% below 1990 levels excluding LULUCF CO₂ (416 Mt CO₂), and also about 24% below 1990 levels including LULUCF CO₂ (516 Mt CO₂)

^b The European Community envisages a restricted use of the mechanisms for the range of possible QELROs.

^c High end is compared to 1990 levels, by recent announcement of new Japanese Government and conditional on Copenhagen agreement

^d The LULUCF sector is included according to the existing rules under the Kyoto Protocol. If the rules change, Norway's national target will change accordingly.

^e Only including a part of the additional reductions on top of the emissions caps.

Information relating to possible quantified emission limitation and reduction objectives (QELROs) of the low-pledge and high-pledge commitments by individual Annex I countries, for the year 2020. Source: informal paper of the UNFCCC of 6 November 2009.

	Emissions in tCO ₂ eq		Low end		High end	
	1990	2005	Relative to 1990	Relative to 2005	Relative to 1990	Relative to 2005
<i>Australia*</i>	416155	529524	13%	-11%	-11%	-30%
<i>Belarus</i>	127361	75594	-5%	60%	-15%	52%
<i>Canada</i>	592281	734491	-3%	-20%	-3%	-20%
<i>Croatia</i>	32527	30561	6%	12%	6%	12%
<i>EU27</i>	5572021	5153699	-20%	-14%	-30%	-24%
<i>Iceland</i>	3409	3709	-15%	-22%	-15%	-22%
<i>Japan</i>	1272056	1358065	-9%	-15%	-25%	-30%
<i>New Zealand</i>	61948	77354	-10%	-28%	-20%	-36%
<i>Norway</i>	49698	53800	-30%	-35%	-40%	-45%
<i>Russian Federation</i>	3326404	2123359	-20%	22%	-25%	13%
<i>Switzerland</i>	52800	53790	-20%	-21%	-30%	-31%
<i>Ukraine</i>	922013	425666	-20%	73%	-20%	73%
<i>United States</i>	6135243	7106638	0%	-14%	-7%	-20%
<i>Annex I total</i>	18734206	18038941	-11%	-7%	-19%	-16%

Pledges differ in scope and conditionality. The following qualifications apply:

Australia: High end is conditional on Copenhagen agreement (450ppm, comparable efforts), including LULUCF and carbon market use (data in the table does not include LULUCF).

Belarus: The target of -15% includes 5% credits from LULUCF.

Canada: Target relates to domestic emission reductions only, unconditional to Copenhagen agreement, 2006 reference year

EU: High end is conditional on Copenhagen agreement (comparable Annex I efforts, adequate DC contributions)

Japan: Conditional on Copenhagen agreement

New Zealand: Target conditional on Copenhagen agreement (450ppm, comparable efforts), including LULUCF and carbon market use.

Russian Federation: Using range indicated by President Medvedev on 18 November 2009. Russia indicated that it is ready to reduce its greenhouse gas emissions by as much as 25 percent below 1990 levels, if other Annex I countries do the same

United States: The less ambitious end reflects objective mentioned by President Obama. The high end taken from the indicative economy-wide reduction target as contained in the Waxman/Markey bill endorsed by the House of Representatives on 26 June 2009. Depending on the further development of that bill in the Senate the implied reductions compared to 1990 could be higher or lower than indicated.

Elzen et al. (2009b). The targets are relative to different base years, but are displayed here all against 1990 and 2005, for comparability. Some countries have indicated that their targets include or exclude Land use, Land-Use change and Forestry (LULUCF), others have not. For the purpose of this report, we have excluded LULUCF from all pledges.

The aggregated reductions by Annex I countries range from 11 to 19%, relative to 1990 levels, for 2020 (see Table A.2). This would be insufficient, according to the IPCC AR4 range of 25 to 40% below 1990 levels, to meet 450 ppm CO₂ eq (Den Elzen and Höhne, 2008; Gupta et al., 2007).

Appendix B Baseline emissions including the impact of the economic crisis

Baseline emissions, including the impact of the economic crisis, were calculated using the TIMER 2 energy model (Van Vuuren et al., 2007) for the energy- and industry-related CO₂ emissions, and the IMAGE 2.4 Integrated Assessment model (Bouwman et al., 2006) for the land-use related greenhouse gas emissions. More specifically, the scenario used here was based on the IEA World Energy Outlook (2008), but updated to account for the economic crisis of 2008/2009 (Den Elzen et al., 2009b). The adjustments for economic growth for 2008, 2009 and 2010, were based on the IMF publications of June 2009. On average, this led to a negative adjustment for the 2009 GDP growth rate, for each world region, of 3 to 5%, a somewhat smaller impact for 2010, and a return to the original growth path after this period. The economic crisis resulted in a decrease in baseline greenhouse gas emissions without climate policy of about 10% by 2010, and 8% by 2020, compared to the baseline emissions without the crisis.

Population, GDP per capita and anthropogenic greenhouse gas emissions

Table B.1

	Population (in million inhabitants)			GDP (1000 USD per capita)			GHG emissions (Gt CO ₂ eq per year)		
	1990	2000	2020	1990	2000	2020	1990	2000	2020
<i>Annex I regions</i>	1167	1211	1254	21	25.1	35.1	18.79	17.62	18.08
<i>Canada</i>	28	31	35	26.6	31.7	41.4	0.60	0.72	0.74
<i>USA</i>	254	279	337	31.2	38.6	49.3	6.03	6.92	7.20
<i>EU27</i>	508	519	521	20.6	24.6	33.6	5.86	5.37	5.43
<i>Ukraine region</i>	66	66	57	2.3	1.2	4.3	1.10	0.48	0.50
<i>Russian Federation</i>	164	165	149	5.3	3.5	10.5	3.48	2.17	2.20
<i>Japan</i>	124	127	125	30.7	34.4	42.3	1.21	1.34	1.26
<i>Oceania</i>	22	25	30	26.6	33.4	44	0.51	0.61	0.75
<i>Non-Annex I regions</i>	4135	4918	6356	1.2	1.7	3.6	13.56	17.23	32.77
<i>China region</i>	1184	1325	1486	0.6	1.4	6.2	4.05	5.38	14.47
<i>India</i>	857	1016	1311	0.4	0.6	1.4	1.42	1.92	3.45
<i>World</i>	5302	6128	7611	5.6	6.3	8.8	32.34	34.85	50.85

Population, GDP per capita and anthropogenic greenhouse gas emissions for the Annex I countries, for 1990, 2000 and 2020, for the baseline including the economic crisis.

Appendix C Surplus AAUs, for Kyoto and Copenhagen period, in FAIR model

Kyoto period – The amount of hot air is a key factor in the analysis presented in this report. Both in the Kyoto and the Copenhagen period, surplus emissions could occur for several countries. The surplus is the difference between the annual actual emissions in this period and the annual reduction target added for all five years. Table C.1 shows the surplus for the Kyoto period, where the emissions and reduction targets for the year 2010, calculated in the FAIR model, were used to represent the annual average. The target was calculated by applying the reduction target to the base year emissions which can deviate from the 1990 emissions¹. The annual gross deficits from the countries with higher emissions than their Kyoto target add up to 0.4 Gt CO₂eq (see Table C.1).

The annual gross surplus from the Central European countries, Russia and the Ukraine (including Belarus) add up to 2.6 Gt CO₂eq. Taking the net of the surplus and deficit, the annual net surplus – not taking sinks into account – is

¹ See http://unfccc.int/ghg_data/kp_data_unfccc/base_year_data/items/4354.php

2.2 Gt CO₂eq. Sinks can be used for compliance under the Kyoto protocol and can be traded during the Kyoto period. However, banking of sink credits (Removal Units or RMUs) for future use beyond this period is not allowed. When sinks are used for compliance, the gross deficit would decrease to 0.3 Gt CO₂eq and the gross surplus would increase to 2.8 Gt CO₂eq. The total demand of 0.3 Gt CO₂eq could be fully covered by trading sink credits with surplus-holding countries. In the FAIR model, it was assumed that RMUs would be sold before AAUs, because the former cannot be banked. Domestic reduction does not occur, because of the low-cost opportunity that is presented by the trading of AAUs.

The total surplus was determined by multiplying the annual demand by the number of years in the Kyoto period. The total surplus (AAUs) can be banked for use in future commitment periods and equals 13 Gt CO₂eq.

Copenhagen period – Using the reduction targets of the high pledges from all Annex I countries, and the baseline emissions for 2015 and 2020, the surplus or deficit of AAUs for 2015

Potential annual surplus or deficit of AAUs over the 2008-2012 period

Table C.1

Kyoto period 2008-2012 (Gt CO ₂ eq)	target 2008-2012	base year	1990	2008-2012 average annual emissions	2008-2012 average annual target	Average annual surplus (+), deficit (-)
EU15	-8.0%	4.36	4.34	4.09	4.01	-0.08
EU10	-7.0%	1.70	1.52	1.03	1.58	0.55
Russia	0.0%	3.48	3.48	2.04	3.48	1.44
Ukraine	0.0%	1.10	1.10	0.48	1.10	0.61
New Zealand & Australia	7.0%	0.51	0.51	0.66	0.55	-0.11
Japan	-6.0%	1.20	1.21	1.21	1.12	-0.09
Canada	-6.0%	0.60	0.60	0.70	0.56	-0.14
Net surplus		12.90	12.76	10.21	12.40	2.19
Gross surplus						2.60
Gross deficit						-0.42

Potential annual surplus or deficit of AAUs over the 2008-2012 period, using our baseline emissions including the impact of the economic crisis, for all Annex I countries or regions (as included in our model) (excluding the United States)

Copenhagen (2015) (GtCO ₂ eq)	target 2015	Base year	1990	2015 annual emissions	2015 annual target	Average annual surplus (+), deficit (-)
EU	-21%	6.06	5.86	5.37	4.57	-0.80
Russia	-33%	3.48	3.48	2.13	2.32	0.20
Ukraine	-38%	1.10	1.10	0.52	0.68	0.16
New Zealand + Australia	6%	0.51	0.51	0.71	0.54	-0.17
Japan	-16%	1.20	1.21	1.27	1.01	-0.25
Canada	-4%	0.60	0.60	0.74	0.57	-0.17
United States	2%	6.03	6.03	7.04	6.17	-0.88
Net surplus		18.97	18.79	17.77	15.87	-1.90
Gross surplus						0.36
Gross deficit						-2.26

Copenhagen (2020) (gtCO ₂ eq)	target 2020	base year	1990	2020 annual emissions	2020 annual target	Average annual surplus (+), deficit (-)
EU	-30%	6.06	5.86	5.43	4.10	-1.33
Russia	-25%	3.48	3.48	2.20	2.61	0.42
Ukraine	-20%	1.10	1.10	0.50	0.88	0.38
New Zealand + Australia	-12%	0.51	0.51	0.75	0.54	-0.21
Japan	-25%	1.20	1.21	1.26	0.91	-0.35
Canada	-3%	0.60	0.60	0.74	0.58	-0.16
United States	-12%	6.03	6.03	7.20	5.61	-1.60
Net surplus		18.97	18.79	18.08	15.57	-2.86
Gross surplus						0.8
Gross deficit						-3.65

Potential surplus or deficit of AAUs for 2015 (upper) and 2020 (lower), using our baseline emissions including the impact of the economic crisis and reduction targets from the high pledges

and 2020 also could be calculated (see Table C.2). The total cumulative surplus was calculated as the sum of the surpluses of the 2013-2017 period (five times 2015 estimates) and the 2018-2020 period (three times 2020 estimates). For example, the new hot air from Russia was calculated as: $5 \times 0.2 + 3 \times 0.4 = 2.2$ Gt CO₂ eq, as indicated in Table 2.2. In the Copenhagen period, new hot air will be created under the current pledges and it is estimated to equal an annual amount of 4 Gt CO₂ eq. Potential surplus or deficit of AAUs for 2015 (upper) and 2020 (lower)

Appendix D Comparing surplus AAUs with those of other studies

Different amounts of surpluses from the Kyoto period and the Copenhagen period (2013-2020) have been communicated in different studies. For this section, we compared the EU reported surplus from the EU Communication (European Commission, 2009a), the surplus reported in the Point Carbon report (Point Carbon, 2009), and the surplus according to our calculation, using the FAIR model.

The differences for the Kyoto surplus AAUs between this study and the Point Carbon study were relatively small (see Table D.1). Both the gross and net surplus were slightly higher in the FAIR model. Despite the excluding of Canada, the gross shortfall in the Point Carbon figures was higher, indicating higher baseline emissions for the Kyoto period. The lower surplus reported by Point Carbon strengthens this conclusion. The Kyoto surplus reported in the EU communication was lower, because they did not include the effect of the economic crisis in their baseline projections, and simply assumed the average emissions in the Kyoto period to be equal to the 2006 emissions, which underestimated

the impact of the crisis on the emissions, as shown by Point Carbon and our estimates.

The differences between the Point Carbon figures and our numbers for the surplus from the 2013-2020 period were larger. Our gross deficit was higher and our gross surplus lower, indicating lower baseline emissions for the Point Carbon study. Therefore, our study did not show a net surplus; all hot air in the Copenhagen period is expected to be sold, opposite to the Point Carbon results.

Comparing reported surpluses (excluding sinks) by EU Communication

Table D.1

	EU	Average pledge* Point Carbon	High pledge this study	Low pledge this study
(GtCO ₂ eq)	Kyoto period	Kyoto period	Kyoto period	Kyoto period
<i>gross shortfall</i>	2.7	2.7	2.1	2.1
<i>gross surplus</i>	10.5	11.7	13.0	13.0
<i>net surplus</i>	7.8	9.1	10.9	10.9
(GtCO ₂ eq)	Copenhagen period	Copenhagen period	Copenhagen period	Copenhagen period
<i>gross shortfall</i>		18.5	22.3	14.6
<i>gross surplus</i>		16.3	4.2	7.4
<i>net surplus</i>		-2.2	-18.1	-7.3
<i>banked hot air</i>		9.1	13.0	13.0
<i>net surplus (after)</i>		6.9	-5.1	5.8

* Excl. Canada

Comparing reported surpluses (excluding sinks) by EU Communication (European Commission, 2009a), Point Carbon (2009), and from our study using the FAIR model estimates, for the Kyoto period (2013-2020) and Copenhagen period (2013-2020).

Appendix E The FAIR model

In order to provide the hot air discussion with a quantitative basis, the integrated assessment model FAIR¹ of the Netherlands Environmental Assessment Agency was used. The model calculated the abatement costs (in USD₂₀₀₅) by assuming full use of the flexible Kyoto mechanisms, such as International Emissions Trading (IET) and the Clean Development Mechanism (CDM), based on the cost-effective distribution of reductions, for different regions, gases and sources, using Marginal Abatement Cost (MAC) curves (Den Elzen et al., 2007; 2009b).² The model calculated the direct additional costs due to climate policy, but did not capture macro-economic costs. The model also calculated the equilibrium carbon price on the international trading market (hereafter called ‘carbon price’), its buyers and sellers, and the domestic and external abatements and costs for each region.

The baseline scenario and MAC curves for the energy- and industry-related CO₂ emissions were determined with the TIMER energy model (Van Vuuren et al., 2007).³ MAC curves were taken from the Energy Modeling Forum’s project ‘EMF 21, Multi-Gas Mitigation and Climate Change’ (Weyant et al., 2006) for non-CO₂ GHG emissions.⁴ Greenhouse gas emissions for the period from 1990 to 2005 were based on national emission inventories submitted to the UNFCCC for the Annex I countries and international databases for the non-Annex I countries. Future emissions were based on a baseline scenario, as outlined below. Although the calculations were performed for twenty-six regions, in the analysis presented here they were grouped into three regions; 1. Annex I countries excluding the Russian Federation and the Ukrainian region (including Belarus) (Annex I excl R&U); 2. Russia and the Ukraine (R&U); and 3. non-Annex I countries. The cost calculations were done for every five years: for 2010, 2015 and 2020, and interpolated to determine the traded amounts

and cumulative cost for the Kyoto period (2008-2012) and the Copenhagen period (2013-2020). The results presented here are mainly those for 2020.

For this hot air analysis, the model was updated with data on hot air trading and banking strategies.⁶ According to the Kyoto protocol, the surplus AAUs from the Kyoto period can be used in three ways: compliance, trading and banking. A country can choose to trade hot air with other countries or bank it for future use. This future use can be domestic compliance, trading⁷ or re-banking. Whether the so-called ‘old’ hot air (from the Kyoto period) can be banked in the Copenhagen period, will depend on the outcome of the negotiations.

1 TIMER = The IMage Energy Regional model; FAIR = Framework to Assess International Regimes for the differentiation of commitments

2 See Den Elzen et al. (2007) for a discussion on the strengths and limitations of this cost methodology.

3 In this model, costs strongly depend on the emission reduction pathway through (1) technological change and (2) inertia. In the FAIR model, this was captured by using several sets of MAC curves from TIMER that differ in timing of climate policy (Van Vliet et al., 2009).

4 These curves have been made consistent with the baseline used here and made time-dependent to account for technology change and removal of implementation barriers (Lucas et al., 2007).

5 In this report we have used Russia and the Ukraine to represent the Russian Federation and the Ukrainian region

6 For details, see Den Elzen et al. (2009b).

7 The trading of sinks is incorporated in the carbon market transactions. Because sink credits (RMUs) cannot be banked, they have higher priority in the selling process.

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Colophon

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Too hot to handle? The emission surplus in the Copenhagen negotiations.

This report analyses the environmental and financial consequences of various strategies of dealing with surplus emission allowances, often known as 'hot air', in the Copenhagen negotiations. This high-profile topic in the Copenhagen negotiations is relevant, in particular, with respect to the Russian negotiation position, as this country is by far the largest holder of surplus emissions. It is concluded that not addressing the surplus problem and waiting for future evolvement of the carbon market is not a feasible outcome of the negotiations, as the sheer size of the surpluses of old and new hot air would jeopardize the environmental integrity of any future agreement. Cancelling emission surpluses against Russia's will is a viable option, although it might well lead to them opting out of this climate treaty, with potential negative effects for broader international relations. However, there are three selected options for an effective compromise available, i.e. I. Stricter Annex I targets; II. Strategic reserve for Russia; III. Institutionalising optimal banking. It is suggested that policymakers consider all three options in their search for a compromise regarding the surplus emission issue in the Copenhagen negotiations.