Beyond Kyoto – Preventing Dangerous Climate Change by Continuing Kyoto - or by the GCCS-Approach?

A premature art. 3.9./13.4.a 'review of the Kyoto Protocol', of Climate Action Network's 'Viable Global Framework' and of the 'Global Climate Certificate System, GCCS' - Approach

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Introduction

In 2005, according to the Kyoto protocol (art. 3.9 and 13.4.a.), there must be an initiation of an official review, whether the current Kyoto commitments and their implementation (by industrialized Annex-I-states) have had or will have the necessary progressive impacts in order to achieve the ultimate objective of UN Framework Convention on Climate Change 'to prevent dangerous anthropogenic interference with the climate system'.(UNFCCC, art. 2) After that review by the 'Meeting of the Parties to this Protocol (MOP)' MOP shall take appropriate action'. (KP Art.9.1.) The subjects of this article are the easily predictable results of that review and the subsequent 'appropriate action.'

Overview and summary

Based on two studies[3] [4] for the ministry of environment and transport of Baden-Württemberg and a recently published book[5] of Lutz Wicke, the authors

i. *will describe the merits of the Kyoto process and – hopefully – the ratification of the Kyoto protocol. Besides that they will*
ii. *have to show (as the above mentioned MOP will have to concede too after a fair and unbiased official review) that with the current (implementation) of the Kyoto commitments it is quantitatively completely impossible to make any progress towards the above mentioned 'ultimate climate objective'. Furthermore the authors will*
iii. *describe the structural deficits of the Kyoto Protocol system and will*
iv. *objectively evaluate, whether the 'commitment system' of Kyoto is capable at all, to reach this objective. Moreover they will*
v. *have to conclude that even the most thoroughly devised and ambitious 'Continuing and improving Kyoto' proposal by NGOs' International Climate Action Network with its 'Three Tracks Viable Framework' approach[6] has got the same deficiencies as the Kyoto Protocol system. Therefore the authors will*
vi. *have to resume that there exists only one 'appropriate action' according to Art. 9.1.KP: Instead of an 'incremental evolution' of the Kyoto protocol its 'reformation' by a 'structural change' based on already currently incorporated market oriented elements is unavoidable and urgently needed in order to 'prevent dangerous climate change'. Finally the authors will*
vii. *present – in the shortest possible description and explanation – Wicke's Global Climate Certificate System (GCCS) as an efficient and implementable approach to 'prevent dangerous interference with the climate system' without dangerous interference with the global economic system.*

Key Words: Beyond Kyoto, Global Climate Certificate System, Kyoto Protocol, Cap and Trade System, CAN's Continuing Kyoto, Kyoto failure, Preventing Dangerous Climate Change, Kyoto Protocol deficits, Kyoto Protocol review, Art. 3.9./13.4.a Kyoto Protocol

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[3] Refer to Wicke, L./ Knebel, J.(2003).

[4] Refer to Wicke, L./ Knebel, J.(2004).

[5] Refer to Wicke, L. (2004): Beyond Kyoto – a new Global Climate Certificate System - Continuing Kyoto Commitments or a Global Cap and Trade System for a Sustainable Climate Policy? Springer Verlag Heidelberg 2004. (main reference of this article, being published in autumn)

[6] Refer to CAN international (2003).

I. The importance and the merits of Kyoto Protocol (process)

The expected dangerous climate change is one of the biggest challenges the world has ever faced. Its dreadful destructive potential has forced the world community into a multilateral process of negotiations to prevent at least the most horrible consequences and to slow down the speed of the change. The first step towards this goal was the UN Framework Convention on Climate Change specified by the Kyoto protocol. Today the protocol has not yet been ratified. The authors still hope and believe that political reasons (good relation to the EU) and the monetary self interest of Russia (selling of surplus assigned amounts gained by tough Russian diplomats, 'hot air', see below) will lead to its final ratification.

Despite all efficiency problems of the protocol which we will discuss in length below, it is quite unexpected and therefore very astounding that the international community has come so far with this 'anti climate change treaty'. Why is it so unexpected? In fact, there exists 'only' (very reliable) scientific evidence for anthropogenic climate change (global temperature rise of 0.6°C since 1760) and a accumulation of weather irregularities, more or less some vaguely connected with beginning climate change. On the other hand there are quite strong worldwide acting forces 'under the command' of fossil energy companies like Exxon[7] which try to ignore scientific evidences and by lobbying massively try to influence national governments in order to "put economy first". Within the US-Senate and Government those opinions since 1997 did and do have an overwhelming majority[8] and therefore the United States have left the Kyoto process at a very early stage. But in sum this process (after ratification) was a success and leads to an international binding obligation for enormous economic efforts mainly in the industrialised (Annex I) countries aimed to reduce GHG-Emissions.

"Never change a winning team" that is why we – the authors of this article - should really be very careful if we criticise this process in case we wouldn't have a better alternative. We fully understand that some environmentalists fear that criticising the Kyoto protocol at the current stage and talking about a better alternative (which means not only a theoretically better alternative but also an implementable one) might be dangerous for the final ratification of the Kyoto protocol. On the other hand it is our obligation as scientists and as environmentalists to search for an alternative since we can't shut our eyes before obvious serious quantitative and structural failures and shortcomings in the Kyoto process. The most important of this failures is not the fact that we will not reach the reduction goals of the first commitment period but the lack of a sufficient incentives for industrialised but even more for developing countries to go further in the second period in order to trigger an economic development that really can prevent dangerous climate change.

Deplorably the CAN-Proposal does not offer this perspective and that's why we try to present a more efficient way to improve the Kyoto process by transferring Kyoto Protocol's relatively limited 'flexible cap and trade mechanism' to a world spanning global 'cap and trade' system. The objectives of the Kyoto Protocol and of the 'GCCS' as a Kyoto reformation system are the same: 'Preventing dangerous interference with the climate system' without dangerous interference with the global economic system. But: The authors are convinced that the chances of the realization of both objectives are much higher in case GCCS really would be implemented.

Irrespective of the fact, that the GCCS has already been developed in much detail[9], so that the author Lutz Wicke is convinced that GCCS is 'in a condition generally ready for application'[10] we nevertheless know: We are going to compare the GCCS being still a model (not yet

[7] Refer to Ecologist's staff (2001). There you'll find a (somehow biased) compilation of Exxon's (and its head Lee Raymond) ecological and other sins.
[8] Refer to the 95:0 Byrd-Hagel Resolution in the US-Senate in 1997, Byrd,R./Hagel (1997).
[9] Refer to Wicke, L. (2004).
[10] Refer to Wicke, L./Knebel, J. (2004).

being discussed with and within the 'Kyoto community'[11]) – partly with the Kyoto system, which has been 'born' and 'developed' (of course not very straightforward and not according to a theoretical road map) in a very complicated political and very sensitive negotiations' reality (of the multinational Kyoto process). This in fact is not quite fair and may be methodically disputable. But nevertheless the unbiased evaluation of the Kyoto Protocol and comparing it with the GCCS, that has been designed in depth to be both theoretically and practicably an 'optimal' climate protection systems (thus learning from deficiencies both of the Kyoto protocol and the European emission trading system and their problematic implementation) could and should lead to the necessary self-reflection of the 'Kyoto community' whether to be (or not to be) on the right climate protection track.
Just like with all other conceivable efficient climate protection schemes for improving the current system, extremely high hurdles will without doubt have to be overcome when implementing the GCCS. This system will have to be incorporated into an approved and ratified, reformed multinational climate protection treaty. However, thanks to the important merits of the GCCS, there is still a small chance that mankind will manage to prevent dangerous climate change.

II. The demerits of Kyoto (1): The quantitative failure to reach its climate objectives

The quantitative results of a fair and unbiased review with the above mentioned upcoming official review by the Meeting of the Parties of the Kyoto Protocol (initiated in 2005) can be easily predicted. One just has got to compare the 'official' statistics and forecasts of the International Energy Agency (IEA) and the calculations of the International Panel on Climate Change (IPCC)of the 'emission paths' of CO_2 not to be exceeded in the 21st century and thereafter in order to reach certain levels of stabilization. Furthermore one has got to compare the results and the forecasts of international CO_2-limits within UNFCCC and the Kyoto Protocol as follows.
By adopting the 1992 UN Framework Convention on Climate Change and the 1997 Kyoto Protocol (which has not yet come into effect[12]) as well as another nine successor conferences (Conferences of Parties, COPs) and many further (preparatory) meetings on all levels, first political steps have been taken and many extremely important international frameworks implemented with in principle binding effect under international law.
However, the quantitative (anticipated) results of all these efforts are sobering, if not depressing.

1. Although Article 4.2 of the UNFCCC aims[13] at limiting emissions by developed countries at 1990's level by the year 2000, energy-related emissions rose by almost 10% world-wide between 1990 and 1999[14], with combustion-related emissions **increases** in the OECD countries totalling 10.1% between 1990 and 2000[15].

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[11] But at least there has already been a pretty hot discussion on the topic of the GCCS (and of the clearly outspoken shortcomings of the Kyoto Protocol) with the German NGOs' climate protection specialists in January 04 (at BUND 'headquarters') and with the German federal environmental agency (UBA) in December 03.

[12] Pending ratification by Russia, the second "criterion for entering into force" – i.e. ratification by states which together represent more than 55% of all greenhouse gas emissions – is not yet fulfilled. 19.2% was still lacking in July 2004. Ratification by Russia and Poland (together accounting for 20.42%) means that the 55% threshold can be exceeded.

[13] "Deliberately disjointed references in the first two paragraphs a) and b) (of Art. 4.2.) suggested that (taking the lead by developed countries, authors' note) would be demonstrated by the indicative (underlined by the authors) aim of returning their emissions of CO_2 and other greenhouse gases to 1990 levels by the year 2000, and this became the focus of attention in the years immediately after the Convention." (Refer to Grubb, M./Vrolijk, C./Brack, D.(1999), p.40.

[14] Refer to IEA / OECD (2002), p. 74.

[15] Calculated on the basis of the data in Table 2 in: DIW (2002), p. 560.

2. Industrial countries and 'countries in transition' ('Annex-I' states) were and are expected to lower their energy-related carbon dioxide emissions by 5.2% (on balance) below the 1990 level during the first commitment period of the Kyoto Protocol by the year 2010 (average values of the years 2008 to 2012). The IEA and the OECD point out that contrary to the 5.2% reduction originally agreed to in Kyoto,
   - the inclusion of existing managed forests – agreed to in Bonn and Marrakesh (COP 6 and 7),
   - the departure by the US from its Kyoto obligations (with an estimated US CO_2 increase of 15.5% by 2010) and
   - other reasons (e.g. the failure to achieve the EU target of minus 8% of its climate emissions compared to 1990)

   the climate gas emissions by industrial countries – under favourable conditions – by the end of the commitment period (2012) will be around 9% above the 1990 level.[16]
3. The European Union too, which is – compared to others –officially very dedicated to the Kyoto process will – as already mentioned – not reach the strived-for 8% reduction of climate gas emissions compared to 1990 by 200/12. The EU Commission believes that 'at best a stabilization of emissions will be achieved'.[17] Elsewhere, the EU forecasts 6% growth in emissions.[18]
4. Even if the originally targeted 5.2% reduction in emissions by Annex-I industrialized and 'transition' nations were achieved, this would 'merely' reduce the rate of rise of global emissions from 5.8 GtC = 21.3 billion t of CO_2 (1990) to 27.8 billion t CO_2 rather than to the expected 29.3 billion t. In the World Energy Outlook 2002, the International Energy Agency (IEA) in fact forecasts CO_2 emissions of approx. 27.5 billion t[19] by the year 2010 and hence a world wide increase of 29.1%(!).
5. Should the above-quoted IEA forecasts materialise, CO_2 emissions will increase by up to 38 billion t[20] by the year 2030. Figure 1 shows: If no decisive progress is made in reducing or limiting CO_2 emissions through a dramatic improvement of the international climate protection system, emissions will fail to stabilize at either EU's 550 (see below) or even the (more desirable) 450ppm level[21]. Unfortunately, this situation strongly suggests that stabilization will at best be possible at 750ppm – a highly dramatic level for the worlds' climate. Remember, the EU's definition of dangerous interference means that such interference starts at a level of 550ppm CO_2. Therefore, stating that a level of 750ppm CO_2 would lead to a climate disaster is certainly no exaggeration! Note: The IEA's forecasts were made regardless of its knowledge of the UNFCCC/Kyoto process. The danger is hence that the world economy's rapid development, irrespective of the international Kyoto efforts, will directly lead to this situation, and this constitutes the foreseeable non-achievement of UNFCCC and Kyoto's 'ultimate objective' of preventing 'dangerous interference with the climate system'.

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[16] Cf. IEA / OECD 2002, p. 72.

[17] Commission of the European Communities (2001).

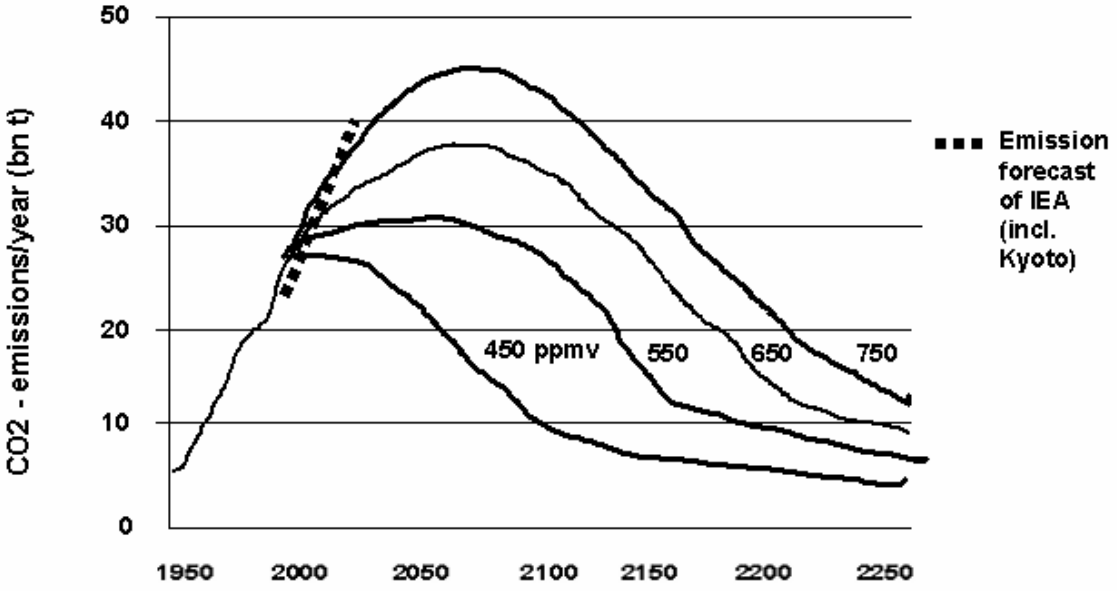
[18] Refer to European Commission Community Research (2002), p.45. EU Commissioner for the Environment Margot Wallström predicts "that if there are no more efforts, the EU as a whole and the majority of the member states will miss their Kyoto-targets." (AFP 2 December 2003). On balance, the EU – so the latest news (early December 2003) from Brussels – will miss its target reduction by 7.5% (a reduction of just minus 0.5 instead of minus 8%).

[19] IEA (2002), p. 413.

[20] Ibidem.

[21] Possibly other unforeseeable political factors like oil and/or coal shortages (or dramatic prices increases) could help to reduce the speed to reach those quoted concentrations.

Figure 1: Global CO_2 emissions from 1990 until 2030 and emission scenarios of the IPCC – presented by WRI – for stabilizing at concentration levels between 450 and 750 ppm CO_2 and emission forecast of IEA till 2030



Sources: Refer to the remarks in and footnotes to Figure 2

III. The demerits of the Kyoto Protocol (2): Structural efficiency deficits of the Kyoto Protocol

There is unfortunately little to no hope at all that this foreseeable development can be changed within the current Kyoto Protocol approach. This approach – in the absence of the will and the power of the world community to implement an approach to really make a big step towards the above quoted ultimate objective of Kyoto and UNFCCC – is designed in such a manner that it bears from the very beginning the very likely risk of failure because of the following structural deficits:

1. There is no global, quantified climate sustainability target (and no intermediate concentration target up to 2010). Contrary to the EU, the 'Kyoto' community was unable or unwilling to define the concentration level of greenhouse gases that may not be exceeded in order to prevent dangerous anthropogenic interference with the climate system. Therefore, this system lacks the one decisive basic precondition for implementing a climate efficient approach and in evaluating the success or failure of the climate protection process. (The 5,2% reduction aim of Annex I states is only a means to reduce the speed of permanently higher greenhouse gas concentration in the atmosphere.)

2. Developing countries have refused and still refuse[22] – and rightly so from their point of view – to restrict or reduce in any manner the increase in their CO_2 or climate gas emissions in light of
   - their economic development backlog and
   - their by far below-average per capita emissions and
   - the large share of blame borne by industrial countries for burdening the earth's atmosphere with accumulated CO_2 emissions (about 85%, 'historic greenhouse gas debt').

   This is true irrespective of the fact that overall emissions by developing countries and newly industrialized countries are on balance rising strongly and, according to forecasts by the IEA, this will result in their emissions being higher than those of industrial countries in and around 2025.[23] (Per-capita emissions of developing countries, however, will still be far below those of industrial countries.)[24]
3. This is why, pursuant to the Kyoto protocol, industrial countries should and are to go ahead (initially) alone with effective reductions ('taking the lead'). More or less as a form of voluntary commitment ('voluntary agreement') within the international framework[25], the various Annex-I states (or the EU as a whole) offered in the aftermath of a lengthy round of 'poker' negotiations to restrict or reduce in as far as they deemed (at that time) to be possible their increases in emissions – based on (and proportional to) their globally far above-average per capita emissions (grandfathering). This in balance ultimately led to a *commitment* of an overall emission reduction of 5.2% by 2010/12 against 1990 by industrial Annex I countries. The quantities agreed to were then included in the Kyoto Protocol and thus have been made binding under international law as Assigned Amounts (AA equal to the emission permits allocated to the countries (average per year) in the period 2008 - 2012) for the individual countries or the EU as whole.[26]
4. This (voluntary commitment) principle of negotiation and agreement leads to a complete misguidance of the players involved <u>against</u> the global climate protection interest. The result of comprehensive investigations into 'voluntary commitments/agreements (even if they are integrated in a national or international legal binding system') for solving environmental problems is very clear. Voluntary commitments cannot solve really costly environmental problems (even if these commitments should become legally binding immediately or at a later point in time)[27]. As soon as the international community starts on the basis of a commitment system the negotiations are mainly focused on the economic interests of the national (industrialized) 'players and negotiators and <u>not</u> the achievement of the climate objective!

   Recurring to the climate change problem this means: As soon as energy savings <u>and</u> the resultant cost reductions (or other positive economic effects) make climate protection no longer 'profitable' on a single-economy or on a national level, and therefore greenhouse gas reduction can only be reached by increasing costs and reducing consumption, the 'free rider effect' will prevail: All the industrial countries affected try to reduce their climate gas emissions burdens to a level that is economically "painless" and possible without any (economic) sacrifice (thus doing no harm to national economy). The effect of every nation's single possible share (of slowing dangerous climate change) is small to rather lim-

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[22] For some striking examples of this refusal of even any discussions about just a indication of that subject refer to ECOFYS (2002), p. 19.

[23] IEA (2002), p. 73.

[24] Ibidem, p. 78.

[25] Refer to Knebel, J./ Wicke, L./ Michael, G. (1999), p. 283 and following.

[26] Due to the binding definition of percentage increases or reductions, which are based on the starting emissions of individual countries, these historically above-proportion per capita and/or absolute national emissions were implicitly recognised as being the basis for agreements governed by international law (the so-called 'grandfathering principle').

[27] Refer to Knebel, J./ Wicke, L./ Michael, G. (1999), p. 520 and following.

ited (USA, Russia), every nation hopes – 'free rider idea' - that other countries will bear the necessary greenhouse gas reduction burden. This means for the climate efficiency of the negotiated 'voluntary commitment' system: Emission reductions cannot and will not be defined as what is necessary in terms of climate policy and climate protection, but as what can be expected from and implemented in the individual countries or groups of countries. This even leads to a 'negotiable' CO_2 (growth) potential compared to the business as usual development (example Russia: 'negotiated' zero emission 'growth' up to 2012 compared to a predicted business as usual path of at least minus 30%, difference: 1.5 bill. t of 'hot air' CO_2![28]).

5. One hence must note that the instrumental approach of the Kyoto protocol as a self-commitment system is in no way capable of solving the problem of climate change. The environmental instrument of 'self-commitment' is in fact the weakest instrument of all when it comes to overcoming environmental problems: This instrumental approach is normally adopted if
   - there is no chance that nations or supranational institutions are able to set clear standards in order to restrict emissions – here greenhouse gases – to the extent necessary, or
   - if no consensus can be reached in order to introduce effective emission charges or taxes or 'cap and trade' CO_2-limits and incentives on a global scale that 'automatically' steer the behaviour of all relevant businesses and private consumers in the right direction, i.e. towards reduction.
   - In such a dilemma (the world community wants do something but is unable to take the right and adequate steps), the instrument of voluntary commitments is adopted merely in order 'to do something' and to 'go in the right direction', but with the implicit and clear aim not to harm national economies or businesses as a whole. Like in the Kyoto process, the outcome is that the world community continues on a course of self-commitments accompanied by disappointment over inadequate commitments:
     - Increasing the global annual CO_2-emission output by around 1.8% between 2000 and 2030[29]) and
     - disappointments of non-compliance of most nations with their legally binding commitments or evade their commitments under the Kyoto Protocol.
   - If world community continues to focus on more stringent commitments by the Annex I states (with zero success up to now) and on enlarging the number of self-committing nations (by some newly industrialized and developing countries), world's community attention will in the long run be distracted even more from the ecological objective, i.e. 'to stabilize greenhouse gas concentrations in the atmosphere in order to prevent dangerous anthropogenic interference with the atmosphere'.

   Failure of the Kyoto system of self-commitment is unfortunately pre-programmed: If <u>self-commitment approaches don't work for (far less) costly environmental problems on a national level</u>[30], <u>there is no way that they are going to work for the most expensive environmental problem either</u>. Reaching climate stabilization does in fact represent the world's most expensive environmental problem: <u>In order to solve this problem, consumption and production patterns of the world economy must be totally transformed in a climate-friendly and sustainable manner.</u> The 'binding international self commitment approach' of the Kyoto Protocol in fact seems to be its basic instrumental error from the very beginning!
6. Furthermore the UNFCCC/Kyoto process

[28] Refer to 'Evaluation of the reference case against Kyoto targets' in: European Commission Community Research (2002), p.45.
[29] Refer to IEA (2002), p. 73.
[30] Refer to Knebel, J./ Wicke, L./ Michael, G. (1999), p. 520 and following.

- neither offered or offers any incentives whatsoever for Annex-I states to enter into particularly far-reached obligations,
- nor does the Kyoto Protocol offer any particular or sufficient incentives to actually ratify the Kyoto Agreement (as is demonstrated by the departure of the USA and by Russia's hesitance[31])
- nor are there sufficient incentives or sufficient 'draconian and feasible sanctions' to observe the commitments entered into (after ratification). (In light of the foreseeable (and indications of a current) failure on the part of many key states to observe their commitments, the performance checks and sanctions pursuant to Article 18 of the Kyoto Protocol, which are defined in great detail in the Marrakesh Accords, including pre-warnings, reporting on the violation of the emission budget, the requirement to buy a corresponding quantity of certificates and the deduction of a higher emission share in the subsequent commitment period[32] seem to be 'dud weapons' (made plain by the above quoted forecasts of IEA about non-compliance (refer to section V.).)

7. The market-orientated incentives that were justly included in the Kyoto Protocol 'merely' serve to make implementation on the respective national (or collective – as in the case of the EU) commitments easier and more cost effective, which can without doubt be seen to serve a 'catalyst' function. However, these flexible instruments provide no incentive to reduce emissions further than the level that was ultimately agreed to in Kyoto's self commitments. Since some states have been granted more 'assigned amounts' (tradable) emission rights [33] than the emissions that would be generated with 'business-as-usual' development, the instrument of joint implementation at least ensures that more emissions than otherwise expected are actually permitted under international law.

Even worse: By not achieving the 'committed' very limited emission (growth) reduction by industrialized countries the whole basic future Kyoto strategy falls apart: Because industrialized countries de facto are 'not taking the lead' in combating climate change but – on balance fail to comply with their obligations – there will be no chance at all, to go on with appropriate commitments of Annex I states in future 'commitment periods' and to include even one single newly industrialized or developing country. That's why – unfortunately – the failure to achieve a second 'commitment period' that really would make progress towards the necessary reduction or at least stabilization of the CO_2 emissions is pre-programmed too.

To summarize the structural deficits of the Kyoto Protocol:

- Without a clear and quantified climate protection objective and
- with the (wrong) instrumental approach of binding self commitments,
- which therefore includes far too small self commitments of industrialized countries only (which they even don't achieve),
- therefore without the least chance to include developing and newly industrialized countries in the climate protection system with substantial emission growth limits and
- with no or insufficient (economic) incentives for climate friendly behaviour for all nations and all fossil fuel consumers world wide

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[31] Russia in fact has got some incentives: Because Russia has successfully negotiated 1.5 billion tonnes of CO_2 of surplus emissions (compared to the business as usual 33% emission reductions till 2010, refer to 'Evaluation of the reference case against Kyoto targets' in European Commission Community Research (2002), p.45.), in case of ratification this surplus 'hot air' could be sold for instance to the otherwise non-complying European Union. But the price of those 'Assigned amounts' remains unclear and there seem to be additional political preferences and potential bargaining deals to further delay the ratification of the Kyoto protocol.

[32] UBA ,Umweltbundesamt (2003), p. 26.

[33] According to Grubb et. al., such 'hot air' is primarily in the states of the former Soviet Union (Russia, Ukraine and the Baltic states as well as in central and in the eastern European states). (Refer to Grubb, M./Vrolijk, C./Brack, D.(1999), p. xxviii.)

there is no chance whatsoever that climate sustainability will be reached, thus preventing dangerous interference with the climate system.

Nevertheless: There exists one important key within the Kyoto protocol for a much more efficient 'Beyond Kyoto' system: The flexible 'cap and trade' mechanism (emission trading between states, joint implementation and clean development mechanism) could be enlarged to a global 'cap and trade' system. This will be outlined in section VII.

IV. An objective assessment of the Kyoto Protocol based on the 'comprehensive standard system for evaluating the prospect of success of different climate protection systems'

Based on thorough studies of the most relevant literature to that subject mainly of IEA/OECD[34], IEA/OECD's authors Philibert and Pershing[35] and ECOFYS[36] Wicke has developed a so-called 'comprehensive standard system for evaluating the prospect of success of different climate protection systems'. All the criteria and sub-criteria of the above mentioned literature have been integrated – and weighted in partly slight deviation to other authors. Especially the possibility to achieve 'climate sustainability' with a certain climate protection system has been – contrary to others, (with only 33%) – given a weight of 50% thus being called the 'paramount criterion'. "Environmental effectiveness – measured in terms of the ability of a policy to stabilize atmospheric concentrations of greenhouse gases – is in this sense the overriding priority of international climate policy. Political considerations of equity, efficiency and so on must take second place to this priority; there would be little point in implementing a politically feasible approach that isn't up to the environmental job in hand."[37]

Therefore – as mentioned before – the climate sustainability criterion accounts for 50%, economic efficiency for 18%, technical applicability for 8% and political acceptance for 24% of the maximum score. On that clearly defined basis (with a total of 19 sub-criteria, which have a single weight according to the information within Table 1.), which – of course – is open to scientific debate and criticsm Wicke could do a comprehensive evaluation of the Kyoto Protocol. The aforementioned merits and demerits of the Kyoto Protocol and other evaluation aspects[38] – based on the shortly described standard evaluation system[39] - leads to the assessement of the Kyoto Protocol as objectively as possible which is presented in Table 1.

[34] IEA / OECD (2002), p.40.
[35] Philibert; C./Pershing, J. (2001), p. 212.
[36] ECOFYS (2002), p xiii and following.
[37] Evans, A./Simms, A. (2002), p. 5.
[38] Refer to Wicke, L. (2004), sub-section III.C.3.
[39] Refer to Wicke, L. (2004), chapter II.

Table 1: The overall evaluation of the existing UNFCCC/Kyoto system, CAN 's viable framework and the Global Climate Certificate System

Part A: Climate sustainability: Main criteria (50 points): Ensuring that with the help of the international climate protection system examined the concentration of CO_2 in the atmosphere does not exceed a level of 550ppm on a permanent basis. (Are the rules agreed to in the contract adhered to?)	**Maximum score**	**Actual score** Kyoto-Protocol	GCCS ►	CAN's viable Framew.
Sub-criteria for securing the main criterion:				
General incentive to reduce the increase in CO_2 in developing countries	**4**	**0**	**1°**	**4**
Incentive / compulsion for fast, substantial reductions in industrialized nations	**10**	**3***	**3***	**7**
Fastest possible involvement of developing countries	**4**	**0**	**1**	**4**
Financing emission reductions in developing countries	**4**	**1****	**1****	**4**
Favouring "early actions" world-wide	**4**	**0**	**0**	**4**
Avoidance of emission shifting (leakage) effects	**4**	**0**	**1*****	**4**
Permanent interest in climate-friendly behaviour world-wide	**10**	**0**	**0+**	**10**
Quantified climate protection aim of the climate system	**6**	**0**	**3°°**	**6**
Avoidance of "hot air" world-wide	**4**	**0**	**1*****	**2**
Total:	**50 max.**	**4**	**12**	**45**

Kyoto:*The performance checks and sanctions according to Article 17 of the KP (Marrakesh Accord) will be of very little influence.**Very weak influence by the Clean Development Mechanism (CDM)/ refer also Wicke, L. (2004), sec. III.C.

CAN vFrW.: °Very limited incentives by bureaucratic and 'costly' CDM within the current Kyoto system with weak legal binding commitments of Annex I countries (low CER demand and price) *The performance checks and sanctions according to Article 17 of the KP (Marrakesh Accord) (corresponding to the KP) will be of very little influence. **Very weak influence by the Clean Development Mechanism (CDM), ***Slightly more favourable than at present because the group of countries involved is, in principle, enlarged. °°Aim deductible from the 2°C – aim, but not quantified by CAN + No incentive mechanism within CAN's proposal

►**GCCS:** For details of the evaluation of **GCCS** refer to Wicke, L. (2004), sections IV.D. and V.B.

Part B: Economic efficiency: Main criteria (18 points): Minimizing adverse economic effects and promoting positive economic impetus whilst implementing the climate-related goals of the climate-policy instrument examined	**Maximum score**	**Actual score** Kyoto-Protocol	GCCS ►	CAN's viable Framew
Sub-criteria for securing the main criterion:				
Cost efficiency: Minimizing global costs	**6**	**2***	**3***	**6**
Flexibility during national implementation (minimizing national costs) and financial assistance for development countries	**5**	**2***	**2***	**4**
Considering structural differences in climate-related requirements	**4**	**3****	**2****	**3**
Positive economic (growth) impetus	**3**	**1*****	**1*****	**2**
Total:	**18 max.**	**8**	**8**	**15**

Kyoto: *The JI, ET and CDM flexibilization elements contribute – with (climate-based) overall low requirements – towards cost efficiency and financing **Developing countries and threshold countries not subject to requirements, (climate-based) very low and differentiated requirements for industrial countries
***Very few incentives in industrial countries for more climate-friendly development
Kyoto protocol evaluation: Refer also Wicke, L. (2004), sec. III.C.

CAN vFrW.: *The flexible Kyoto elements JI, ET and CDM contribute – with hopefully(!) overall higher (climate-based) requirements compared to the Kyoto Protocol – towards cost efficiency and co-financing by (CAN's hope for) enlarging the JI and ET group and bigger commitments ** In contrast to the KP, 'a relatively small number' of newly industrialized countries are supposed (!) to not being exempted from the requirements, low consideration of structural differences between industrialized nations and newly industrialized countries.***Very few incentives in industrialized nations and newly industrialized countries for more climate-friendly development

►**GCCS:** For details of the evaluation of GCCS refer also to Wicke, L. (2004), sec. IV.D. and V.C.

Table 1**, continued**: Overall evaluation of the existing UNFCCC/Kyoto system

Part C: Technical applicability: Main criterion (8 points): Do the structure and individual elements of the system meet the requirements of easy technical applicability	**Maximum score**	**Actual score**		
		Kyoto-Protocol	**GCCS viable Framew**	**CAN's ►**
Sub-criteria for securing the main criterion:				
Ability to fit into the international climate protection system and the negotiation process	**4**	**4**	**4°**	**3**
Easy applicability and control capability in order to ensure practical functioning	**4**	**3**	**2***	**3**
Total:	**8 max.**	**7**	**6**	**6**

Kyoto - evalutation: Refer mainly to Wicke, L. (2004), sec. III.C.
CAN vFrW.: °CAN's proposal is completely compatible to the current Kyoto system
*The group of countries to be controlled hopefully becomes substantially larger than with the Kyoto Protocol.
►**GCCS:** For details of the evaluation of **GCCS** refer to Wicke, L. (2004), sections IV.D. and V.D.

Part D: Political acceptance: Main criterion (24 points): Do the climate protection systems examined comply with the principles of fairness and how likely is it that they will be accepted by all or a majority of the contract states? (Could it lead to a signing of a contract?)	**Maximum score**	**Actual score**		
		Kyoto-Protocol	**GCCS viable Framew**	**CAN's ►**
Sub-criteria for securing the main criterion:				
Fulfilment of the fairness principles				
- Promotion / non-prevention of sustainable development	**5**	**3***	**2***	**4**
- Stronger burden on industrialized nations bearing main responsibility and capable of bearing more burdens	**5**	**3***	**2***	**5**
Political acceptability				
- Acceptance by all key players (groups of players)	**5**	**4****	**1****	**3**
- Acceptance by the largest possible percentage of all contracting states	**9**	**8*****	**2****	**6**
Total:	**24 max.**	**18**	**7**	**18**

Kyoto:*Over 50% of points, because requirements (climate-related) are in total low
**Some prospects still exist that the Kyoto Protocol (55% emission quorum) will come into force
***Agreement was signed even through important contracting states (groups) no longer took part later.
CAN vFrW.: *Due to the hopefully early involvement of newly industrialized countries (with a significantly lower per-capita income), newly industrialized countries are exposed to lower burdens.
**Very low degree of acceptance (see above) – both industrialized and newly industrialized countries.
►**GCCS:** For details of the evaluation of GCCS refer to Wicke, L. (2004), sections IV.D. and V.E.

The scoring in the various sub-criteria is based on the explanations above and – in more detail explanations – on the underlying book.[40]

On balance the evaluation in Table 1 of the **Kyoto Protocol** comes to following results:
The existing Kyoto system was awarded 37 out of 100 points which, pursuant to the English scoring system means a score of "poor" or "complete failure" (in German, this would be 5.0).
Conclusion: Due to its structural deficits, the current UNFCCC/Kyoto system is not capable of adequately reaching the European Union's stabilization goal or climate sustainability. The

[40] Refer to Wicke, L. (2004), sections IV.D. to V.B. to V.E..

much better scoring within the economic, technical and political evaluation criteria does not compensate the complete failing in the overriding climate sustainability criterion.

V. Climate Action Network's 'Viable Global Framework for Preventing Dangerous Climate Change' and it's assessment

After tremendous and very meritorious efforts of thousands of very climate protection dedicated persons world wide over many, many years to negotiate all details of the Kyoto protocol, to get this protocol signed and (hopefully) ratified after all, the 'incremental regime evolution' strategy – as Berk/den Elzen call it[41] – obviously and for mere 'practical reasons' seems to be the best way to further internationally combating climate change. Therefore there exist many proposals for an 'incremental evolution' of the Kyoto Protocol[42].
One of that proposal – the most recent one and one of the most sophisticatedly devised and ambitious proposals – has been published and put forward to Milan's COP 10 climate conference by NGOs' International Climate Action Network with its 'Viable Framework for Prevention Dangerous Climate Change' approach.[43]
This CAN proposal is based on a "three track" approach with its main objective to keep global warming "as far below 2°C as possible":

- the "Kyoto track" with "its legally binding tradable emission obligations as the core of the system that will drive rapid technological development and diffusion and provide the technological basis for win-win solutions to climate and sustainable development objectives.",
- the "Greening" (decarbonisation) track that would drive the rapid introduction of clean technologies that can reduce emissions and meet sustainable development objectives in developing countries" and
- the "Adaptation" track, which "provides the resources to the most vulnerable regions (small islands, least developed countries) to deal with unavoidable climate change." [44]

As far the **'core element Kyoto track'** is concerned, CAN adds:
"The fact that the current US administration rejects the Kyoto Protocol does not mean that the regime of legally binding emission targets for industrialized countries has failed, cannot work in the future or is not an essential element of an international system to prevent dangerous climate change. … The Kyoto ratifying countries should move forward with their implementation and start developing plans for deeper reductions in the second commitment period and be ready to discuss this concretely in 2005 when progress on Kyoto is to be reviewed. … For the second commitment period of the Kyoto Protocol it is clear that only a relatively small number of countries not in Annex B would need to join the binding emission obligations track."[45]
This optimistic and hopeful outlook should be critically reviewed:

1. CAN's discussion paper unfortunately does not contain any indication of how to convince the current Annex-I countries of 'plans for deeper reductions in the second commitment period' after the foreseeable joint non-achievement of their commitments in the first commitment period (1990 to 2008/12) (plus 9% instead of the joint commitment of minus 5.2% according to the IEA, refer to section II.). CAN neither gives any indication how enormously big those 'deeper reductions' must be in order to reach an emission path towards CAN's objective of a "global warming far below 2°C". (see the calculation at numeral 3. below). nor does CAN show – and that is even more important – which incentive or implementable sanction mechanism - could drive the current Annex I countries to those desirable reductions between 2013 to 2017. As pointed out in section II. the Kyoto sys-

[41] These systems based on the Kyoto system are – according to Berk/den Elzen – instruments which lead to an 'incremental regime evolution' and hence to a gradual expansion of the Annex-I states group. The here aim is to achieve further, committing and quantified emission limits or reduction targets within the scope of the UN Framework Convention on Climate Change. Refer to Berk, M./den Elzen, M.G.J. (2001), p. 2.
[42] Refer to Wicke, L. (2004), chapter III, overview in section III.H.
[43] CAN international (2003): p. 1 and following
[44] Ibidem
[45] Ibidem

tem, which CAN describes as a "system of legally binding absolute emission reductions and compliance regime" is primarily based on a bargaining process for voluntary self commitments by states. Those states can not be forced to any reduction or other limits of their emissions, that they don't accept. In short: As long as CAN doesn't present new incentive or sanction mechanism for 'deeper reduction' commitments there on balance will be no such reductions.

2. This holds true even more in respect to CAN's idea "that additional countries should join the legally binding obligation". The determination of those countries "would have to be based on criteria that involved a combination of factors involving relative per capita emissions, per capita income, and historical responsibility. For the second commitment period this would most likely involve a relatively small number of developing countries that are at the upper end of the income range for this group."[46] Up to now in fact no developing country is prepared to discuss or even commit itself at all to any limit or restriction of its GHG emissions[47] For some striking examples of this refusal of even any discussions about just a indication of that subject refer to ECOFYS (2002), p. 19. – because of the historical responsibility and 'blame' borne by industrialized countries and their current by far above-average, per-capita emissions compared to developing countries. After the above-mentioned failure on the part of industrialized Annex-I countries to 'take the lead' in the first commitment period, developing countries will have even less motivation to adopt such self-commitments.
3. CAN unfortunately fails to even mention the magnitude of the necessary, qualified 'deeper reductions' demanded of current and future Annex-I states. CAN should have referred to literature and should have quoted ECOFYS' proposal of 'Continuing Kyoto' (very similar to CAN's 'viable framework') about the magnitude of their demanded 'deeper reduction' within CAN's three track approach ('viable framework'). As a result of ECOFYS' calculations[48] ECOFYS (and therefore CAN too with it's 'viable framework'-proposal and strategy) thus assumes that developing / newly industrialized countries will (voluntary have to) agree (!) to reduce their emissions in line with the ECOFYS requirements (and CAN's demands) for industrialized nations by 20% (!!!) between 2010 and 2020 **even though** developing countries generate only around 30% of per capita GNP of industrialized countries. Furthermore, these industrialized nations – with a significantly better economic situation between 1990 and 2010 (compared to developing countries) – will, as already discussed earlier, increase their emissions by at least 9% rather than reducing their emission by the pledged 5.2% (over **20!** years).
4. Further consequences of CAN's 'Kyoto track' objective – as outlined by ECOFYS – are even more important: Under the economic conditions described and commented on above, ECOFYS expects these developing countries to reduce their emissions annually by between 0.7% and 2% or between 7% and 20% in ten years between 2010 and 2020. Note to this demand: During the first commitment period, industrialized nations will "achieve" an increase of around 9% rather than a 5.2% reduction in twenty years![49]

Summarizing these calculations and comments, it can be said that within the current Kyoto self-commitment system (refer to sections II. to IV.) hoping that these extremely ambitious goals can be achieved is merely an illusion. From an ecological point of view, the authors highly appreciate CAN's 'Kyoto track' objective which is indeed strongly dedicated to climate protection. But this Kyoto track - quantified by ECOFYS – is without doubt out of any reasonable reference to reality as long as no new incentive (or sanction) mechanism is installed within the global climate protection system. (Authors' note: CAN should not only propose

[46] CAN international (2003), p.4.
[47] For some striking examples of this refusal of even any discussions about just a indication of that subject refer to ECOFYS (2002), p. 19.
[48] ECOFYS (2002), p. 33.
[49] Refer to ECOFYS (2002), p. 33.

desirable objectives and desirable 'tracks'. If CAN really wants to achieve 'its' objectives CAN has to think about the implementation of new and necessarily market-orientated 'cap and trade' schemes like (C&C and) the GCCS proposal within this article, section VII. .)

Interestingly enough the main authors of the CAN proposal den Elzen and Berk (the authors of this article suppose that they are CAN's 'ghost writers', at least they are the only authors quoted in CAN's paper[50]) have a completely different view in one of their earlier published papers. In that paper – described and quoted in the footnote – they compare the 'multistage approach'- system (which is very similar and something like a 'precursor-system' of CAN's three tracks system) with the 'cap and trade' scheme C&C (Contraction and Convergence). In that paper Berk and den Elzen are rightly convinced that a market oriented incentive system like C&C has important advantages compared to 'incremental evolution of Kyoto approaches' (one of those is represented by CAN's viable framework) in the following respects:

- cost efficiency,
- incentives for developing countries for limiting their emission growth,
- giving DCs more incentives than by CDM (see below, 'greening track' of CAN's proposal) and
- providing 'more incentives for a timely participation of developing countries and
- better opportunities for an effective and efficient regime for controlling global GHG emissions'.[51]

The authors of this article have no explanation why den Elzen and Berk have changed their mind so significantly. The de-qualification of C&C as a 'system that is not practicable'[52] makes no sense as long as there exists no real effort of economists and other experts to instrumentalise C&C or similar approaches like GCCS (refer to section VII) and make it practicable. In fact there is – as Evans and Simms rightly state – "little point" in presenting and trying to implement a climate committed 'viable framework' as a "politically feasible approach that isn't up to the environmental job in hand"[53].

As above quoted, CAN outlines its **"Greening" (decarbonisation) track** as the track "that would drive the rapid introduction of clean technologies that can reduce emissions and meet sustainable development objectives in developing countries … ". CAN adds elsewhere: " The

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[50] Refer to the reference within CAN's paper: CAN international (2003), p. 9.. The there quoted two den Elzen et. al. articles and books are quoted in the references of this article.

[51] Berk, M./den Elzen, M.G.J. (2001), p. 13. Within this quoted article (p. 13 and following) Berk and den Elzen emphasize the

- cost efficiency advantage of the C&C system. "First, the convergence regime offers the best opportunities for exploring cost-reduction options as all parties can fully participate in global emission trading. There may be excess emission allowances (hot air), but this will not affect the effectiveness nor the efficiency of the regime, only the distribution of costs. Second, there will be no so-called carbon-leakage."
- Furthermore, they rightly point out that the C&C system creates a (stronger) incentive for developing countries to limit the growth of their emissions (in order to be able to sell emission rights).
- They claim that developing countries are granted more emission rights than they currently emit, enabling them to strive for sustainable development and to adapt themselves to climate change. "So from their perspective, the C&C approach is more attractive than a multi-stage approach" (where the developing countries must commit themselves to emission reductions and limitations on reaching of certain thresholds; refer to Wicke, L. loc. cit. III.E.1). Furthermore, they state that the C&C system is more attractive for developing countries than their current non-annex-I status providing them with only minor advantages when trading emissions within the framework of the clean development mechanism.
- Berk/ den Elzen summarize the importance of the C&C systems compared to the system of growing self-commitment on the part of developing countries (i.e. the so-called multi-stage approach, refer to Wicke, L. loc. cit. III.E.1) as follows: "Where climate change limits are stringent, a C&C regime seems to provide more incentives for a timely participation of developing countries, and better opportunities for an effective and efficient regime for controlling global GHG emissions ..."

[52] CAN international (2003), p. 8.

[53] Evans, A./Simms, A. (2002), p. 5.

availability of resources and technology from the industrialized countries is critical as is also the capacity and ability of the developing countries to act. …. Where technical or other assistance is required to do so, this needs to be made available from the industrialized countries." [54]

There is no doubt that such climate-friendly or sustainable development in developing and newly industrialized countries, i.e. a 'greening or decarbonisation track', is of great importance for (diminished) growth or reduced acceleration of CO_2 emissions and thus the growing greenhouse gas concentration in the atmosphere. But even this leaves substantial uncertainty concerning the proposed track and here again there exists only a very low level of 'instrumentalisation'. In other words: As long as no really substantial funding is available for this track in developing countries, the greening track will remain highly desirable but not (very) realistic. As long as the fight against poverty and for (hopefully somehow sustainable) growth for more and better-paid jobs continues to be the dominant objective – and **no substantial,** especially dedicated funds for sustainable and climate-friendly development are available – there will be only very limited chances of such a 'greening track' gaining ground in developing countries.
Surprisingly, CAN does not refer to the Clean Development Mechanism (CDM) as one potential source of finance for initiating and co-financing some 'greening track projects'. It may be possible that CAN has sufficient proof that – irrespective of the important potential of CDM to reduce the overall costs of a certain degree of CO_2 limitation – the rather complicated and somewhat bureaucratic CDM does not have the potential to really become the basis of sustainable and climate-friendly development in developing countries.
CAN should hence look for a realistic global climate protection system that – besides giving big incentives for CO_2 reductions worldwide – provides adequately large and substantial funds for CAN's desirable 'Greening' or 'Decarbonisation track'.
In section VII of this article the prefence system (GCCS) of the two approaches are described (C&C and GCCS) that provide both big incentives for decarbonisation in industrialized and developing countries and the funds urgently needed to finance nation-wide decarbonisation installations in developing countries and climate-friendly behaviour and measures by consumers and companies of all sizes. Note: Describing desirable developments without practical instruments for their broad implementation is extremely inadequate when it comes to effectively fighting dangerous climate change!

CAN's third track – Adaptation Track – "provides the resources to the most vulnerable regions (small islands, least developed countries) to deal with unavoidable climate change" and CAN adds elsewhere: Those that bear the main responsibility for these climate changes, the industrialized countries, would be required to fund these measure… . Existing elements of the UNFCCC/Kyoto Protocol system that would form part of a coherent Track 3 are the Adaptation Fund, the Special Climate Change Fund and the LDC fund." [55]

In this case too, there exists a very low level of instrumentalisation. Especially, CAN fails to 'deliver' an instrument urgently needed in order to acquire the funds required for climate change adaptation in many of the least developed countries (often being most endangered too). It is merely (political) theory that these often most vulnerable, yet mostly politically 'irrelevant' or at least 'less important' countries will receive enough 'adaptation funds' from the current Kyoto financing mechanism. If one does not want to merely 'talk' about adaptation, one will have to think of and 'provide' a (financial) instrument, so that those countries vulner-

[54] CAN international (2003), p. 4 and following.
[55] CAN international (2003), p.5.

able to climate change have a chance for adequate adaptation to the consequences of climate change! This – besides other considerations – will be done in section VII of this article.[56]

According to the standard evaluation system described in section IV and based on the above described evaluation remarks and additional certain remarks to detailed evaluation criteria within table Table 1. CAN's 'Viable Global Framework' is evaluated as shown in Table 1. with an overall grade of 33 out of 100 points. The main deficit is the very poor fulfilment of the climate sustainability criterion. CAN's proposal just is not able to meet its own main objective to 'prevent dangerous climate change' because there exists no means or mechanism for incentives for states and fossil fuel consumers world wide to reduce their emissions. Because of its very low political acceptance compared to the existing Kyoto system which was at least signed (even though it has – up to early autumn 2004 - not yet come into effect). On the basis of the English marking scale the system is hence with even stronger justification rated as "poor" (German grade: 5.0).
Conclusion: CAN's 'Viable Global Framework for preventing dangerous climate change' system with its structural shortcomings and insufficient political acceptance is completely unable to come reasonably close to – at least – the European Union's stabilization target (and it is even much more far away from its own objective 'prevent dangerous climate change' by keeping "global warming as far below 2°C as possible"). Therefore – deplorably – CAN's very ambitious proposal can not avoid dangerous interferences with the atmosphere.

VI. The only possible 'appropriate action' (according to Art. 9.1.): Reformation or 'structural change' of the Kyoto Protocol

In sections II to IV the authors have presented a premature 'review of the Kyoto Protocol' according to its articles 3.9. and 13.4.a.. In section V the most recent proposal for - according to Berk/den Elzen - an 'incremental regime evolution'[57] has been assessed. The score of "poor" or "complete failure" of the two systems unfortunately is representative for all important proposals for incremental regime evolution of the Kyoto system. Besides the Kyoto protocol and CAN's proposal Wicke has evaluated on the basis of the same objective 'comprehensive standard system for evaluating the prospect of success of different climate protection systems' the proposals of Continuing Kyoto (ECOFYS), MultiStage Approach, New MultiStage Approach; Global Triptych Approach, Extended Triptych Approach and MultiSector Convergence Approach. The scoring was pretty much at the similar level between 28 and 51 points out of maximum 100[58]. Only the New MultiStage Approach of ECOFYS reaches with 51 point the 'pass' threshold. But even that proposal gets only 23 out of maximum 50 points in the predominant criterion of reaching 'climate sustainability'. This means: The implementation of that proposal wouldn't avoid dangerous anthropogenic interference with the climate system either.
These results of – as Wicke calls it – an objective evaluation of the quoted most important proposals for a 'beyond Kyoto' incremental regime evolution of the Kyoto Protocol – which of course are open to scientific (controversial) debate – imply: The only 'appropriate action' according to art. 9.1. of the Kyoto Protocol can be a substantial 'reformation' respectively a 'structural change' (as Berk/den Elzen call it[59]) of the Kyoto Protocol.

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[56] For details for 'financial assistance to developing countries for sustainable development and combating poverty' and 'special assistance under the GCCS for poor developing countries particularly vulnerable by the adverse effects of climate change' refer to Wicke, L. (2004), sections VI.E.5.a. and b..
[57] Berk, M./den Elzen, M.G.J. (2001), p. 2.
[58] Refer to table 15: Overall evaluation of the most important variants for the further development ('incremental regime evolution') of the Kyoto system. in: Wicke, L. (2004): section III.H.
[59] Berk, M./den Elzen, M.G.J. (2001), p. 2.

In the final section VII the authors will – in the briefest possible presentation – put forward the Global Climate Certificate System (besides the C&C, contraction and convergence system[60]), one of the two systems that really could be able to prevent dangerous interference with the atmosphere. The GCCS has been assessed on the basis of the same objective 'comprehensive standard system for evaluating the prospect of success of different climate protection systems' and has - based on this evaluation system – (which has been developed even before Wicke has devised any details of the GCCS) proven clearly to be the preference system. It has achieved an excellent score of 84 out of 100 points. Therefore, by all (European) score scales[61] the GCCS must be termed in principle as an extraordinarily well-suited climate protection system. Of course: Not only the above mentioned 'standard evaluation system' but also the scoring and evaluation of the GCCS and all other 'Beyond Kyoto' proposals are open to scientific discussion. As far as GCCS is concerned and for a fair 'evaluation debate' the critical reader has got to read not only the following few pages of an 'outlining' description of GCCS in this article. The GCCS has been designed, evaluated and elaborated in much detail up to a status 'to general application maturity' within more than 150 pages.[62]

VII. GCCS: Briefest description and the results of its evaluation

As already said: In this article the authors can only present the overview of the description of the GCCS. That is why the interested reader has no choice but to look in the quoted sections of the book 'Beyond Kyoto – a new Global Climate Certificate System - Continuing Kyoto Commitments or Global Cap and Trade System for a Sustainable Climate Policy?' because an adequate resuming of about 160 pages within 5 pages in an article is a too complicated exercise. So the reader can get only a small impression of that global cap and trade system and its evaluation in Table 1.

The basic idea for devising GCCS has been born on the main results of the above quoted standard evaluation of the various 'Beyond Kyoto'-proposals summarized as follows: "Preventing dangerous interference with the climate system" is only possible – by way of structural change of the Kyoto system – with the help of a 'cap and trade' incentive system with a world-wide incentive effect in order to achieve the minimum climate stabilization target as laid down by the European Union in 1996.
The main features of the GCCS can be characterised as follows: In 1996 (before the Kyoto negotiations), the European Union defined the level at which 'dangerous anthropogenic interference with the climate system' will occur thus violating the ultimate objective of Article 2 of the UNFCCC Climate Convention: Dangerous interference will occur when the concentration of carbon dioxide exceeds a level of 550 parts per million (ppm) – for the majority of climate scientists and NGOs, this concentration is far too high. But even this goal is very hard to achieve. A global 'cap and trade' system is the only way to ensure that the EU's maximum concentration level is not exceeded and the most cost-effective solution is achieved. The stabilizing line for 550 ppm in Figure 2 shows how much CO_2 per annum can be emitted globally (as area below the 550 curve). On the basis of this EU objective, the 'cap and trade' – Global Climate Certificate System (GCCS) can be outlined in eight main elements as follows:

1. Global CO_2 emissions and therefore the 'cap' maximum is fixed as of 2015 at around 30 billions tonnes for at least 50 years. Since this amount is almost equal to future emissions as of the year 2015 (according to the International Energy Agency), there will be no

[60] Refer to a comprehensive description, improvement and evaluation of the C&C-proposal Wicke, L. (2004), section IV.C..
[61] D: 1.3, F: 18 from 20 points, GB: 82 from 100 points, ES: 8 out of 10: Grade "maximum distinction", A (excellent) (Note: Lutz Wicke is a professor at a French/English/German/Spanish European school of economics, the ESCP-EAP, European School of Management Paris, Oxford, Berlin und Madrid.)
[62] Refer to Wicke, L. (2004), sections IV.D. to VIII.D.

global shortage in the beginning. The annual allowance of 30 billion tonnes of CO_2 are represented by 30 billion Climate Certificates (CCs) (refer to Figure 2).

2. The (pretty limited number of) providers importing or domestically producing fossil fuels and resources (FRPs) require a sufficient amount of CCs in order to cover CO_2 emissions resulting from their trading of fossil fuel products. Unlike the European Emission Trading System, the GCCS starts at the first level of trading, i.e. at the level of domestic fossil fuel and resources providers, importing or producing, thus being the basis of subsequent CO_2 emissions. This basic level constitutes a significant simplification of the emission trading system.
3. The CCs valid for each year are distributed yearly free of charge to all national states (and their National CC Banks (NCCBs)) on the basis of a generally fair distribution key of 'one man/one woman – one climate emission right' in proportion to the population figure of a certain fixed reference year. These CCs would represent 4.9 tonnes of CO_2 per capita - for example, 400 million tonnes for Germany and 4.9 billion tonnes for India. Developing countries would be able to sell their surplus CCs. Industrialized countries would have to buy CCs in order to continue producing and/or consuming as before.[63]
4. On a global scale, this would create an enormous incentive for sustainable development. By implementing the GCCS, developing countries would be able to sell large quantities of CCs over several years whilst industrialized nations would have to buy fewer (expensive) CCs. But this 'text book'-type of 'cap and trade' would lead to enormous annual multi-billion dollar or euro transfers from industrialized to developing countries. This, in turn, would lead to unbearable and unacceptable disturbance of the world economy. To have a good chance to be accepted by all or at least the overwhelming number of all states the GCCS has got to guarantee at least three issues:
   - the transfer sum between industrialized and developing countries must be limited to an acceptable level but still giving enough incentives for DCs to be part of GCCS
   - there must a guarantee that FRP get a basic CC supply with moderat prices but still having enough incentives for CO_2-limiting and reduction and
   - there must a guarantee against 'skyrocketing prices' on the CC-market.

   This is why – as stated before in short – the GCCS requires a division of markets as follows:
5. On the transfer market between states (via a World Climate Certificate Bank, WCCB), developing countries would (have to) sell their surplus CCs for US$2 per CC to industrialized nations. On the basis of the total amount of CCs (based on the country's population) allocated free of charge to the National Climate Certificate Banks (NCCBs) plus the CCs returned by developing countries (surplus re-transfers for US$2), the NCCBs supply their FRPs on the basis of their demand proven for the previous year. (The FRPs hence receive a reasonable basic supply). If the US$2-price of the CCs is passed on to consumers, this would add around US$ 0.005 to the price of a litre or 0,02 of a gallon of petrol.
6. On the free CC market between FRPs, FRPs have to buy additional CCs if they wish to sell more fossil fuels and resources (for example, due to expanding business) and if this demand is not covered by their basic supply of CCs as shown in 5. (Since developing countries have per capita emissions far below the global average, their (potentially climate friendly) development cannot and should not be restricted. Therefore developing countries need more CCs and the re-transfer of surplus CCs to industrialized nations will decline anyway over the course of time.) In order to prevent any 'skyrocketing' CC prices on the free market, the WCCB sells a sufficient quantity of CCs at an initial free market price of US$30 per CC - a maximum price or a 'price cap' on the free market that will prevent any

[63] In principle NGOs both on the environmental and on the development aid side in principle are backing a certificate or 'cap and trade' solution for the fight against dangerous climate change. Refer to BUND/Misereor (Editors) (1996), p. 403 and following.

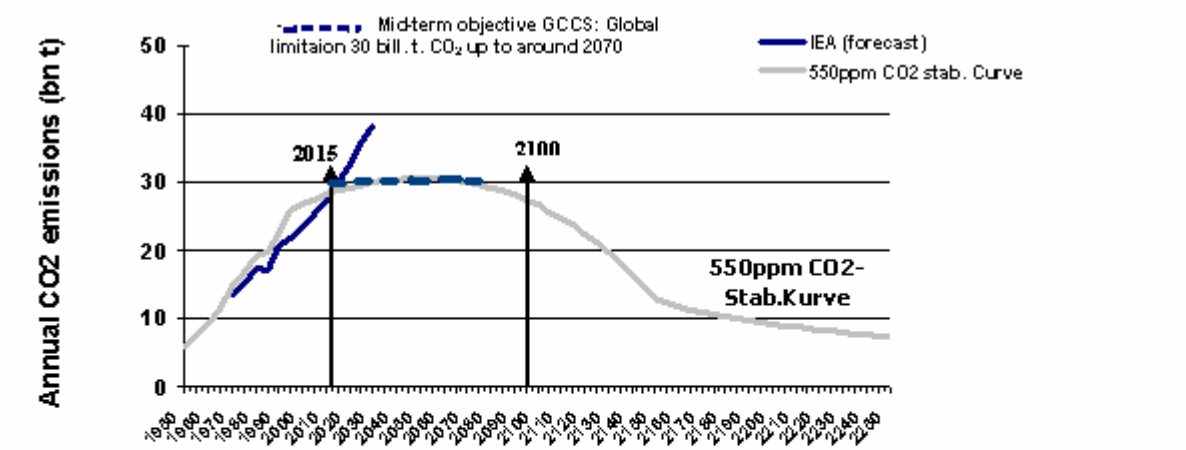
overburdening of economies and consumers. (This price cap and the transfer price as stated in 5. will be raised every 10 years in order to boost incentives for climate-friendly 'action' on a global scale.)

7. Developing countries can only use the revenue from their sale of surplus CCs to finance measures in line with climate-friendly 'sustainable development and elimination of poverty' rooted in 'SDEP' plans which are developed on a national level and approved on a supra-national scale.
8. Efficient measures to supervise and control the amounts of fossil fuels and resources sold according to a 'simplified IPCC reference system' and to protect against fraud and corruption in implementing SDEP measures and programmes will warrant correct implementation of the GCCS both in industrialized and in developing countries.

Figure 3 shows how the elements interact. As already noted, in chapter VI of the quoted book of Lutz Wicke[64] all the key elements are there described in such a detail that the author considers the 'GCCS to be in a condition generally ready for application'. The GCCS largely embodies almost all important wishes, apprehensions and constructive proposals from both industrialized and developing countries as far as flexible mechanisms within the Kyoto Protocols are concerned. The GCC system will, of course, be modified in many respects during the course of potential international negotiations.

[64] Refer to Lutz Wicke (2004)

Figure 2: Emissions from 2000 until 2250 aimed at in order to stabilize CO_2 levels in the atmosphere so as to achieve the European Union's 550ppm CO_2 objective (according to IPCC/WRI) and the 'actual' rise of energy-related CO_2 emissions from 2000 until 2030 according to the International Energy Agency.



Sources for Figure 2:

a) 550 ppm CO_2 path as a target: PowerPoint presentation by the World Resources Institute (http://powerpoints.wri.org/climate.ppt) according to IPCC 1995 a, p.10, and 1995 b[65]
b) Energy-related CO_2 emissions: IEA 2002 a– International Energy Agency: World Energy Outlook 2002, p. 73 and p. 413[66] [67].

For a fair and unbiased evaluation of the GCCS[68], which is quantitatively shown in Table 1 the following remarks are important too:

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[65] IPCC (1995 a), p. 10 Fig. 1 (b) and IPCC (1995 b) p. 85 (Fig. 2.6). These findings are based on the publication of Wigley, T. M. L./Richels, R. and Edmonds, J. A. (1995). (*Note for particularly interested readers*:According to Fig. 6-1 and Table 6-1 IPCC TAR (2001/S), p. 99 and following, the 550ppm stabilization curve shown in the TAR (already) reaches its peak between 2020 and 2030 and drops to a level below the 1990 value between 2030 and 2100. But:This TAR IPCC presentation represents the 550ppm carbon dioxide equivalents of all greenhouse gases and sources (ibidem, footnote6, p. 98).According to the IPCC (TAR S, ibidem, p. 100) the 650ppm CO_{2eq} stabilization curve which comes closer to the EU's 550ppm CO_2 stabilization target, which is solely based on CO_2 emissions, reaches its peak between 2030 and 2045 and falls to below 1990 emission levels between 2055 and 2145. This is also reflected by the above-mentioned WRI stabilization curve on the basis of the IPCC's Second Assessment Report (SAR).The WRI/IPCC(SAR) 550ppm curve hence (largely) corresponds to the 650ppm IPCC (TAR2001/S) stabilization curve.)

[66] Since other CO_2 emissions from sources other than energy production and use (especially from other industrial processes and changes in land and forest use) must be additionally considered, carbon dioxide emissions of around 30 billion tonnes must be expected in 2012-2014.

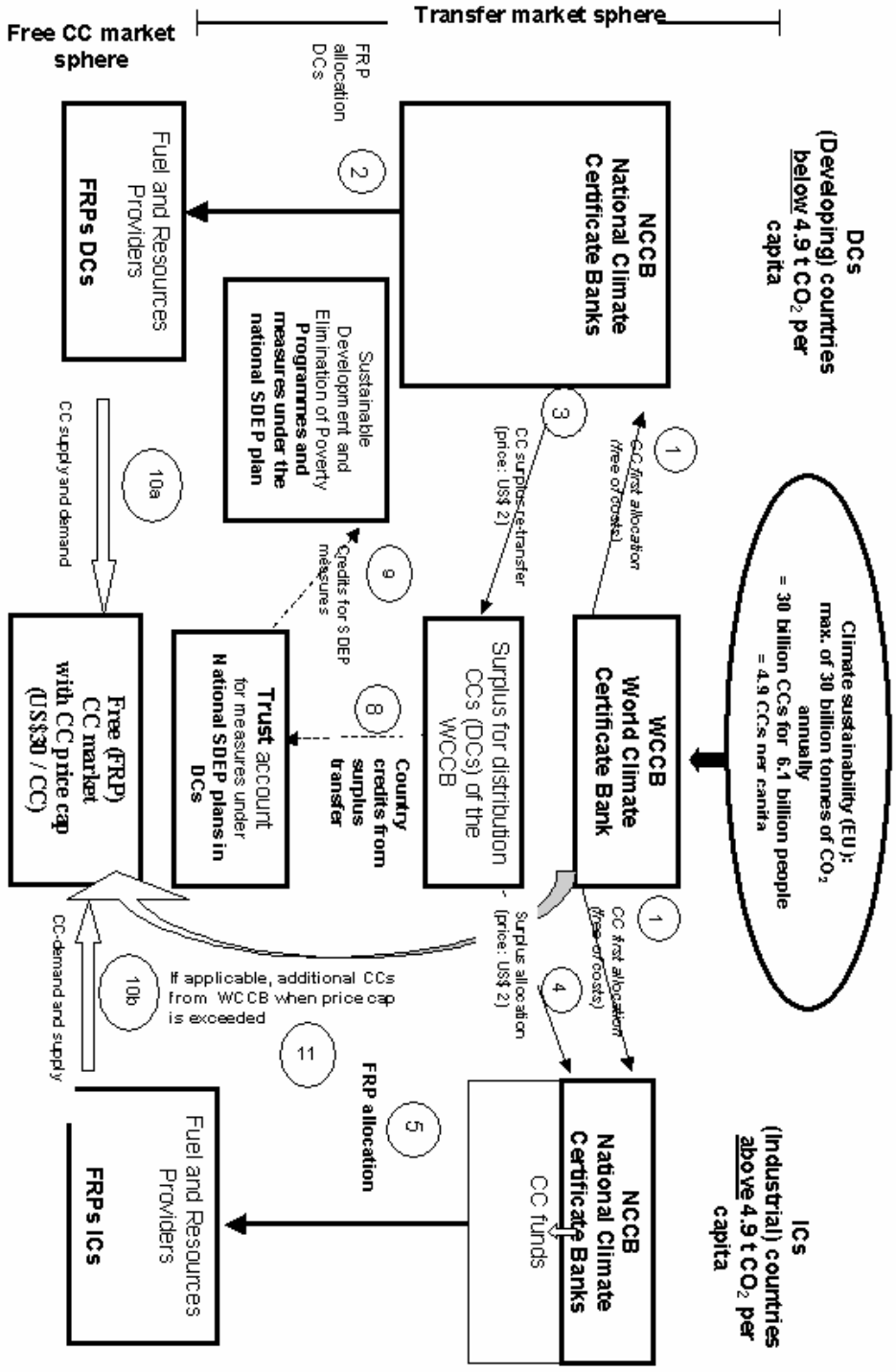
[67] Note: Since in Germany, for example, another 1% to 2% of emissions from sources other than energy production and use (especially from solvent and process emissions) must be added, this IEA curve represents a trend slightly below the actual CO_2 emissions during the period from 1970 to 2030.

[68] In chapter V of Lutz Wicke (2004) there is a thorough assessment of the GCCS taking into consideration all main criticism and criteria put forward in literature (i.e. by IEA/OECD, Philibert/Pershing, ECOFYS).

1. The Global Climate Certificate System, briefly described above thus exactly fulfils a central requirement of the 2002 Environmental Report by the German Council of Environmental Advisors: "What would be desirable both from an ecological as well as from an economic point of view is a strictly quantity-related trading system with the largest possible international basis which involves all emission sources and which is based on the first trading level."[69] **(**The first trading level refers to the level of domestic providers producing or importing fossil fuel and resources, authors' note). By addressing the interests of all countries to the largest extent possible whilst at the same time also achieving the European Union's climate stabilization target, this "desirable" system is hence in principle also feasible as a GCCS in political terms. It goes without saying that the above very shortly described GCCS can only be an illustration of a conceivable, actual application. This illustration would be modified in many aspects during the course of long and detailed international negotiations.
2. The GCCS also includes an important development component: It has not only implemented the 'great' basic idea of equal distribution of emission rights 'born' in India and in Pakistan[70]. The 'one man/ one woman – one climate emission right' principle for the first time allows the active integration of developing countries into the global climate protection scheme. As a function of their per-capita emissions which are far below average, developing countries generate revenue: They should restrict the use of this revenue for **'sustainable development and elimination of poverty'** measures in accordance with their national SDEP plans in a manner as climate-friendly as possible. Concurrent climate protection as well as sustainable development and the elimination of poverty (SDEP) can and should be ensured by the concrete implementation of such plans with the GCCS. What's more, (sustainable) growth in developing countries is not just not obstructed but explicitly promoted.
3. Therefore it seems to be a good chance for a pro GCCS – initiative by (some) developing countries: The GCCS is based on fundamental principles which were developed in developing countries, such as in India and in Pakistan (see above). This GCCS concept which was fully operationalised and instrumentalised here as urgently demanded by late Anil Agarwal can certainly be endorsed by many other countries. It should hence go without saying that developing countries in particular can and should launch an initiative for such a system or a modified form thereof.
4. On the other hand: It seems completely contra-productive (and, even worse, also arrogant) to negate the criticism in the US by members of the two dominant parties (with the 1997 95:0 Byrd-Hagel Senate Resolution (with a democratic majority in both houses of Congress during the Clinton administration)) and the 'official' refusal of the Kyoto Protocol in 2001 under the Bush administration based thereon. The main points, i.e. that the strongly growing economies of developing countries might over-compensate potential efforts on the part of the US in the climate sector and that the US economy might suffer 'serious harm' in the case of sole efforts on the part of the US (and other industrialized nations) cannot be dismissed as irrational, no matter whether one accepts the result of the US policy (or being critical as the authors are). This is why these points and other points of US scientific discussions are explicitly considered (to the largest extent)-

[69] RSU (Rat von Sachverständigen für Umweltfragen) (2002), Tz 481.
[70] Refer to Agarwal, A. (2000), Agarwal and Narain (1991 and 1998) and Aslam (2002)

Figure 3: Operation of the GCCS as a climate-stabilizing and at the same time economically compatible 'cap and trade' emissions trading system (key functions)



in the design of the GCCS! (There will be no 'inconsistent' 'exemption for Developing Countries Parties' and there will be no 'serious harm to the United States economy'[71] and there will not be 'skyrocketing prices' for Climate Certificates and a just moderate rise of the price of fossil fuels: The GCCS system is the most efficient system which is conceivable whilst at the same time ensuring maximum business compatibility, so that it imposes upon the United States the weakest burdens possible whilst also demanding the smallest possible degree of change in order to achieve climate stabilization. This is highly in the interest of the United States to avoid growing dangerous consequences of the accelerated climate change like the possible consequence of the cease of the gulf or North Atlantic stream!

5. Following the above mentioned careful evaluation of the proposals so far made for the incremental regime evolution of the Kyoto Protocol and an evaluation of the two most important proposals for structural regime change[72], i.e. the C&C system which so far only exists as an (interesting) rough concept and the GCCS (now in a form which is 'generally' mature for application), the authors are convinced of the following conclusion:
   - Should it be at all possible – with the authors being both sceptical and hopeful at the same time in this respect – to reduce global climate gas emissions to such an extent that climate stabilization is still possible (at least – on the level of the minimum EU target of 550ppm CO_2 in the atmosphere),
   - then this can only be achieved with the help of a global incentive system in the form of a 'cap and trade' emissions trading system where allocation is substantially based on the 'one man/one woman – one climate emission right' principle.
   - The design of such a system must ensure that it offers developing countries sufficient incentives to join in on the one hand whilst also ensuring the highest possible degree of economic compatibility in order to avoid overburdening any country.

From this perspective, the GCCS concept shortly presented here does seem to be the only practicable and promising and at the same time sufficiently operationalised approach towards resolving our planet's climate protection problems in an acceptable manner.[73]

In this respect, the key element of the GCCS, i.e. the principle of 'one man/one woman – one climate emission right' can and should also be used as the crucial key to solving the global climate change problems to the benefit of all the children and children's children of the people currently living on this planet.

Conclusions

Irrespective of the necessity to show in this article, the enormous shortcomings of the Kyoto Protocol and of the proposals of its 'incremental regime evolution', Lutz Wicke and Gerhard Timm very much favour a quick ratification of the Kyoto Protocol. Only on that basis the international community will have a legal and binding framework to really start and move on as fast as possible towards climate protection.

The authors hope that they could present some arguments for the upcoming review of the Kyoto Protocol and – with the GCCS, that has been designed and shaped in great detail by Lutz Wicke in the underlying book – also a contribution to the unavoidable discussion about the urgently needed reformation and structural change of the Kyoto Protocol. The authors are convinced: Only a global cap and trade system based on or similar to the here shortly outlined GCCS can be the only 'appropriate action' (according to Art. 9.1. Kyoto Protocol) to overcome the evident quantitative and structural shortcomings of that Protocol.

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[71] Refer to Byrd,R./Hagel (1997), 10th and 11th paragraph of the Senates Resolution No. 195-54.

[72] Refer to Wicke, L. (2004), chapters III and IV.

[73] In Wicke, L. (2004), section VIII.D. and in chapter IX. – in the light of the various positions of economic and political self-interest of certain states or group of states – there are detailed considerations about elements of a strategy to implement and enforce GCCS as an effective 'Beyond-Kyoto I' – climate protection system.

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