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Evaluating the Bush Climate Change Initiative

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Abstract

This report evaluates the Climate Change Initiative as presented by President Bush on February 14, 2002. The President's proposal aims to reduce the greenhouse gas intensity of the US economy by 18 per cent between 2002 and 2012. This policy target can be regarded as being very modest, when compared to historical trends and projected baseline developments. It will not prevent US emissions from rising and in fact, the proposal implies that US greenhouse gas emissions in 2012 will be 32 per cent above the 1990-level. This is far above the original Kyoto target for the US of -7 per cent in 2010, or -3 per cent corrected for sinks. The US effort is also significantly less than the efforts of the EU, Japan and Canada under the Kyoto Protocol. Yet, there are concerns that even the modest US target will not be met in case of economic slowdown and because of its voluntary character and lack of a compliance regime or clear rules for corporate participation.

Furthermore, the Bush Initiative advocates using intensity targets in the international climate change regime for the steps to be taken after Kyoto but overlooks serious problems associated with this approach. The main problem is the inherent uncertainty about the environmental effectiveness. Furthermore, it is very likely to lead to delays in reducing global emissions, making the EU target of stabilising greenhouse gas concentrations below a doubling of pre-industrial levels no longer feasible. It can be concluded that the Bush Initiative offers no credible alternative to the Kyoto Protocol as a basis for establishing an effective and acceptable regime. At the same time, the President's proposal is mainly of political significance as it explicitly accepts the importance of the climate change problem and the long-term objective of the Climate Change Convention. Thereby, the Bush Initiative improves the longer-term prospects for US participation in a global climate change regime.

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Samenvatting

Deze rapportage evalueert het Climate Change Initiatief dat President Bush op 14 februari 2002 heeft gepresenteerd. Dit Bush Initiatief beoogt de broeikasgasintensiteit van de Amerikaanse economie tussen 2002 en 2012 met 18 procent te verminderen. Deze beleidsambitie valt als zeer bescheiden te typeren, zowel in vergelijking met historische trends als met de basisprojecties voor broeikasgasemissies voor de komende 10 jaar. Het zal zeker niet leiden tot een daling van de emissies; integendeel, de broeikasgasemissies voor de VS zullen in 2012 naar verwachting 32 procent boven het niveau van 1990 uitkomen. Dit ligt ver boven het oorspronkelijke Kyoto doel voor de VS van –7 procent in 2010, of –3 procent gecorrigeerd voor sinks. De inspanning van het Bush Initiatief ligt aanzienlijk onder de inspanningen van de EU, Japan en Canada in het kader van het Kyoto Protocol. Tegelijk bestaan er risico's dat zelfs het bescheiden Amerikaanse beleidsdoel niet wordt gehaald, vooral in geval van economische tegenspoed alsmede door het vrijwillige karakter en het ontbreken van een nalevingregime of heldere regels omtrent de deelname van het bedrijfsleven.

Het Bush Initiatief propageert het gebruik van intensiteitsdoelstellingen voor internationaal klimaatbeleid na de eerste Kyoto periode maar hieraan zijn ernstige tekortkomingen verbonden. Het grootste probleem betreft de fundamentele onzekerheid omtrent de milieu-effectiviteit. Bovendien zal deze benadering zeer waarschijnlijk tot een vertraging van de mondiale emissiedaling leiden waardoor het EU doel van stabilisatie van broeikasgasconcentraties onder een verdubbeling van preïndustriële niveaus onhaalbaar zal worden. De conclusie is dat het Bush Initiatief geen geloofwaardig alternatief is voor het Kyoto Protocol als basis voor een effectief en acceptabel klimaatregime ten behoeve van het hoofddoel van de Klimaatconventie. Tegelijkertijd is het Bush Initiatief vooral van politieke betekenis omdat het klimaatprobleem en het lange termijn doel van de Klimaatconventie expliciet wordt onderkend. Daardoor verbetert het lange termijn vooruitzicht voor deelname van de VS aan een mondiaal klimaatregime.

1 Introduction: the Bush Climate Change Initiative

This report analyses the Climate Change Initiative launched by President Bush on February 14, 2002, in Silver Spring (Maryland, US). He also presented his Clear Skies Initiative at this time. The analysis concentrates on the Bush Climate Change Initiative. It does not address the implications of the abatement of other air pollutants in the Clear Skies initiative.¹ The analysis is, as far as possible based on data and projections of official US sources, although it is not possible to exactly reproduce the numbers in the Bush Climate Change Initiative.

The objective of our analysis is to answer the following questions:

- How substantial is the effort of the US? How does the policy target for the greenhouse gas intensity compare to US historical performance and baseline projections (see section 2)?
- What are the expected emissions for 2012 if the policy target is met under different baseline assumptions? How do these compare to 1990 emissions levels (see section 3)?
- How does the Bush Climate Change Initiative compare to efforts under the Kyoto Protocol (see section 4)?
- What are the risks concerning the implementation of the Bush Initiative (see section 5)?
- What are the implications of the Bush Initiative for international climate change policy (see section 6)?

The Bush Climate Change Initiative is based on two important premises.² The first premise is that the Kyoto Protocol approach adopted by the UNFCCC, in which the US would have to reduce (net) greenhouse gas emissions by 7 per cent in 2008-2012 compared to base-year levels, would have serious negative economic consequences for the US. It would result in a GDP loss of \$400 billion and 4.9 million job losses.³ The second premise is that economic growth is needed for, and will enable the development of, new, clean technologies for de-linking economic growth and greenhouse gas emissions in the long term.

The Bush Climate Change Initiative aims first at limiting the growth of greenhouse gases by adopting a target for reducing the greenhouse gas intensity of the US economy (the quantity of greenhouse gases emitted per unit of economic activity expressed in GDP terms). It also enhances the development of technologies that should make greenhouse gas abatement affordable in the future. The plan aims at reducing the greenhouse gas intensity of the US economy from its present 183 tons of emissions per million dollars of GDP in 2002 to 151 tons by 2012.⁴ This implies a reduction of the greenhouse gas

¹ Policies in the Clear Skies Initiative related to the abatement of air pollutants such as SO₂ and NO_x could also affect the emissions of greenhouse gases. This has *not* been included in the analysis.

² This is based on documents made available by the White House, including the Executive Summary and the transcript of the speech of President Bush delivered at NOAA in Silver Spring, 14 February 2002.

³ These estimates are documented in a report compiled by the Economic Committee of the Global Climate Coalition assuming implementation of the US target in the Kyoto Protocol *without* international emissions trading. The same report shows that the use of the Kyoto Mechanisms would substantially cut US costs to between \$120 to \$210 billion while limiting the job losses to 1.1 million.

⁴ The latest US inventory shows an intensity of 188.3 MtC per million US\$2001.

intensity by 18 per cent in a 10-year period and should result in a reduction of greenhouse gas emissions (compared to baseline levels) of 100 Mt, which would be 4.5 per cent below the baseline projection. The cumulative reduction would be more than 500 Mt over the entire decade. This effort is claimed to be comparable to the average effort of countries participating in the Kyoto Protocol. The Bush Initiative indicates the existence of particularly cheap near-term emission reduction options, by promoting fossil fuel energy saving, methane recovery (e.g. from land fills), and carbon sequestration in soils and forests.⁵

The intention is to achieve the US policy objective using a set of policies and measures including:

- The promotion of voluntary emission reduction measures in industry by improving the voluntary emission reduction registration and offering the prospects of using registered credits to comply with future climate policies;
- An increase of federal funding for climate change policies to US\$4.5 billion in 2003, to finance policies like tax incentives for renewable energy (wind, solar, biomass, geothermal), co-generation, new methane land fill programmes and new technologies (US\$555 million);
- Transportation policies supporting the promotion of research and development of fuel-efficient and clean motor vehicle and trucks, including tax credits for the purchase of fuel cell and hybrid vehicles.
- Enhancing carbon sequestration under the Farm Bill.
- Establishing performance agreements and partnerships with trade and industry (business challenges).

In addition, the Bush Climate Change Initiative has announced:

- More funding for fundamental scientific research on climate change, and research on advanced energy and sequestration technologies.
- More funding for international policies complementing domestic policies, including tripling the funding of “debt for nature”-swap programmes to halt deforestation, a more than doubling of the US contribution to the Global Environment Facility, an increase of USAID funds for climate change programmes in developing countries and US support for climate observation systems in developing countries.
- Joint research programmes with Japan, Italy and Central America.

⁵ Note that the policy does not seem to include sinks, see section 2, footnote 6.

2 How to interpret the US effort under the Bush Initiative?

The Bush Climate Change Initiative has formulated a policy target of 18 per cent reduction of the greenhouse gas intensity between 2002 and 2012. This target translates into a reduction of the intensity of 183 ton carbon equivalents (tC-eq) per million US\$2001 in 2002 to 151 tC-eq in 2012. According to the Initiative, this would be 4.5 per cent below the baseline projection. This section evaluates the scale of the US effort by putting the intended reduction in historical perspective and comparing it with reductions in other baselines.⁶

Historical perspective

Figure 1 shows the historical improvement of the greenhouse gas intensity combined with the projection up to 2012 in the Bush Climate Change Initiative (Bush baseline BL) and the policy target. Historically, the index improved by almost 2.2 per cent per year in the last two decades – with some periods showing faster improvement than other periods. The cumulative reduction was 23 per cent in the 1980s and 17 per cent in the 1990s. The decline was particularly rapid in the early 1980s after the second oil crisis (more than 3 per cent) and the second half of the 1990s. The latter was due to warmer than normal winter conditions, increased output from existing nuclear power plants, reduced methane emissions from coal mining and waste and strong economic growth in less energy-intensive sectors (see for example US-EPA, 2002). The intensity reduction was particularly slow during the economic recession of the early 1990s, only 1 per cent a year. Nevertheless, the average improvement rate in the 1990s was still about 1.8 per cent per year.⁷

⁶ In reproducing the intensity figures mentioned in the Bush Initiative, we found that the numbers include energy-related CO₂ emissions and all non-CO₂ greenhouse gases included under the Kyoto Protocol (methane, nitrous oxide, HFCs, PFCs and SF₆), but *not* the industrial CO₂ emissions and the net uptake of CO₂ by means of land use change and forestry. This conclusion is based on an analysis of greenhouse gas emissions and GDP data. The sources used are the Annual Energy Outlook 2002 of the Energy Information Administration of the US Department of Energy (EIA, 2002) for fossil fuel related CO₂ emissions and the US-EPA projections for non-CO₂ emissions (EPA, 2001). Next to sinks, industrial CO₂ emissions seem to have been excluded, but including them will not alter the trends and observations as these emissions are small. We used EIA (2002) for our historical analysis. Historical figures in the National Communication (USA, 2002) and in the EPA inventory report (US-EPA, 2002) are slightly different, but, again, these data do not alter the figures significantly. We used historical GDP data provided by the Bureau of Economic Analysis (US-BEA, 2002).

⁷ This is without corrections for weather conditions. Correcting the trend for relatively warmer summers during the second half of the 1990s would decrease the improvement rate somewhat.

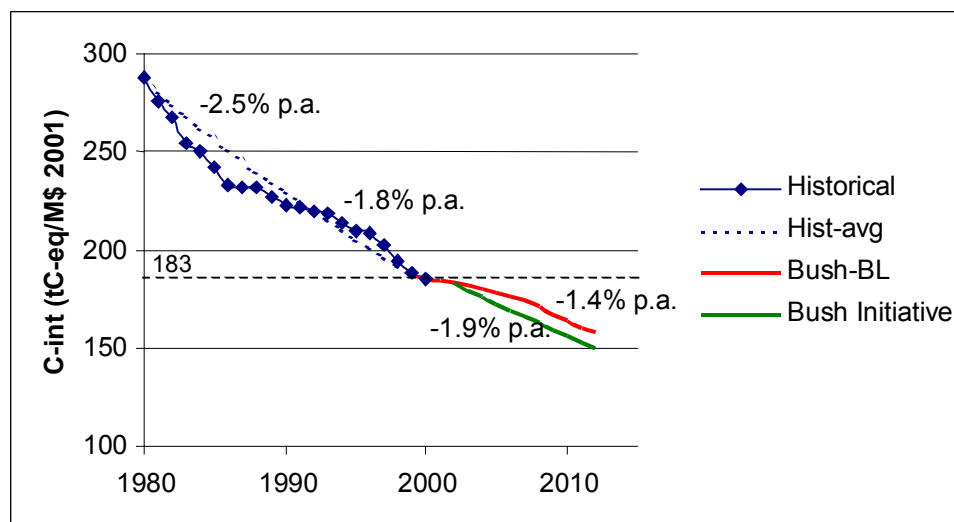


Figure 1: Historical and projected change in carbon equivalent intensity in the US (in tC-eq/Million US\$2001). Bush BL = baseline in the Bush Initiative; Historical avg = trend in 1980-2000 values based on exponential regression.

This means that the targeted 18 per cent reduction over a 10-year period would keep the US greenhouse gas intensity close to its historical record. It should be noted that the current greenhouse gas intensity of the US is relatively high compared to other Annex I countries. Figure 2 shows that the respective greenhouse gas intensities of Western Europe and Japan, for example, is currently about 50 per cent and less than 30 per cent of that of the US (based on 1995 exchange rates). On the other hand, the intensity of Canada is about 30 per cent higher than that of the US.

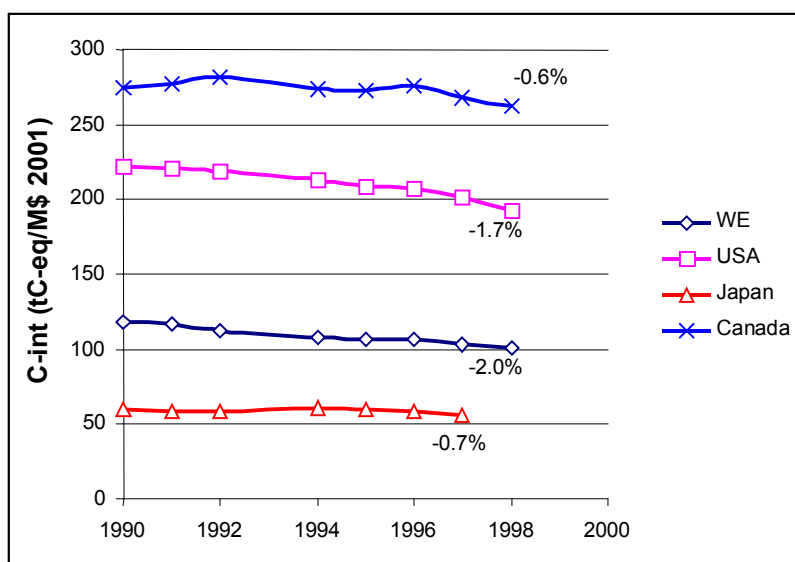


Figure 2: Historical change in carbon equivalent intensity in selected Annex-1 countries (in tC-eq/Million US\$2001). Emission data are taken from the Emission Inventory of UNFCCC (2002), GDP data are based on World Bank (2001).

The differences between the US, Western Europe and Japan can be explained by economic structure, consumption patterns (in general more energy intensive in the US), travelling volume and mode (more travelling kilometres per capita in the US), fuel mix (for example, a higher share nuclear based electricity in Japan and Western Europe versus

a higher share of coal based electricity in the US) and efficiency. Figure 2 also shows that the improvements rates differ between the regions. During the 1990s, improvement rates were highest in Western Europe and the US.

Comparison to other baselines

The Bush Climate Change Initiative claims that the targeted reduction of 18 per cent by 2012 will result in a 4.5 per cent improvement compared to the baseline projection. An important reason is that the intensity improvement rate in the baseline of the Bush Initiative is fairly low, compared to historical trends (less than 1.5 per cent compared to 1.8 per cent see Figure 1). This begs the question of whether the US baseline gives a real indication of the US developments or has been inflated? Without climate policies, is it likely that the US greenhouse gas intensity reduction will slow down? A closer look at the Annual Energy Outlook (US-EIA, 2001) underlying the energy related CO₂ emissions of the baseline used in the Bush Climate Change Initiative shows an important reason for the relatively slow improvement rate. The Outlook foresees a strong dependence on fossil fuels. This projection seems to be in line with the Energy Plan that was published by the Bush Administration last year; this plan aims, amongst others, at promoting the use of coal for electricity generation.

We will use three other sets of baselines for comparison: 1) the US (draft) third National Communication (USA, 2002), 2) the IMAGE 2.2 projections for all greenhouse gases and 3) the low and high cases of the Annual Energy Outlook.

For non-CO₂, the preliminary third US National Communication gives more recent projections than used in the baseline of the Bush Initiative. Using these projections, the greenhouse gas intensity is projected to decrease by almost 1.6 per cent per year between 2000 and 2012, which would reduce the result of the US policy in the Bush Initiative to a 3.5 per cent emission reduction below baseline levels by 2012 (see Figure 3).

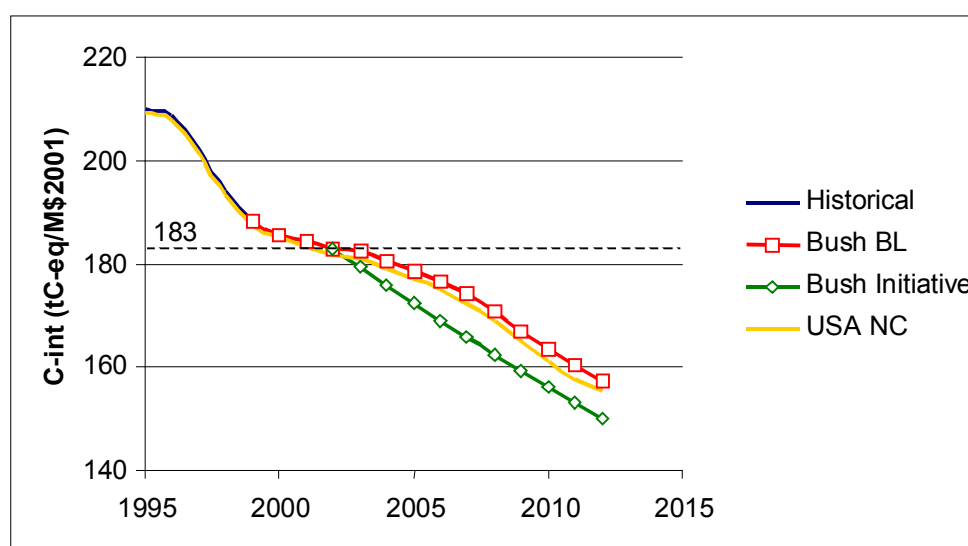


Figure 3: Development of carbon equivalent intensity under the baseline and target scenario of the Bush Climate Change Initiative compared to the projection of the draft third US National Communication.

We have also compared the baseline of the Bush Initiative with a set of baseline scenarios developed by RIVM using the IMAGE 2.2 model within the context of the IPCC Special Report on Emissions Scenarios (SRES, see IMAGE team, 2001).⁸ Figure 4 shows the projected greenhouse gas intensity for the US by 2012 to be lower than in the baseline of the Bush Initiative in 3 out of the 4 scenarios. Only in the A2 scenario (with low economic growth and technology development and an emphasis on coal use) would the US policy target *not* be reached under baseline conditions.

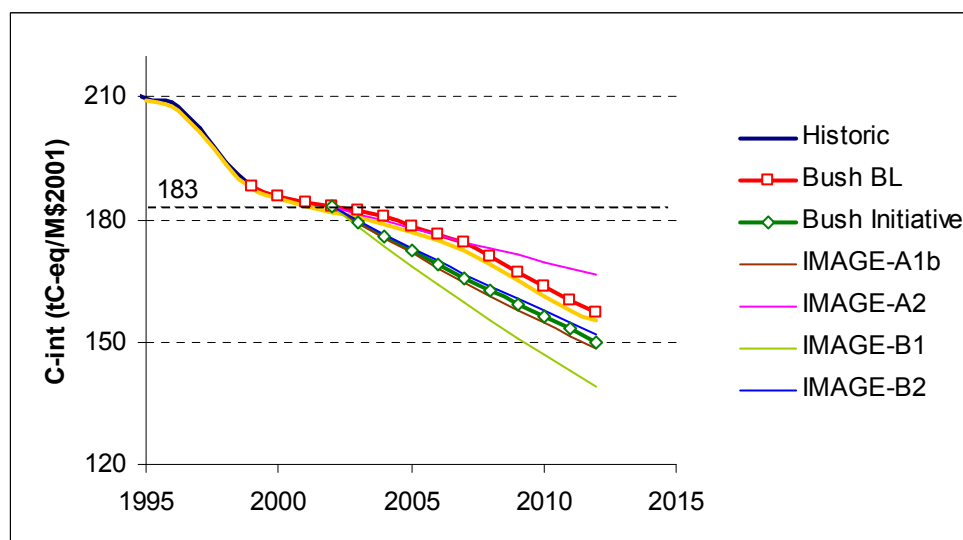


Figure 4: Development of carbon equivalent intensity under the baseline and target scenario of the Bush Climate Change Initiative compared to 4 IMAGE 2.2 SRES baseline scenarios.

The last comparison has to do with the baseline of the Bush Initiative, with high and low economic growth scenarios of the US-DoE/EIA fossil fuel CO₂ emissions projections (see Figure 5).⁹ The high economic growth baseline (with a 3.8 per cent annual growth rate between 2002 and 2012 compared to 3.3 per cent in the baseline of the Bush Initiative) finds itself in a greenhouse gas intensity that already approaches the 18 per cent policy target, without any additional policies. In contrast, the low economic growth baseline (with 2.9 per cent annual growth between 2002 and 2012) results in a larger gap between the reduction target and the original baseline (almost 8 per cent difference in 2012 between baseline and target versus 4.5 per cent). This suggests that the greenhouse gas intensity target can be more easily met under high economic growth conditions than in times of low economic growth.

⁸ The IMAGE SRES scenarios have been developed to study the long-term trends in global change. They emphasise the wide-range in different possible futures and cover all greenhouse gases mentioned in the Bush Initiative. In this context, they serve as a basis for comparison with the baseline of the Bush Initiative.

⁹ For the non-CO₂ emissions, we used the original US-EPA projections as reported in the Bush Climate Change Initiative. No high and low growth projections exist for these gases. The projections are less directly dependent on economic assumptions as they are mainly related to land use and changes in industrial processes.

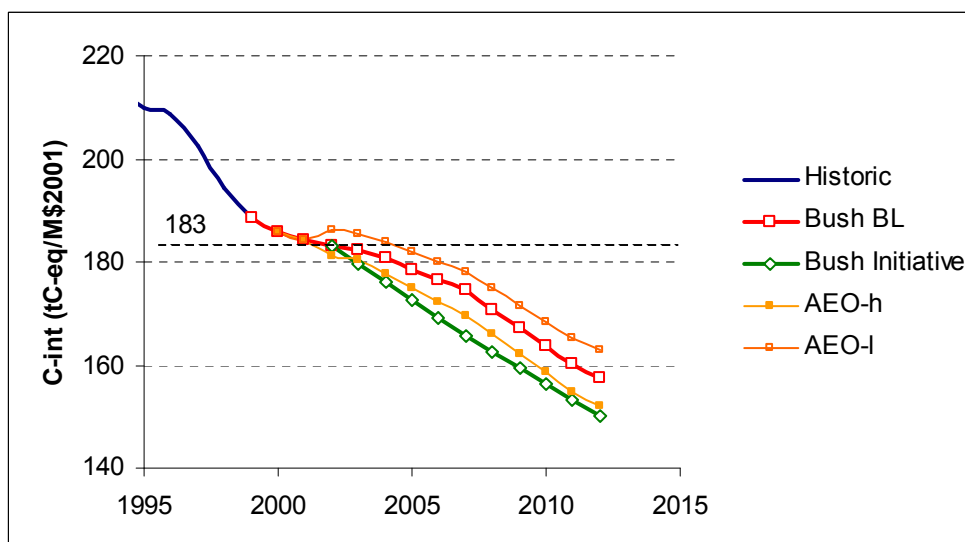


Figure 5: Development of carbon equivalent intensity under the baseline and target scenarios of the Bush Initiative compared to the high and low economic growth scenarios of the Annual Energy Outlook (EIA, 2001).

In conclusion, putting the Bush Climate Change Initiative into historical perspective and comparing it to alternative scenarios suggests that:

- The 18 per cent (cumulative) reduction target is comparable to historical reduction rates, which was 23 per cent in the 1980s and 17 per cent in the 1990s.
- The baseline used in the Bush Initiative is more carbon intensive than the historical improvement rates and most of the IMAGE 2.2 SRES baselines.
- The policy ambition of the Bush Climate Change Initiative can be regarded as being very modest. It might even be that no additional policies will be needed to meet the policy target.

3 What will the US emissions be?

The Bush Climate Change Initiative includes a policy target for reducing the greenhouse gas intensity of the US economy. It does *not* set absolute emission targets, which raises the question what the 2012 emission levels under the Bush Initiative will be and how these will compare to the US target under the Kyoto Protocol and the 1990 emission levels.

Figure 6 shows historical US greenhouse gas emission levels between 1990 and 2000 and projections for 2012 under the baseline of the Bush Initiative. Historically, US greenhouse gas emissions (excluding sinks) have been growing continuously at an average rate of 1.3 per cent per year since 1990, resulting in greenhouse gas emissions of 1874 MtC in 2000.¹⁰ This is an increase of 14 per cent above 1990-levels. Following the baseline of the Bush Initiative, US greenhouse gas emissions would rise further, to a level of almost 39 per cent above 1990-levels.¹¹ The 18 per cent intensity reduction would bring US emissions down to 2160 MtC, or 32 per cent above the 1990-levels. In the IMAGE 2.2 scenarios A1b and B2 (medium IMAGE projections), greenhouse gas emissions under baseline conditions are already comparable with the policy target.

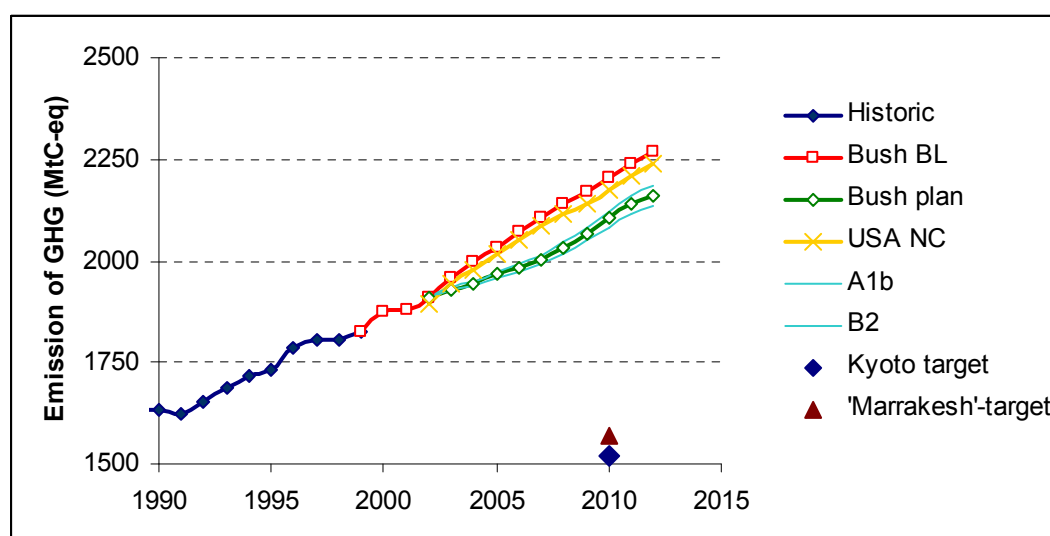


Figure 6: US historical and projected greenhouse gas emissions under different baselines (excluding sinks). The cross indicates the original 7 per cent emission reduction target for the US under the Kyoto Protocol and the single triangle the target after the Marrakesh Accords. Two IMAGE baseline scenarios have also been included.

Under the Kyoto Protocol, the US had originally agreed to reduce its emissions by 7 per cent compared to 1990 levels.¹² The sinks agreements in Bonn and Marrakesh have potentially relaxed the US emission reduction target under the Kyoto Protocol to about –3

¹⁰ The latest US inventory shows slightly different figures for 2000 and earlier years. However, the figures used here are consistent with those mentioned in the Bush Initiative. Furthermore, the conclusions remain unchanged.

¹¹ The US third National Communication projections indicate an increase of 37 per cent above 1990-levels.

¹² The 7 per cent reduction compares to the base year level, which includes net land use emissions and is based on 1990 emission levels for CO₂, CH₄ and N₂O and 1990 or 1995 for PFC, SF₆ and HCFCs.

per cent (see Den Elzen and de Moor, 2001a, b).¹³ However, it is already clear that the emission reduction effort under the Bush Initiative is of a different magnitude (i.e. lower) than the original US effort under the Kyoto Protocol.

¹³ Moreover, the US could have used the Kyoto Mechanisms to realise a major part of their efforts abroad. A more quantitative assessment will be made in section 4.

4 Comparing the Bush Initiative with efforts under Kyoto

This section compares the effort of the Bush Climate Change Initiative with the efforts of other major industrialised countries under the Kyoto Protocol after the Bonn Agreement and Marrakesh Accords (see UNFCCC, 2001). The calculations for the US include abatement through sinks, estimated at about 38 MtC. This is based on the total carbon credits from domestic sink activities, when the rules are applied for Annex I countries under the Kyoto Protocol and the Marrakesh Accords.¹⁴ This estimate corresponds reasonably well with the sink figures as presented in the Bush Initiative.

The Bush Climate Change Initiative claims that the US goal is comparable to the average progress of Annex I regions under the Kyoto Protocol. However, it is more relevant to compare the US effort to countries in similar positions e.g. the EU, Japan and Canada. Figure 7 makes this comparison for the outcomes in 2010 using the IPCC SRES IMAGE 2.2 A1b scenario.¹⁵ As we have shown in our earlier evaluations of the Bonn Agreement and Marrakesh Accords, it can be expected that the dominant sellers, Russia and the Ukraine, will act in their own interest and pursue a strategy to maximise their revenues from permit trading. Therefore we have assumed a case of optimal banking, in which Russia and the Ukraine will exercise market power, and curtail and bank their supply of hot air. In the A1b scenario, such an optimal permit supply strategy would lead to 40 per cent banking of hot air, with the international permit price estimated between US\$15-20/tC.¹⁶

Figure 7 clearly shows that the effort of the US under the Climate Change Initiative is significantly less than the efforts of the EU, Japan and Canada under the Kyoto Protocol. The total effort, including hot air, amounts to 25 per cent reduction under baseline levels in the EU, 25 per cent in Japan and over 30 per cent in Canada.

¹⁴ Domestic sinks activities include mainly afforestation, reforestation, forest and agricultural management. See also Table 2 in den Elzen and de Moor (2001a).

¹⁵ The FAIR model is used as the framework for evaluation, similar to earlier analyses on the environmental effectiveness and economic efficiency of the Kyoto Protocol (den Elzen and de Moor, 2001a, b; 2002). For a full description of the FAIR model, see den Elzen and Both (2002). For the US, the baseline in the US Initiative is used.

¹⁶ The optimum for banking is likely to be larger in scenarios with lower baseline emissions.

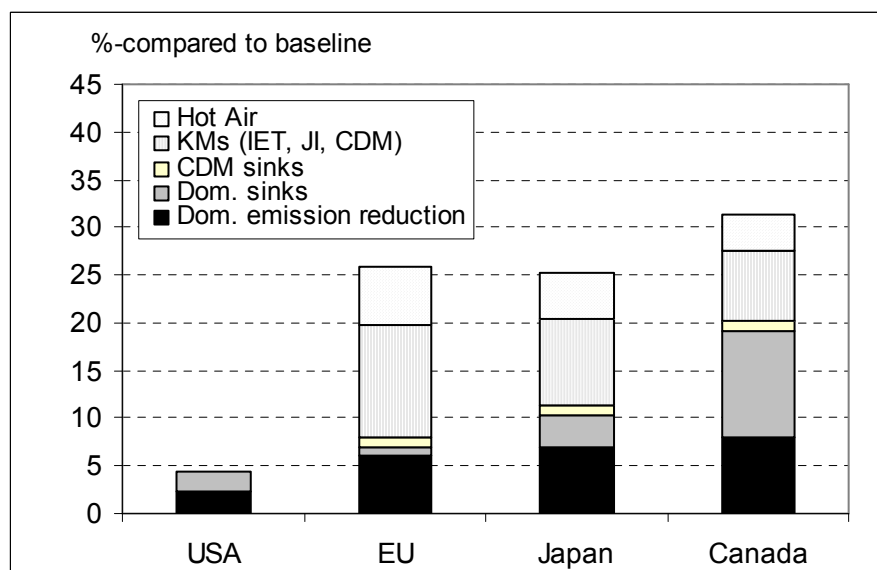


Figure 7: US reductions compared to the efforts of the EU, Japan and Canada under the Kyoto Protocol as a percentage of the baseline emissions in the A1b scenario in 2010.

As the Bush Climate Change Initiative is far less ambitious than the efforts of the major Annex I countries, the costs for the US to reach the intensity target are also lower (see Figure 8). On the other hand, the Annex I regions can use the Kyoto Mechanisms to cut compliance costs. While the EU, Japan and Canada achieve a much higher reduction compared to baseline, the use of international emissions trading facilitates limiting the costs of meeting the Kyoto targets to less than 0.07 per cent of GDP per year.¹⁷

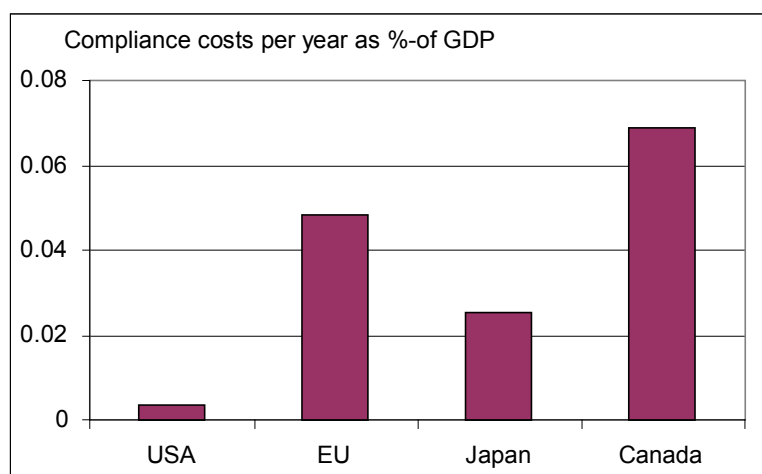


Figure 8: Compliance costs per year as a percentage of GDP for the Bush Initiative and for meeting the Kyoto targets of the EU, Japan and Canada, assuming optimal banking of hot air. Calculations are based on the FAIR model and the IPCC SRES IMAGE A1B scenario in 2010.

¹⁷ These costs result from using Marginal Abatement Curves (MACs) that reflect the extra costs to reduce an extra unit of carbon. Costs are calculated as the area under the abatement curve. Using MACs is a transparent way to show the effects of climate change policies and permit trading. However, MACs only represent the direct cost effects but not the linkages and rebound effects through the economy. There is no direct link with macroeconomic indicators such as GDP losses or other measures of income or utility losses.

An interesting issue here would be to assess the effort under the Bush Climate Change Initiative with a simulated US participation under the Kyoto Protocol and the Marrakesh Accords. Table 1 compares the environmental effectiveness and economic efficiency of the Bush Climate Change Initiative versus a simulated US participation in the Kyoto Protocol, starting from a situation with no US climate action.¹⁸

Table 1: Environmental effectiveness and economic efficiency of no US action, the Bush Initiative and US-participation in the Kyoto Protocol in the A1b scenario, assuming optimal banking of hot air.

	Environmental effectiveness			Economic efficiency		
	Annex I CO ₂ abatement ^a		CO ₂ equivalent emissions compared to base-year (in %) ^b	Domestic reduction (in %)	Internat. permit price (in US\$/tC)	Annex I costs (bln US\$/yr) ^c
	MtC	In %				
<i>No US-action</i>						
US	0	0	+34	0	0	0
Annex I including US	277 ^d	-6	+9 (+5.5)	32	21	5.2 (8)
<i>Bush Climate Change Initiative</i>						
US	43	-2.5	+31 (+28)	100	(13) ^e	0.3
Annex I including US	320	-7	+7 (+3.5)	32	21	5.5 (8.3)
<i>US participation in the Kyoto Protocol^f</i>						
US	514	-26	-3.5 (-7)	39	29	13
Annex I including US	630	-14	-1.5 (-5.2)	41	29	14 (23)

a This refers to reductions of anthropogenic CO₂ emissions, in absolute terms and compared to baseline emissions.

b The numbers in parentheses include, besides abatement efforts through emission reductions, efforts to remove CO₂ through sinks to capture the overall effect on atmospheric CO₂ built-up.

c The numbers for Annex I costs are net costs and hence also include the revenues from permit sales of the Annex I FSU. The numbers in parentheses reflect the costs *without* the Annex I FSU revenues.

d Under no hot air banking, this would be 115 MtC, see Den Elzen and de Moor (2001b) for details.

e This reflects the US autarkic marginal price.

f Calculations show that there is no need for hot air banking if the US participates in the Kyoto Protocol.

Table 1 demonstrates the very modest effort associated with the Bush Climate Change Initiative, certainly in comparison to the original Kyoto target for the US. The Bush Initiative will cut greenhouse gas emissions by 43 MtC, but US emissions in 2010 will still come to 30 per cent above base-year levels.¹⁹ Under the Kyoto Protocol, a simulated US participation would lead to a much larger greenhouse gas abatement of 514 MtC, bringing US emissions 3.5 per cent below base-year level.

The costs for the US to meet the intensity target in the Bush Climate Change Initiative are obviously far lower than under the Kyoto Protocol. However, participation under the

¹⁸ Environmental effectiveness is represented by the Annex I abatement efforts, and defined as the total amount of emission reductions within Annex I countries through domestic policies, international emissions trading, Joint Implementation and Clean Development Mechanism. Economic efficiency is represented by total abatement costs (in US\$95) for Annex-I countries to comply with their Kyoto commitments, and the expected average clearing price in the international permit market over the commitment period. Abatement costs only include CO₂ reductions and not the costs of reducing non-CO₂ emissions, hence, total abatement costs for reducing CO₂ equivalent emissions could be higher. See den Elzen and de Moor (2001b) for the exact definitions and explanation.

¹⁹ Note that 2010 is the reference year instead of 2012 in the earlier sections. Note also that base-year levels are used as a reference. For the US, the base-year levels are almost the same as the 1990-levels.

Protocol allows Annex I countries to use the Kyoto Mechanisms and cut compliance costs up to 80 per cent. With international emissions trading, the US can limit annual compliance costs to about \$13 billion, or 0.1 per cent of GDP in 2010. Although this is higher than under the Bush Initiative, the abatement effort is also far more substantial.

A simulated US participation in the Kyoto Protocol would significantly improve the environmental effectiveness of the Protocol. Emission reductions would amount to about 630 MtC, bringing total Annex I emissions, including the US emissions, to 14 per cent below baseline developments and 1.5 per cent below base-year emissions. But US participation in the Kyoto Protocol produces another essential benefit for international climate policy, i.e. it would improve the viability of an international emissions trading market. It would strengthen permit demand and raise the permit price to about 29 US\$/tC. Furthermore, US participation in the Kyoto Protocol would also eliminate the problem of hot air dominating the permit market.

5 Implementation of the Bush Climate Change Initiative

What are the risks involved in the implementation of the Bush Climate Change Initiative, given its intensity-based approach? An intensity target approach is explicitly aimed at safeguarding economic growth. This key feature is at the same time the largest risk factor in meeting the intensity target objective. In case of high economic growth, the approach may work well when investments in new technology are easy to make. In such a case, however, the Bush Initiative does not mention any additional policy efforts or targets. On the other hand, a situation of economic slowdown or recession may derail public support for climate policy and the intensity target may become out of reach. There are cases, like the Former Soviet Union in the early 1990s, in which the greenhouse gas intensity is found to increase when economic growth stagnates.

The voluntary character of the plan is another important risk factor. The Bush Initiative lacks a real compliance regime or clear rules for corporate participation. Voluntary approaches, including those in environmental policy, can indeed be useful, but they require at the very least strict rules and monitoring to assess whether actions are real or would have occurred anyway. In this context, the experience with voluntary approaches in the US is not really promising. A recent assessment of the US Climate Challenge programme by the Natural Resources Defence Council, for example, shows that the programme has failed to achieve its goals and was unable to reverse or even slow down the trend of rising emissions.²⁰ In fact, several senior fellows from the US-based institute Resources for the Future have stated that a serious and credible climate change policy requires not a voluntary but a mandatory, market based approach such as the SO₂ trading programme in the US.²¹ Surprisingly, President Bush while in his speech explicitly hailing the mandatory SO₂ cap-and-trade programme as a successful example of an environmental policy that works, does not opt for such an approach in his Climate Change Initiative.²²

The Bush Climate Change Initiative seems to recognise the inherent uncertainty associated with an intensity target approach since it anticipates a moment for evaluating whether the US is on track in meeting the policy target. However, this evaluation is set at the end of the period in 2012 and is, hence, too late to induce additional action if needed. The Bush Initiative would have been much more credible with a review in 2007, halfway during the ten-year period.

²⁰ Lashof, D., 2001, *Reported "Reductions", Rising Emissions*, Natural Resources Defense Council.

²¹ See Kopp et al. (2002). Their viewpoints are also reflected in *Tax or trade*, *The Economist*, February 25, 2002.

²² According to President Bush, the SO₂ programme has resulted in the reduction of more emissions than required by law, with virtually 100 per cent compliance at low administration costs and without any law suits. Moreover, the economic incentives associated with a cap-and-trade system has reduced compliance costs by about 80 per cent.

6 Implications for international climate change policy

After the unanimous agreement reached on the details of the Kyoto Protocol at CoP6^{bis} in Bonn and CoP7 in Marrakech, most countries have expressed their intention to ratify the Kyoto Protocol, even without US participation. In this context, the Bush Initiative seems too late and lacks sufficient substance and credibility to offer a real alternative to the Kyoto Protocol.

The Bush Initiative does, however, include positive elements that could facilitate future US re-engagement to international climate change policies. First of all, it is important that the Bush Climate Change Initiative explicitly accepts the objective of the UNFCCC. Secondly, and albeit very modest, the current US administration seems willing to make some policy effort to control US greenhouse gas emissions. More concretely, the Bush Initiative aims to support the development of break-through technologies such as fuel cell and hydrogen-based energy systems. It also supports the development of carbon removal and storage technologies.²³ When the Annex I countries consider opening a dialogue with the US in the context of international climate change debates, a promising option could be to join efforts in technology development.

The Bush Climate Change Initiative is conceived and presented as a new approach to defining greenhouse gas emission targets. It suggests that the approach would be particularly appealing for developing countries to take on quantified commitments in future periods. What will the implications be of an intensity target approach?

The idea of greenhouse gas intensity targets is not new. It was already proposed during the Kyoto Protocol discussions.²⁴ In principle, intensity targets could well be used to limit and eventually reduce global greenhouse gas emissions. If sufficiently stringent, emission intensity targets will lead to absolute emission reductions.²⁵ It has been argued that intensity targets have a number of merits compared to fixed targets (see Philibert, 2000, Philibert and Pershing, 2001). First, intensity targets would reduce the level of uncertainty on the costs of climate change policies. In the case of fixed targets, costs may be higher than expected if economic growth exceeds expectations. This is the main reason that intensity targets are deemed more acceptable for developing countries than fixed targets. Second, advocates of intensity targets argue that the reduction in uncertainty about the costs will lead to more stringent targets resulting in a higher overall environmental effectiveness than with fixed targets. Third, intensity targets would avoid the creation of hot air due to inflated baseline projections or economic crises, such as in the case of the FSU and Eastern Europe under the Kyoto Protocol.

²³ It is unclear whether the funding being proposed is additional to existing programmatic funding or sufficient for meeting the need. It can further be questioned that channelling the funding through the Bush Initiative will be adequate without a strong market price signal to spur the private sector to develop the new technologies.

²⁴ See for example Baumert et al. (1999), Hargrave (1998) and Philibert (2000). The idea of applying the approach to all countries has been more recently explored by the secretariat of the OECD/IEA to (see OECD, 2001a, 2001b, and also Philibert and Pershing, 2001).

²⁵ The percentage reduction of emissions needs to be higher than the percentage economic growth rate.

However, these advantages claimed overlook a number of serious and fundamental difficulties associated with an intensity approach:

- First, intensity targets create an inherent uncertainty about the environmental effectiveness, as measured by the reduced emissions of greenhouse gases to the atmosphere. The real effectiveness in terms of absolute emission reductions can only be determined ex-post. The Bush Climate Change Initiative already serves to demonstrate this uncertainty (see section 3).
- Second, using intensity targets in international climate change negotiations is quite likely to result in time and policy delays. It may turn out particularly problematic under a climate regime that requires targets for a subsequent commitment period to be fixed before the following period. Disappointing results of the 2nd commitment period can then only be adjusted by setting targets for the 4th commitment period, leading to a delay of up to 10 years or more.
- Third, the greenhouse gas intensity reduction may be feasible when economic growth is high but there are serious risks in times of economic slowdown or recession. Countries may then be confronted with an increase, or smaller decrease, in greenhouse gas intensity, while their ability to meet their intensity targets is reduced. This may result in non-compliance.
- Fourth, there are technical problems related to the measurement of the greenhouse gas intensity. Uncertainty in economic data is added to uncertainty in emissions data. Moreover, the approach is complicated by the use of different currencies. Countries will prefer national currencies that may be under- or overrated, or re-valuate or devalue over time, requiring GDP or PPP corrections. This will further complicate monitoring and compliance.
- Fifth, the adoption of intensity targets will also complicate the functioning of the Kyoto Mechanisms and the monitoring of emissions. It will become more problematic to define permits and the size of the international greenhouse gas market may become more sensitive to (changes in) economic growth.²⁶ It will also be more difficult to monitor and predict if countries are likely to meet their targets at the end of the commitment period.

Apart from these problems, it can be seriously questioned whether the example set by the Bush Initiative will be effective in reducing emissions to stabilise greenhouse gas concentrations at a 'non-dangerous' level, the key objective of the UNFCCC. Considering the modest US policy target, developing countries are quite likely to claim even lower intensity targets, more in accordance with their lower per capita income levels.²⁷ This will effectively result in a delayed global response in reducing greenhouse gas emissions and the EU goal of stabilising greenhouse gas concentrations below a doubling of pre-industrial levels is likely to remain out of reach.²⁸

²⁶ The international emissions trading market under a regime of intensity targets will probably be of a baseline-and-credit type. In this case, tradable permits are defined in terms of credits and countries can only sell the credits that are below the intensity target. This may create situations in which a country with higher than expected economic growth can sell credits while its absolute emissions are still increasing.

²⁷ Interestingly, some developing countries have a better historical record of reducing the greenhouse gas intensity of their economy than the US. China is a notable example with declining emissions over the last 5 years under continued economic growth (see van Vuuren et al., 2001; Streets et al., 2001).

²⁸ Berk and den Elzen (2001) have shown that to meet the EU (and Dutch) target of limiting global temperature to less than 2 degrees above pre-historical levels, global greenhouse gas concentrations need to be stabilised at a level of 550 ppmv CO₂ equivalent, congruent to a stabilisation of CO₂ concentrations at about 450 ppmv. According to IPCC Third Assessment Report, this implies that CO₂ emissions should peak within a few decades (see IPCC, 2001).

The foregoing analysis leads us to the following conclusions:

- The Bush Initiative offers no credible alternative to the Kyoto Protocol but does improve the prospects for US re-engagement at a later stage and discussions on future commitments.
- The intensity target approach might be regarded as attractive by the developing countries in taking on quantified commitments, but there are serious and fundamental difficulties in adopting this approach as a basis for defining commitments for all countries.
- The stringency of the intensity targets adopted in the Bush Initiative lacks sufficient substance and credibility to be the basis for establishing an effective and acceptable regime for meeting the ultimate goal of the Climate Convention.

7 Conclusions

This report evaluates the Climate Change Initiative as presented by President Bush on February 14, 2002. The main findings of our evaluation are:

- The policy target of 18 per cent improvement in the greenhouse gas intensity of the US economy between 2002 and 2012 is comparable to historical trends. In the 1980s, the intensity in the US declined by 23 per cent and in the 1990s by about 17 per cent.
- The intensity improvement of the baseline projection for greenhouse gas emissions over the next 10 years used in the Bush Initiative is 14 per cent. This is below historical improvement rates of 23 per cent in the 1980s and 17 per cent in the 1990s. The baseline forecast in the (draft) US Third National Communication puts this improvement at 15 per cent. In a high economic growth scenario, the intensity improvement is even more than 16 per cent. Other scenarios also show higher baseline improvements, including for instance most of the IMAGE SRES baseline projections for the US.
- The policy target in the Bush Climate Change Initiative will result in a continued increase in US greenhouse gas emissions. In 2012, emissions will be 32 per cent above the 1990-level (compared to 39 per cent in the baseline of the Bush Initiative). This is far above the original Kyoto target for the US of -7 per cent in 2010 (or -3 per cent corrected for sinks).
- The effort of the Bush Initiative is significantly less than the efforts of the EU, Japan and Canada under the Kyoto Protocol. As the Bush Initiative is far less ambitious, the costs for the US to reach the intensity target are much lower than for the major Annex I countries. Still, the use of the Kyoto Mechanisms enable the EU, Japan and Canada to limit compliance costs to less than 0.07 per cent of GDP per year.
- There are serious concerns that the US policy target will not be met. First, if economic growth stagnates, investments in technical improvements become uncertain, public support for climate policy may erode and the intensity target may get out of reach. Second, the voluntary character adds to the uncertainty of meeting the policy target as there is no compliance regime nor are there clear rules for corporate participation. Third, the evaluation to assess whether the US is on track in meeting its target is set for 2012, too late to induce additional action if needed.
- The Bush Initiative advocates using intensity targets in the context of next steps after Kyoto but there are serious and fundamental problems associated with this approach. First, intensity targets create an inherent uncertainty about the environmental effectiveness, as measured by the reduced emissions of greenhouse gases to the atmosphere. Second, using intensity targets in international climate change negotiations is likely to result in serious time and policy delays. Third, an intensity approach may create problems in case of an economic slowdown or recession. Countries may then be confronted with an increase in greenhouse gas intensity, while their ability to invest in improvements is reduced. Fourth, the measurement of the greenhouse gas intensity adds uncertainty in economic data, for example on GDP and PPP corrections for national currencies, to uncertainty in emissions data. This further complicates monitoring and compliance. Fifth, an intensity approach will also complicate the functioning of the Kyoto Mechanisms as permits may be more problematic to define and the size of the international emissions trading market more sensitive to economic developments.
- The conclusion is that the Bush Initiative offers no alternative for the Kyoto Protocol. The stringency of the intensity targets adopted in the Bush Initiative also lacks

sufficient substance and credibility to be the basis for establishing an effective and acceptable climate change regime. Developing countries might find the intensity approach attractive, but would probably demand a less stringent policy target than the US. This would inevitably delay global emission reductions, making the EU target of stabilising greenhouse gas concentrations below a doubling of pre-industrial levels no longer feasible.

- The Bush Climate Change Initiative is mainly of political significance. It recognises the importance of the climate change problem. It also explicitly accepts the long-term objective of the Climate Change Convention to avoid dangerous interference with the climate system, requiring deep emission cuts in the longer term. Finally, it includes some policies to stimulate development of technologies that are needed to achieve such longer-term reductions. The Bush Initiative thereby improves the prospects for US participation in a global climate change regime.

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