

Hot topic: AAU surplus

Political implications of the long-term effect of surplus from the first and second Kyoto period

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Keywords

Surplus, AAUs, Kyoto, Article 3

Executive Summary

There is a vast surplus of units in Kyoto's cap-and-trade system. If no solution for the carry-over of this surplus from commitment period to commitment period is found, countries that have put forward a target for the second commitment period (CP2) may be under no pressure to deviate from business-as-usual (BAU) emissions until 2026.

As a group, they could comply with their emission reduction pledges simply by relying on a build-up of surplus units from the first and second commitment periods to fulfill these pledges. This means that with current surplus rules in place, the majority of the emission reductions below BAU by 2020 are likely to come from the developing world.

The problem of surplus units has been identified as a challenge to the environmental integrity of the Kyoto Protocol and discussed within UNFCCC negotiations for a number of years without resolution. With the first Kyoto commitment period (CP1) drawing to a close, there was an expectation at the Durban climate talks a year ago that a decision would be reached in Doha.

There is a lack of clarity on many fronts:

- who will participate in the second commitment period (CP2) of the Kyoto Protocol;
- what will happen to the surplus of countries that do not participate; and
- how Kyoto units will interact with evolving rules under the Convention.

This makes it a challenge to ensure the environmental integrity of the system and to avoid the creation of new loopholes.

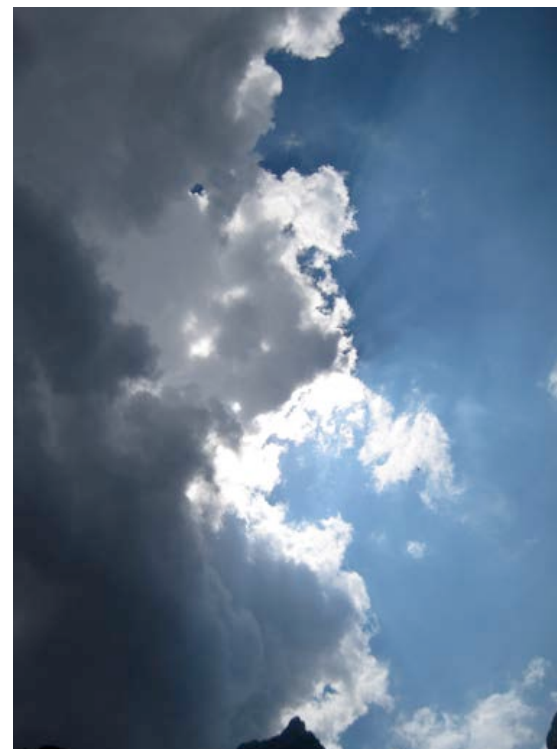
Our analysis finds that the arguments made in support of the full carry-over of CP1 surplus and for 2020 pledges that are well above current emissions are not based on realistic assumptions.

Ukraine, for example, would require an annual average GDP growth of 11.7% between 2010 and 2020 to require all CP1 surplus domestically for its own compliance purposes. Under current pledges and rules, the oversupply of CP2 units undermines the carbon price and weakens the motivation to generate revenue from surplus sales.

If adopted in Doha, current proposals can address much of the surplus problem, although a number of issues still require clarification. Our analysis shows that removing 'hot air' from the system and restricting carried over units to domestic use can have similar, if not larger effects than purely eliminating carry-over of CP1 surplus. Rules on CP2 'hot air' in combination with domestic use could reduce the time span until countries with a CP2 target to deliver real reductions below BAU levels to 2020.

Changes to the eligibility rules could undermine efforts to address surplus. The most crucial question in this context is to determine who is allowed to trade Kyoto units, both within the Kyoto architecture and under the Convention.

Unless it is clear who can use which types of units - Kyoto or others - for compliance, the environmental effects of surplus rules are difficult to determine. If not addressed, full and unlimited fungibility and eligibility of units within the KP and within the Convention will create new loopholes that will potentially reduce the overall level of real emission reductions of Annex I countries as a group.



1 Introduction

Various analyses have demonstrated that currently pledged emission reduction targets for 2020 submitted by both developed and developing countries under the UNFCCC are not sufficient to achieve the 'common goal' of holding temperature increase below 2°C relative to pre-industrial levels (Rogelj et al. 2010; UNEP 2010; UNEP 2011; UNEP 2012).

Making matters worse, there is the legacy of a surplus of emissions allowances from the first commitment period (CP1) of the Kyoto Protocol.

Countries with surplus allowances (called assigned amount units - AAUs) may use them in two ways: a) Sell the allowances within the same commitment period (CP) to countries with a deficit (countries whose domestic emissions will exceed their total allowance); or b) Bank units for use during the next CP ((UNFCCC 1998), Article 3, para 13). Banked units are carried over to the next CP and used for compliance then, or sold to other countries.

The problem of surplus has been identified as a challenge to the environmental integrity of the Kyoto Protocol and discussed from this perspective within UNFCCC negotiations for a number of years without resolution. With the first Kyoto commitment period (CP1) drawing to a close, there was an expectation at the Durban climate talks a year ago that a decision would be reached in Doha¹.

Article 3.1 of the Convention states that developed country Parties should take the lead in combating climate change. This principle provided the cornerstone for agreement on the Kyoto Protocol. While it has become clear that all countries need to act - and act fast - if the common temperature limitation goal is to be achieved, existing surplus rules, if maintained, will fundamentally undermine the leadership of Annex I countries reflected in their current targets.

While previous analyses (Höhne et al., 2012; UNEP, 2011) have noted the surplus problem, we argue that the political and practical effects of this

substantial surplus, and the possible solutions to this problem, have not been adequately communicated. The literature has focused mostly on the impact of surplus at a point in time - 2020 - rather than on the overall aggregate effect of surplus over time.

The UNEP Bridging the Gap report (2011), for example, notes that the annual supply of surplus emissions of 2.9 GtCO₂e by 2020 represents a substantial share of the global gap. However, this 2.9 GtCO₂ figure has not yet been placed in the context of its effect on the level of ambition of Annex I countries' pledged emission reductions relative to business-as-usual (BAU) emissions.

In addition, most analyses, like the ones assessed by the UNEP Gap Report, focus on global emissions. Studies that aggregate emission reductions from global pledges, without distinguishing between developed and developing country efforts, imply reductions below BAU levels for all countries. However, only Annex I Kyoto Party targets are currently affected by the existing surplus rules.

It is therefore not necessarily the case that all countries will achieve reductions below BAU levels, given the impact of surplus units in undermining effective Annex I Party emission reductions. With current surplus rules in place, the majority of the emission reductions below BAU by 2020 are likely to come from the developing world. Our analysis therefore concentrates on the impact of surplus on the emission reductions by Annex I countries and in turn on total effective emission reductions.

¹ By decision 1/CMP.7, paragraph 7, the CMP requested that the AWG-KP "assess the implications of the carry-over of assigned amount units to the second commitment period on the scale of emission reductions to be achieved by Parties included in Annex I in aggregate for the second commitment period with a view to completing this work at its seventeenth session" 11/29/2012 4:29:00 PM

This paper provides an assessment of the most recent proposals discussed at the UNFCCC negotiations to address the surplus problem and evaluates the long-term effects of these proposals on the Annex I emissions permitted. We attempt to untangle the complexity of the current situation and provide insights into the building blocks of an environmentally sound solution. We will discuss

several issues and arguments that have aided or blocked progress in resolving the surplus issue, including the trade of surplus and other units within and outside of the Kyoto Protocol Parties, the domestic need for carry-over of surpluses, and the issue of “overachievement” that is considered by some to provide a right to the carry-over and use of surplus allowances in later CPs.

2 Has Durban changed the picture?

The Durban climate summit did not deliver any concrete decisions on the carry-over of surplus AAUs. However, several decisions were taken that influence the context of the discussion substantially.

A new work stream, the Ad Hoc Working Group on the '**Durban Platform for Enhanced Action**', was created to establish a legal agreement covering all Parties, to be implemented from 2020. Until details for this are further defined, no clear accounting system exists under the Convention that is comparable to KP accounting rules. More importantly, as long as no emission budgets for Parties exist under the Convention, the trade and use of units from any new market mechanisms seem meaningless, as it is unclear how they would relate to the achievement of pledges.

The Parties also agreed that there would in fact be a **second commitment period** of the Kyoto Protocol (CP2). Parties were invited to submit information on their Quantified Emission Limitation and Reduction Objectives (QELROs) by 1 May 2012. Both the actual targets and the length of the CP2 (5 or 8 years) remain to be decided by the CMP in December 2012².

Canada, Japan and Russia had already expressed in 2010/11 that they did not intend to participate in CP2, while the US has signed but never ratified the Kyoto Protocol³. Just after Durban, Canada announced a full withdrawal from the Protocol (UNFCCC 2011b).

Australia's QELRO is fresh from the press with the submission from Monday this week. New Zealand announced on 9 November that it would not provide a QELRO⁴.

Otherwise it is clear by now who will participate in the CP2 and proposed targets are sufficiently transparent for most Parties, as summarized in Table 1. New Zealand and the Ukraine did provide submissions to the UNFCCC, but these submissions did not specify a QELRO; the Ukraine restated that its participation in CP2 is subject to the condition that there are no amendments to paragraph 13 of Article 3 of the Kyoto Protocol, i.e. no changes to surplus carry-over rules⁵.

Durban has added more questions and resolved few - the surplus situation is more complex than ever

Table 1 QELRO submissions for the CP2 of the Kyoto Protocol

Country	Proposed QELRO	Pledge under the Convention	Base year
Australia	99.5	-5% / -15% / -25%	1990 (2000 for Convention pledge)
Belarus	92	-5% to -10%	1990
Croatia	80	-20% / -30%	1990
EU27	80	-20% / -30%	Kyoto base years
Iceland	80	-15% / -30%	1990
Kazakhstan	90	-15%	1990
Liechtenstein	84 / 78	-20% / -30%	1990
Monaco	78	30%	1990
New Zealand	No QELRO provided	-10% to -20%	1990
Norway	81-84	-30% / -40%	1990
Switzerland	84.2 / 77.7	-20% / -30%	1990
Ukraine	No QELRO provided	-20%	1990

Source: UNFCCC⁵

² FCCC/KP/CMP/2011/10/Add.1: paragraphs 1 and 5

³ FCCC/KP/CMP/2011/10/Add.1: Notes to Annex I

⁴ <http://beehive.govt.nz>

⁵ All submissions related to QELROs can be found here: http://unfccc.int/kyoto_protocol/items/4752.php

Overall these developments have left a complex picture with more questions open in relation to the treatment of AAU surplus than before. Additional to the question of how ambitious the targets are, the question of who participates in trading in CP2 has become a determining factor of the analysis. Based on the available information we establish the country groups as shown in Table 2 for further analysis.

Countries in group 4 do not participate in the Kyoto Protocol with a commitment and are not eligible for the trade or use of Kyoto mechanisms. However, due to the lack of clarity regarding many aspects of the regulations and due to the political importance of the Annex I group as a whole we include this group in our analysis and show results for a scenario in which these countries were to participate in trade.

Table 2 Overview of country groups for CP2¹

Group 1 QELRO CP1+CP2	Group 2 CP1 QELRO + CP2 unclear	Group 3 CP1 QELRO but not CP2	Group 4 No QELRO in CP1 + CP2
Australia	Ukraine	Japan	Canada ³
Belarus ²		New Zealand	USA ⁴
Croatia		Russia	
EU27			
Iceland			
Kazakhstan			
Liechtenstein			
Monaco			
Norway			
Switzerland			

¹ Annex I countries, excluding Turkey

² The QELRO for CP1 for Belarus was adopted by the Parties but never received a sufficient number of ratifications to enter into force. Belarus's submission on its CP2 QELRO nevertheless provides a QELRO starting in 2008. It is unclear how this will be addressed in Doha. For the sake of this illustrative exercise we assume the same QELRO also applies to CP1

³ Although Canada had a QELRO in CP1, in December 2011 Canada gave notice of intention to withdraw from the Kyoto Protocol, which will take effect in December 2012. This enables Canada to avoid a compliance assessment for its CP1 QELRO

⁴ The United States has not ratified the Kyoto Protocol and is not a Party to the Kyoto Protocol

3 Interaction with other units in the UNFCCC system

According to the current rules, surplus AAUs are not the only tradable emission units that can be carried over to subsequent CPs. Adding to the problem are surplus Certified Emission Reductions (CERs) – generated from the Clean Development Mechanism⁶ projects that have taken place in developing countries and Emission Reduction Units (ERUs) – generated by Joint Implementation⁷ projects between developed country partners.

Each Party is permitted to carry over 2.5% of its CP1 assigned amount in CERs and another 2.5% in ERUs, as agreed under the Marrakesh Accords⁸.

Removal units (RMUs) generated from activities that absorb carbon dioxide in the land use, land-use change and forestry (LULUCF)⁹ sector, such as reforestation, may only be used in the commitment period in which they were created and any surplus may not be carried over.

The total quantitative impact of the carry-over of different units under this rule set is difficult to assess, since trading is still active and will continue until the end of the CP1 and through the subsequent 'true-up period' (until 2014). In addition, because all of these units can be used for compliance under the Kyoto Protocol, countries may choose to retire RMUs, CERs and ERUs before retiring AAUs, to avoid exceeding carry-over limits that apply to certain categories of units. They may also trade these units between registries to avoid exceeding carry-over limits.

Making this assessment more complex, in the CP2, certain Annex I Kyoto Parties will not have quantified CP2 commitments. If CP1 eligibility rules are maintained, these Parties will be ineligible to carry units over and/or ineligible to trade any carried over units. Some of these non-CP2 Kyoto Parties nevertheless are openly seeking to maintain access to their surplus units in CP2, and wish to retain the eligibility to trade this surplus to other Parties.

Potential new units coming from the new mechanism defined under the Convention add to the complexity. The EU has proposed an amendment to Article 3, paragraph 12 of the Kyoto Protocol that would allow an Annex B Party to use units from a market-based mechanism under the Convention to meet commitments under the Kyoto Protocol¹⁰. This proposed amendment is still being debated, but raises further questions regarding eligibility¹¹ and fungibility¹².

This lack of clarity on the eligibility of countries to trade in CP2 leaves us with a complex situation, as illustrated in Figure 1. The schematic overview presents a 'worst case' scenario, where potentially all countries are eligible to use all kinds of units and different types of units are fully fungible.

Although clear rules on eligibility exist under the Kyoto Protocol, some Parties are strongly advocating full surplus carry-over even though they do not have a QELRO for CP2 and thus would under current rules not be eligible to trade. Other Parties without a QELRO for CP2 have expressed their intention to use, for example, CERs. While it is not clear how this would work technically and legally, the discussion points to the fact that the relationship between the Kyoto Protocol and the Convention is not as clear as required.

Resolving eligibility to mechanisms and surplus use is paramount for the environmental outcome of pledges

⁶ <http://cdm.unfccc.int/>

⁷ <http://ji.unfccc.int>

⁸ FCCC/KP/CMP/2005/8/Add.2 13/CMP.1 and "ANNEX - Modalities for the accounting of assigned amounts under Article 7, paragraph 4, of the Kyoto Protocol".

⁹ http://unfccc.int/methods_and_science/lulucf

¹⁰ UNFCCC Proposal by the Chair to facilitate negotiations FCCC/KP/AWG/2012/CRP.1 9 October 2012, Annex 3 section H. Article 3, paragraphs 12 bis and ter

¹¹ Eligibility: the validity to participate in certain activities, in this case the trading of units.

¹² Fungibility: exchangeability of different types of units.

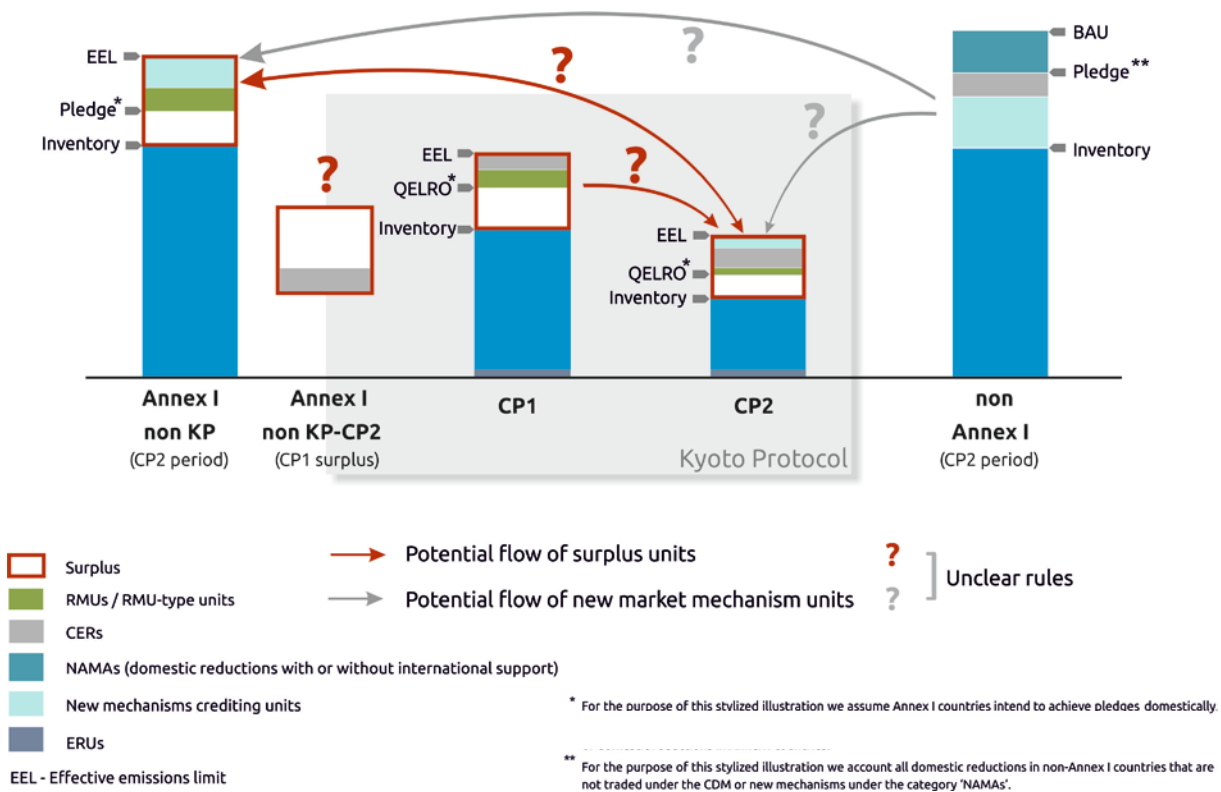


Figure 1 Schematic overview of potential emission units' interaction in CP2

We recognize the shortfalls of this illustration and the many questions it poses. However, it clearly illustrates the complexity of the situation. Proposals to better manage surplus units under discussion at the moment only address some elements linked to the flow of surplus (red question marks). Resolving the different question marks in this picture is

paramount to enable an environmentally sound system. For the remainder of this paper we will, however, concentrate on issues directly related to the Kyoto Protocol to allow a more focused analysis, although we also include Annex I Parties that do not have a Kyoto target.

4 Review of proposals under discussion

The original Kyoto banking rules allow the full carry-over of surplus AAUs to the next CP. There has been a continuous evolution of proposals over the last years to amend the Protocol and ensure the environmental integrity of the system. The Parties most active in proposing ways to move this discussion forward have been AOSIS, the African Group and Brazil (UNFCCC 2012a; UNFCCC 2012b; UNFCCC 2012c; UNFCCC 2012d). Some NGOs have suggested that Parties simply retire all surplus AAUs (Climate Strategies 2010; WWF International 2010). Table 3 provides an overview of the main elements that are addressed in these proposals.¹³

Restricting impact of CP1 surplus: The main objective of most proposals is to limit the amount of surplus units that can be used for compliance in CP2. Different approaches have been proposed to achieve this, either by directly limiting or preventing full carry-over, or by allowing full carry-over but establishing restrictions on the quantity of units allowed for use toward compliance in CP2 or restricting CP2 use to domestic use of carried over units (not permitting onward trade of surplus units to other Parties). This choice has political and technical implications.

Full carry-over, with a subsequent limit on the volume that may be used toward compliance, or with a limitation on domestic use, may provide a greater sense of security for countries that are worried about achieving their CP2 commitments. However, allowing full carry-over with a domestic use restriction may allow for more opportunities to evade restrictions on use if this restriction is not well enforced (see discussion on eligibility below).

Some proposals have included CERs and ERUs within carry-over or use restrictions, to strengthen the existing carry-over limit (cap) on these units of 2.5% of a country's initial CP1 assigned amount, or to address concerns around the fungibility of these units with surplus AAUs. While the number of ERUs in the system is small, up to 2.3 GtCO₂e worth of CERs are expected to be issued within CP1 alone (Den Elzen et al. 2012).

Table 3 Elements addressed in proposals affecting total impact

Restricting impact of CP1 surplus
<i>Cap on carry-over to the next CP</i>
<i>Limitation on use of carried over units (domestic and traded)</i>
<i>Restrictions on use of carried over CERs and/or ERUs</i>
Preventing creation of 'hot air' in CP2
Restricting trade of carried over surplus
Fungibility of 'banked' AAUs and 'new' AAUs
Retiring unused carried over AAUs at the end of the next CP

Preventing the creation of new 'hot air': Some proposals address new surplus from the CP2. One method proposed is to re-calculate the assigned amount of a Party if historical emissions before the start of CP2 are already below the pledged target. This rules-based approach would in fact set a maximum assigned amount for a Party for CP2 at the established level of historical emissions. While there are differences in the historical basis proposed for this calculation, all use historical emissions that are already published either as a single-year reference or using a multi-year average.

¹³ Additionally some proposals also address elements that have limited effect on emissions or where this effect is impossible to determine at this point in time: the possibility of a change of QELROs during a CP to be able to adjust to intermediate increases of ambition; a share of surplus AAUs being transferred to the Adaptation Fund to assist the most vulnerable countries. These elements are not further discussed in this paper.

Restricting trade: Proposals have been put forward that limit the use of surplus units partly or fully to domestic compliance. Earlier versions also included options to allow a limited trade of units, but required proceeds to be invested in domestic mitigation projects (so-called 'Green Investment Schemes'). Such limitations could indeed have significant impacts on the overall level of emissions. Sale by countries of carried over surplus units to other Parties would be eliminated or restricted, thus limiting the options for compliance for countries with no surplus of their own.

If restrictions on trade are not combined with additional restrictions on carry-over, or use of surplus, the effectiveness of this rule could be undermined by the trade of surplus within the true-up period of CP1 or selling 'regular' AAUs and using surplus units for compliance.

Fungibility of units: Most new proposals envisage a specific allocation space for surplus units, the 'Previous Period Surplus Reserve' (PPSR). This indicates that they see a qualitative difference between 'banked' AAUs and 'new' AAUs from the CP2. Only one of the proposals, however, makes clear stipulations that these units are not fungible. Under full fungibility, regulations on the limited use or trade of 'banked' units could be undermined by the possibility of exchanging units.

Retiring unused surplus: Individual countries may have remaining surplus at the end of CP2. If carried forward this could increase the time span until de facto reductions below BAU levels need to start. If surplus units from CP1 are interchangeable with AAUs from CP2 and if banking of CP2 surplus is allowed, this could create a situation where the 'old' surplus AAUs would be used and 'new' surplus would be generated and banked for future use.

Table 4 highlights issues that may affect the impact of surplus.

Eligibility of Parties: It is currently not clear how surplus units from countries that were part of CP1 but are not part of CP2 will be treated. A lack of clarity exists about the relationship between 'old' surplus from CP1 and 'new' surplus from CP2.

Treatment of the EU: The EU has opted to apply Article 4 of the Kyoto Protocol to fulfill its commitments under the Protocol jointly. For most of the elements proposed to address surplus the effect depends on whether each country within this group is treated individually according to the

Table 4 Elements that may affect total impact of surplus

Eligibility of Parties without a QELRO in CP2
Treatment of 'Article 4' countries, i.e. the EU (as a bubble or individually)
Changes to the Commitment Period Reserve rules

burden sharing agreement under the Kyoto Protocol, which is as yet undefined, or whether the EU is treated as a group. (Den Elzen et al. 2012) for example calculate a difference in impact between the two options of 3% of 1990 level emissions for the low ambition case and 5% of 1990 level emissions for the high ambition case under full trade restrictions.

Commitment Period Reserve: Another element not usually included in the surplus discussion is the Commitment Period Reserve (CPR). Parties are required to hold in their registries at any time a minimum of 90% of their initial assigned amount calculated pursuant to Article 3, paragraphs 7 and 8 of the Kyoto Protocol, or 100% of five times their most recently reviewed inventory – whichever is lowest¹⁴.

Rules on the CPR have a large influence on the ability of countries to trade and exchange units. Thus a relaxation of the CPR rules, for example through a reduction of the required CPR level, could worsen the impact of surplus or undermine potential restrictions on the use of individual types of units. Currently, some Parties seek to reduce the level of the CPR and a decision on this will be made in Doha.

¹⁴ Decision 11/CMP.1, Annex, paragraphs 6-7. Each Party identifies which approach will apply to it, based on this formula, at the outset of the CP. The calculation based on the latest inventory reflects the CP length and would need to be changed to eight times the inventory in case of an 8-year CP2.

5 Long-term effects of surplus carry-over on Annex I countries

Aggregate targets set by Kyoto aimed to reduce aggregate emissions for Annex B Parties over the CP1 by 5% compared to 1990 emission levels.

For some countries, mainly economies in transition, emission levels allowed for CP1 in Annex B were set far above observed historical emission levels. We estimate this surplus from AAUs to be a total 11.4 GtCO₂e¹⁵ (Chen et al. n.d.), which mainly comes from Russia, Europe and Ukraine, but with smaller contributions also from Australia and Belarus. Including estimates for CERs and ERUs (Den Elzen et al. 2012) and RMUs (Climate Action Tracker 2012) increases the total surplus to 14.5 GtCO₂e.

We estimate the total 'deficit' of AAUs over the CP1 to be only 0.4 GtCO₂e, but once the impact of CERs and ERUs is considered, and estimated RMUs already generated by countries are added, this CP1 AAU deficit disappears.

Current minimum ambition pledges of countries that participated in CP1 could add another 8.4 GtCO₂e of 'new' net surplus between 2013 and 2020 (Chen et al. n.d.). Gross surplus, i.e. surplus before trade, could be as high as 10.7 GtCO₂e for CP2. In CP1 there is no difference between gross and net values. The gross value is relevant for some of the options in our calculation, where 'hot air' is removed at the beginning of CP2.

Current rules deliver no reductions below BAU levels for years to come

We have previously highlighted the fundamental political importance of Annex I countries taking a leadership role in reducing emissions. We consider whether Annex I Parties will actually reduce their emissions in CP2 and beyond by calculating the timeframe it may take for the full volume of this surplus to be absorbed, based on existing pledged reductions.

We look at the time horizon and ask: in which year do countries finally start to reduce emissions below BAU levels, while still technically meeting their pledged emission targets? Figure 2 illustrates the problem described.

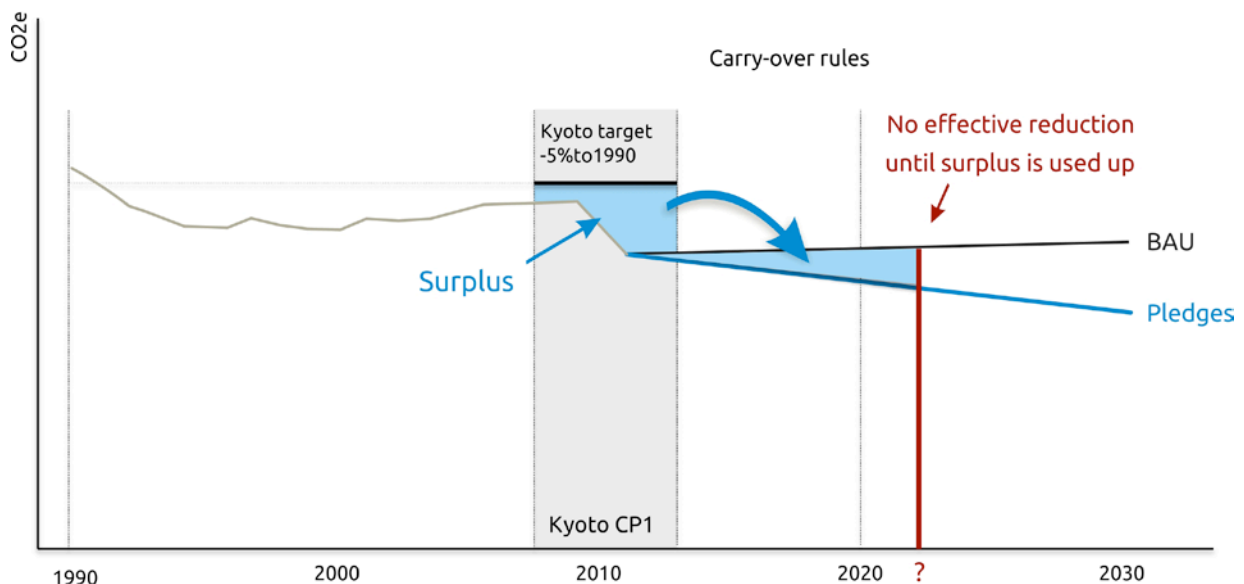


Figure 2 Schematic illustration of surplus carry-over for Annex I countries

¹⁵ All numbers in this chapter from Chen et al. (forthcoming)

We calculated by when different country groupings would need to start deviating from BAU levels while still complying with their pledges under different surplus proposals. This analysis does not make any assumptions about what would happen to emissions for countries outside the group.

To illustrate the effects, we use a number of options that contain one or more of the elements discussed above and compare these to the current rules with full carry-over:

No carry-over - Complete removal of CP1 and CP2 surplus from the system; no further rules;

Carry-over restricted - Cap of 1% of CP1 AAUs on carry-over; no further rules;

Removal of 'hot air' - Reduction of carry-over based on the real reported emissions of the last year

before a CP for CP1 and CP2. Here we evaluate two variants based on the timing of the reduction of carry-over: either at the beginning or the end of the CP; both variants remove 'hot air' for CP1 at the end of the CP1 and for CP2 according to the variant;

Combined - Full carry-over of CP1 surplus AAUs and full carry-over of ERUs up to the 2.5% limit with these units available for domestic use only; carry-over of CERs up to the 2.5% limit with no trade restrictions; removal of CP2 'hot air' at the beginning of the CP; no removal of CP1 'hot air'.

Results are summarized in Table 5

Table 5 Timeframe for start of 'real' reductions below BAU levels under different options for minimum ambition targets (incl. CERs, ERUs, RMUs)

	Full carry-over	No carry-over	Carry-over restricted <i>1% of CP1 AAUs</i>	Removal of 'hot air' ⁵ <i>Beginning of CP2</i> <i>End of CP2</i>		Combined <i>AAUs and ERUs domestic use, CERs traded, no CP2 'hot air'</i>
Group 1 ¹	2026	2019	2020	2025	2025	2020
Group 1+2 ²	2031	2021	2021	2024	2026	2019
Group 1+2+3 ³	2034	2021	2022	2023	2024	2017
Group 1+2+3+4 ⁴	2028	2021	2021	2020	2021	2016

Note: Calculations are based on QELRO submissions up to 28 November 2012

¹ Australia, Belarus, Croatia, EU27, Iceland, Kazakhstan Liechtenstein, Monaco, Norway, Switzerland

² Countries as in Group 1 plus Ukraine

³ Countries as in Group 2 plus Japan, New Zealand, Russia

⁴ Countries as in Group 3 plus Canada, USA

⁵ Hot air is removed if the initial assigned amount for a CP is higher than the emissions in the last year before the beginning of the CP. In this case AAUs equivalent to the difference between those two quantities are transferred to the cancellation account of the Party at the beginning of the CP (for CP1 this calculation must necessarily be made at the end of the CP). The cancellation account is subtracted from the surplus. The difference between the two variants is the timing of this subtraction, which is either at the beginning or the end of a CP. This difference influences the trade volumes within the CP.

With the current rules regarding carry-over in place, i.e. with no restrictions, and the given minimum level of ambition of targets¹⁶ for the next CP, the surplus from CP1 and CP2¹⁷ would allow the group of countries that participated in the CP1 to continue BAU development until 2034, while still technically complying with their targets. The same rules would allow countries with a CP2 QELRO continue BAU until 2026 and Annex I countries as a whole until 2028.

Even with no carry-over from CP1, the surplus generated in CP2 would allow countries in most groups to continue BAU emissions until the end of CP2. Only the group with a CP2 QELRO would start reducing below BAU from 2019. This highlights the importance of preventing new 'hot air' entering the system in CP2, either within the Kyoto CP2 group, or from outside, for example if trading is allowed of units from within the KP with units potentially created under the Convention.

According to our calculations, the option delivering the earliest deviation from BAU by 2017 is the combined option for Annex I countries as a group. This option allows only domestic CP1 surplus use and removes CP2 'hot air' at the beginning of CP2. If we only assess the group of countries with a CP2 QELRO, both a cap of 1% on carry over and the combined option would deliver first reductions below BAU in the last year of CP2.

Removing 'hot air' at the end of CP2 delivers later real reductions below BAU compared to the option removing it at the beginning of the CP due to the ability to trade within the CP.

The country composition of the group eligible for use of surplus units has a large impact on the results.

We can see that the country group that excludes the US and Canada from the analysis (Group 3) could continue BAU emissions the longest under most options.

Assuming the US and Canada are excluded from the analysis, and all other KP Parties are permitted full access to banked AAUs, KP Parties as a group could delay reductions below BAU, in reliance on this surplus, until 2034. This is due to the high level of initial emissions of the US and Canada and therefore large size of potential surplus demand even at modest reduction percentages.

¹⁶ For the period after 2020 we use targets for 2050 for all countries except Belarus

¹⁷ For the sake of this illustrative exercise we assume an 8-year CP as pledges and QELROs are provided for 2020 only

6 Effects of different supply and demand scenarios

To evaluate the impacts of alternative options for addressing surplus, we need to look at the underlying motivation of Parties in light of observed historical and expected future emission

development. Based on current pledges there are three main cases depending on how a country's pledge for the two CPs relates to past and projected emissions.

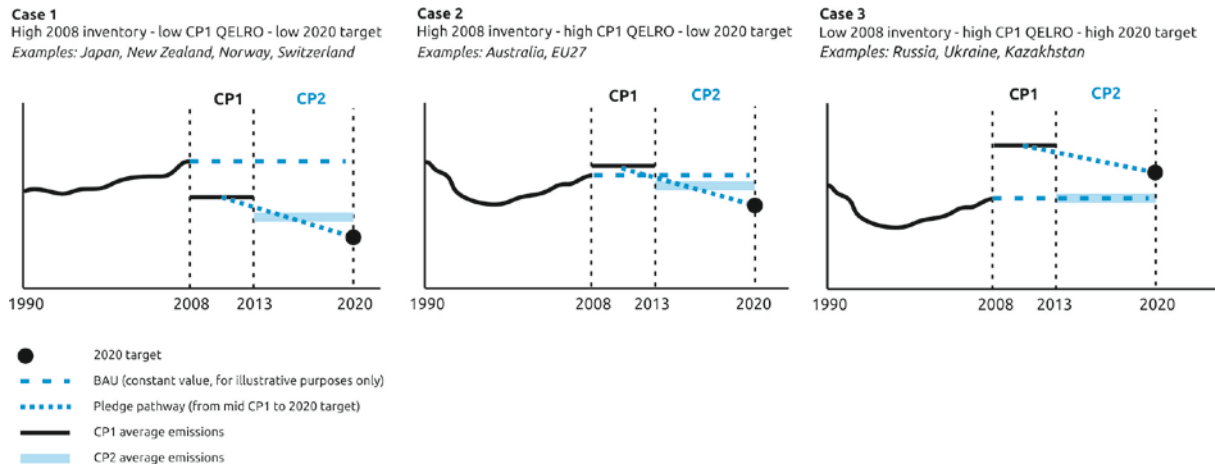


Figure 3 Stylized demand and supply cases

A country's motivation for resisting strong restrictions on carry-over or use of surplus is likely to depend on which case best describes that country's situation, of the three cases illustrated in Figure 3.

Case 1 - *High 2008 inventory, low CP1 QELRO level, low 2020 target level:* Countries in this category could have an interest in buying cheap compliance units.

Case 2 - *High 2008 inventory, high CP1 QELRO level, low 2020 target level:* Motivation for countries in this category is the expected need for surplus units for domestic use for CP2.

Case 3 - *Low 2008 inventory, high CP1 QELRO level, high 2020 target level:* The motivation expressed by countries in this category is the uncertainty about future economic development, i.e. the fear that case 2 may turn out to describe their situation, if BAU emissions actually surpass the target. An additional motivation may be the expected revenue from sales of units.

While cases 1 and 2 are relatively straight forward, the first motivation mentioned under case 3 warrants some further analysis. Assessing the motives in more detail we take a closer look at Russia and Ukraine.

To do this we use a simplified methodology based on the Kaya identity (Kaya 1990):

Russia's 2020 pledged emission limitation level (minimum level of ambition) of about 2,200 MtCO₂ (Climate Action Tracker 2012)¹⁸.

The IEA projections are based on an assumed annual GDP growth rate of 3.6%. Projections from other sources range from 3.6% (International Energy Agency 2011) and 3.8% (U.S. Department of Agriculture 2012) to national estimates of 5% (Institute of Energy Strategy 2010).

IEA projects annual growth in primary energy demand of 1%, representing a 2.5% annual reduction in energy intensity, and a small trend towards somewhat lower carbon intensity of the energy supply in line with the trend observed in the past 20 years.

New CP2 surplus is only avoided if Russia's GDP grows by more than 5.7% per year between 2008 and 2020.

Expected future growth is unlikely to warrant retention of full surplus or the high level of 2020 pledges

Only an annual GDP growth of 7.8% on average over the 2008-2020 period would require full domestic use of Russia's CP1 surplus.

Even higher growth rates are required if we assume that Russia meets its energy efficiency goal of a minimum of 40% reduction in the energy intensity of the Russian economy by 2020 compared to 2007¹⁹. This is more ambitious than the IEA assumption of roughly a 30% reduction, which we used for our calculation.

If we assume the 40% efficiency goal is achieved, new surplus would be generated with average annual GDP growth of up to 7% and full domestic use of CP1 surplus AAUs would only occur for annual GDP growth as high as 9.3%.

The GDP growth of Russia has been below 5% per year when averaged over the past 10 years, including the recession (USDA 2012). The argument that CP1 surplus and a high pledge level for 2020 for domestic growth is required seems only justified assuming much higher GDP growth between 2011 and 2020 than historically recorded and independently projected.

Ukraine. Ukraine has similarly shown average annual GDP growth of 4.3% over the past 10 years, including the recession. Projections for 2011-2020 are at comparable levels. According to our calculations the country could meet its pledge even at average annual GDP growth of 8.7% between 2008-2020 and still not need to use CP1 surplus. Only with a growth of 11.7% annually would the country make full domestic use of the CP1 surplus AAUs.

Hence the Ukraine's historical and projected GDP growth likewise indicates that the arguments used in the surplus discussion do not stack up. Current rules and the current pledge will likely create new hot air and no domestic need for CP1 surpluses.

¹⁸ Note that pledge pathways are calculated including all Kyoto greenhouse gases. To estimate a pledge pathway of CO₂ emissions only, we applied the share of CO₂ in total CO₂e emissions that is typical from the historical record.

¹⁹ Presidential Decree N. 889 titled "Concerning some measures for improving the energy and ecological efficiency of the Russian economy"

Table 6 GDP growth rates under different scenarios for Russia and Ukraine

	Historical¹	Independent projections²	Required growth to fully eliminate CP2 surplus	Required growth to also eliminate CP1 surplus
	<i>Average annual GDP growth 2000-2010</i>	<i>Average annual GDP growth 2011-2020</i>	<i>Average annual GDP growth 2008-2020³</i>	
Russia	4.8%	3.6-5%	5.7%	7.8%
Ukraine	4.3%	3.6-4.7%	8.7%	11.7%

¹ Sources: (U.S. Department of Agriculture 2012)

² Sources: (International Energy Agency 2011; U.S. Department of Agriculture 2012; Institute of Energy Strategy 2010)

³ IEA 2011 only covers the period up to 2008 for the countries in question, so that we opted to estimate average annual GDP growth between 2008 and 2020. Including the economic crisis of 2009/2010 would imply that the average annual GDP growth would need to be even higher over the next 8 years than the numbers provided here.

The two examples include the countries with the largest expected CP1 and CP2 surplus that have also been most vocal in advocating their need for access to surplus for the future development of their economies as described for case 3. Our analysis indicates that expected future growth is unlikely to warrant either retention of full surplus or the high level of the 2020 pledges.

The other potential motivation expressed by countries wishing to retain surplus is the expected revenue from sales of units. Den Elzen et al. (2009) show that the revenue for Russia, Ukraine and Belarus peaks at around 4 GtCO₂e of total CP1 and CP2 surplus and then deteriorates due to falling carbon prices (Den Elzen et al. 2009). With the total

expected surplus of 14.5 GtCO₂e, revenue could even fall below expected revenue with no carry-over. While this analysis would need to be updated based on more recent estimates, the fundamental economics of the situation has not changed.

The large amount of surplus in the system will likely lower emission price levels even more, as can currently be seen in the EU-ETS where prices only stabilized after the EU Commission announced steps to prevent the issuance of large amounts of allowances exceeding the demand of the market.

Therefore, we do not find convincing evidence to support the two possible arguments for case 3 to justify surplus carry-over and high 2020 pledge levels,.

7 Differentiating 'hot air' and 'overachievement'

Some surplus may be generated by successful domestic climate policy; some surplus will be the result of initial pledges having been set above emission levels consistent with a realistic evaluation of the future development of a Party's economy ("hot air"). This distinction has potentially significant political and economic implications for attempts to lower emissions and is therefore crucial to recognize.

Many economies in transition suffered a severe economic downturn after the collapse of the Soviet Union. In many cases it thus remains unclear to what extent low present-day emission levels are related to climate policy. One example is the improved energy intensity (units of energy per unit of GDP) in Russia over the past 10 years. This improvement coincides with increased oil and gas prices in the years leading up to the global recession, which resulted in a rapid growth in GDP mainly from gas sales in the country. This GDP growth reduced energy intensity, without necessarily requiring increased efficiency in energy production and use.

For projections through 2020 the differentiation between 'hot air' and 'overachievement' is

somewhat easier and the discussion in the previous sections can help in this regard. We have shown that extremely and implausibly high average annual GDP growth rates are required to justify the currently proposed 2020 pledges and any new surpluses created in coming years will be the result of newly created hot air, rather than overachievement.

The IPCC AR4 established that global emissions need to peak before 2020 (Fisher et al 2007), thus true 'overachievement' can be defined most leniently as real emissions in the coming years that are lower than pledges that do not exceed current emission levels. In other words, pledges for 2020 need to be at or below current emission levels and overachievement requires real emissions below such pledges. This would be in line with the proposal evaluated in section 4 that removes CP2 hot air (footnote 4 of Table 4).

8 Conclusions

Countries that have put forward a target for the second commitment period (CP2) may be under no pressure to deviate from business-as-usual (BAU) emissions until 2026. As a group, they could comply with their emission reduction pledges simply by relying on a build-up of surplus units from the first and second commitment periods to fulfill these pledges.

With the current rules for the carry-over of the surplus from CP1 and with no rules in place to prevent the generation of new surplus in CP2, the countries included in Annex B with a CP1 target could continue BAU development until 2034. Annex I countries as a whole could continue BAU development until 2028. This is due to the high level of initial emissions of the US and Canada and therefore large size of potential surplus demand even at modest reduction percentages. This illustrates the importance of limitations on the carry-over and use of surplus, to ensure that Annex I countries live up to their leadership role and in fact take action to reduce emissions.

Removal of 'hot air' and trade rules can deliver important solutions. Our analysis shows that removing 'hot air' from the system and restricting carried over units to domestic use can have similar, if not larger effects than purely eliminating carry-over of CP1 surplus. Rules on CP2 'hot air' in combination with domestic use could reduce the time span until Annex I countries deliver real reductions below BAU levels to 2016.

Clarity on eligibility is needed. Efforts to improve the environmental integrity of Annex B targets by resolving the surplus issue can be undermined if changes are made to the eligibility rules. The

complex situation requires a wide range of issues beyond Article 3, paragraph 13 to be resolved to ensure there is a real environmental benefit from the pledges made.

The most crucial question is to determine who is allowed to trade Kyoto units, both within the Kyoto architecture and under the Convention. Unless it is clear who can use which types of units - Kyoto or others - for compliance, the environmental effects of surplus rules are difficult to determine.

Fungibility of units could undermine rules. Options to limit the use of surplus units could be undermined if units are fully fungible. If not addressed, the fungibility and eligibility of units within the KP and with the Convention will create new loopholes that potentially reduce the overall level of real ambition of Annex I countries as a group.

Arguments for surplus carry-over and new 'hot air' are weak. Our analysis finds that the arguments made in support of the full carry-over of CP1 surplus and for 2020 pledges that are well above current emissions are not based on realistic assumptions. Ukraine, for example, would require an annual average GDP growth of 11.7% between 2010 and 2020 to require all CP1 surplus domestically for compliance purposes. The potential alternative motivation, to generate revenues from surplus sales, is also misguided considering the oversupply of CP2 based on current pledges and rules, which would undermine the price for such units.

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