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Voluntary Compensation of Greenhouse Gas Emissions

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Voluntary compensation of greenhouse gas emissions is emerging as a new business field which increasingly attracts the public interest. This policy paper gives an introduction to compensation schemes and aims to guide companies, organisations and individuals who are interested in compensating their emissions in identifying high-quality compensation options.

However, the purpose of this paper is not to evaluate individual providers but to explain the basic concept and the different options that are available. By now many different offers for emissions compensation have arrived on the market. While the overall business idea is always the same, these offers vary significantly in their concrete design as well as in the climate benefits they achieve. To gain the best possible result as a customer, it is necessary to know what different components of compensation schemes are possible and how they are to be judged.

From the climate protection point of view, the reduction of own emissions is the "first-best" and compensation only a "second-best" option. Moreover, compensation is a completely voluntary activity, which aims at demonstrating a commitment to climate protection. In order for this commitment to be credible and not just "greenwashing", customers may wish to aim for the best available quality. The evaluations in this paper therefore take environmental integrity as the most important criterion, but other criteria like feasibility are also taken into account.

1. What Is Compensation?

Many sources of emissions like private households, public administrations, the majority of small- and medium-sized enterprises (SMEs), travel – especially aviation - events, etc. are presently not or only insufficiently addressed by existing climate policy instruments. Moreover, it is usually not possible to bring one's emissions down to zero. Compensation is a new approach which tries to use the principle of emissions trading to cover these emissions.

Compensation means to take an optional amount of the greenhouse gas (GHG) emissions a customer has caused and avoid or reduce the same amount of emissions at a different place. For this purpose, projects are implemented which either avoid or reduce emissions from sources, like replacing diesel generators by wind power or improving the insulation of buildings to reduce the heating energy needed, or remove carbon dioxide (CO_2) from the atmosphere and store it in biomass (so-called sink projects), like afforestation projects.

Companies as well as organisations and governments increasingly make use of compensation. A recent example is the compensation of the entire GHG emissions of the *Renewables 2004* conference in Bonn, including the travel emissions of all participants. The German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety and the Federal Ministry for Economic Cooperation and Development will buy the corresponding amount of emission reduction certificates and cancel them afterwards, i.e. retire them from the market. The certificates will come from a bundled small scale Clean Development Mechanism (CDM) project dealing with solar community kitchens in India, which was developed by the Swiss Factor Consulting and Management AG (http://www.factorag.ch/English/News.html). Another example is the FIFA World Cup 2006, which is supposed to become a climate-neutral event (Öko-Institut 2003: 16).

One should note that there is no clear terminology since different providers use different terms like to "offset" or to "neutralise", and the result is called "climate neutral", "CO_2-neutral", "climate friendly", etc. Offers using the word "neutral" imply that the emissions are 100 per cent compensated, whereas other terms can also mean any other level of compensation.

2. One Example – Klimabalance

For giving an overview of what compensation means in practice it seems helpful to start with a concrete example. The approach the German Klimabalance (http://www.klimabalance.de) has chosen exemplifies many of the available offers.

Klimabalance, a product of 500 PPM (http://www.500ppm.com), offers to compensate GHG emissions by supporting projects in local communities in the South. The offers cover emissions from individuals and companies as well as events. For example, the emissions from the 2004 'Carbon Market Insight Conference' in Amsterdam were compensated by financing a decentralised power supply network powered with pongamia oil in a small and remote village in India. The following example will focus on the process of compensating an individual's GHG emissions.

First, the individual's emissions have to be estimated. This can be done with the help of Klimabalance's CO_2 calculator. For roughly calculating the annual CO_2 emissions of one person, an online-form has to be filled in. The calculator considers the emissions caused by heating and transport as well as the entire life cycle emissions of consumer goods and infrastructure investments, including the emissions from the entire production chain. In the following, exemplary data is used and shown inside the brackets.

The short version of the CO_2 calculator asks if the person is a working person (yes), how large her living space is (50 m^2), how many cars she possesses (1), what her favourite means of transportation is (car) and how many people are living in her household (1). The computation of the data in brackets yields the result that this person generates 11.36 t CO_2 annually.

This calculation is based on the German average per capita data, which are then modified according to the data entered. In order for the customer to be able to compare her results, the average annual per capita emissions of Germany (10.78 t), Europe (9.70 t), the USA (19.85 t) as well as the level that would be necessary to achieve a stable climate in the long term (3.50 t) are displayed.

To compensate these emissions, the customer can buy certificates at 9.20 Euro per tonne CO_2. These certificates are generated by projects located in South Africa, Indonesia, India and Brazil. According to 500 PPM, all projects are either under certification for the CDM Gold Standard or micro projects generating Verified Emission Reductions (VERs) which are too small for the CDM process but provide substantial climate, environmental

and social benefits (see section 4.5 for details on the distinctions between project types).

The next step offers a choice between three levels of GHG emissions compensation:

1. Compensation of 21% of own emissions (= German national reduction target) = 2.39t (= 25.95 Euros).
2. For achieving what Klimabalance calls the "optimum sustainable level" of 3.5t of emissions per capita, the total amount of 11.36t minus 3.5t = 7.86t (= 76.31 Euros) has to be compensated.
3. To "neutralise" her emissions, the customer would need to compensate 11.36t (= 108.51 Euros).

The prices given in brackets are based on the price of 9.20 Euros per tonne plus a transaction fee of 4.00 Euros. To complete the process, the customer has to fill in her personal data as well as her preferred way of payment. Klimabalance will cancel the certificates and inform the customer about the progress and completion of the projects and about the realised emission reductions.

3. Compensation as Such from a Climate Protection Perspective

For a variety of reasons the reduction of own emissions and the introduction of binding climate policy instruments are superior to compensation. But where these are not possible, compensation can be a viable second-best option if the integrity of the scheme is ensured.

From the climate protection point of view, first of all one needs to observe that efforts to reduce own emissions should precede compensation. Climate scientists agree that global warming needs to be kept below 2°C and the temperature increase per decade below 0.2°C if dangerous impacts are to be averted. Given the current scenarios of the Intergovernmental Panel on Climate Change (IPCC), the scientific advisory body of the international climate regime, this means that emissions need to be drastically reduced below the current levels by mid-century. Since developing countries will need a certain increase of their emissions in order to cover their development needs, this means that industrialised countries will have to reduce their emissions by 80 per cent by mid-century, compared to the 1990 baseline. In order to achieve this target, emissions in industrialised countries need to be reduced by 40% by 2020 already (Enquete-Kommission 2002; IPCC 2001; WBGU 2003a).

In this vein, the complete internalisation of the external costs of GHG emissions through binding economic policy instruments like the ecotax or emissions trading in conjunction with sectoral and technology-oriented abatement policies would bring about higher long-term climate benefits than compensation since they would help to initiate the necessary structural changes in the industrialised countries.

Moreover, the implementation of these instruments would achieve actual climate benefits, whereas compensation is at best a zero-sum game: the same amount of emissions is avoided or reduced at another place, but not more. And even this achievement is not necessarily assured but depends on the standards the projects have to fulfil in order to demonstrate that the claimed emission reduction or carbon sequestration does indeed take place and goes beyond what would have been achieved under a business-as-usual scenario, the so-called "additionality" (see section 4.5 for more details). A badly designed compensation scheme might therefore actually result in higher overall emissions because it makes its customers believe that they can now act without restraint while the emissions this causes are actually not compensated.

Another aspect is the ancillary benefits GHG emission reductions usually entail, such as the reduction of emissions of pollutants, reduced noise levels, less traffic congestion etc. By shifting emission reductions elsewhere, these benefits are also shifted.

A customer's analysis should therefore first of all examine the possibilities to bring down her own emissions whereas compensation should only be considered as a complementary measure. In the same vein, the providers of compensation schemes should provide detailed information to raise the customers' general awareness of the climate change problem and point out options for reducing own emissions. They should also convey the message that compensation is not a real solution but only a second-best option.

But once own options have been exhausted, a high-quality compensation scheme can be a viable second-best option. It gives customers an additional means to bring their own actions in line with their views on environmental protection and can play a significant role in raising public awareness.

4. The Components of Compensation Schemes

The following section will focus on the design of compensation schemes and particularly on their different possible components. The compensation process always includes the determination of emissions, support of emission avoidance/reduction or sink projects and some form of return to the customer. However, variations can be found regarding the concrete contents of these components.

Compensation schemes can be regarded as building blocks with variable components. These are summarised in table 1 and will be further explained in the following. The 1st column contains the umbrella term of the component, the following columns list the various possible options for each component.

In principle, almost every GHG emission can be subject to a compensation scheme and almost any entity, e.g. private households, communities, NGOs, individuals, can be responsible for these emissions and consequently be a customer of compensation schemes. In the following, the range of possible customers was grouped into the two main customer groups of individuals/private households and companies/public administrations.

Components	Variations			
Emissions to Be Compensated	Own direct/indirect emissions from individual sources	Emissions from services / products entailing various sources		
Return to Customer	Emission certificate plus cancellation	"GHG-neutral" Labelling	Donation receipt (as sole return)	
Emissions Calculation	Online calculator for individual customers	Calculation by provider	Calculation by provider with third party verification	
Compensation Projects	Sinks (Biomass Sequestration)	Avoidance / reduction at sources (Energy Efficiency / Renewable Energy)	Small scale sink projects with significant benefits for local communities	Small scale source projects with significant benefits for local communities
Project Standards	Standard developed by provider	CDM/JI Standard	CDM Gold Standard	
Project Location	Annex B	Non-Annex B		

Table 1: Components of compensation schemes

4.1 Emissions to Be Compensated

4.1.1 Description

Emissions to be compensated can generally be divided into emissions from individual sources on the one hand and emissions resulting from services or products which entail emissions from a variety of sources on the other.

The emissions from individual sources could be further divided into direct and indirect emissions, but most schemes offer the compensation of emissions from heating, electricity and transport in one package. The one exception is emissions from aviation, which are usually treated separately because of the high amount of emissions generated per travel.

Events are one example of products and services which entail emissions from a variety of sources, such as heating, transport (arrival, departure), accommodation, food supply (frozen food and instant meals require lots of energy). This compensation service predominantly addresses companies, but private households can also be customers: conferences or workshops as well as birthday parties or weddings or any other event can be covered. It is mainly providers of the German-speaking region (Klimabalance, myclimate, Prima Klima, CliPP, 3C) which offer this particular kind of compensation. It usually includes emissions calculation, personal consulting and marketing support.

Production processes also entail emissions from various sources. Providers' online-service platforms mainly target individual consumers and therefore do not feature this option, but several providers do offer the service of compensating their production processes to their corporate clients. The compensation of products and production processes is always a customer-tailored offer, because emissions in a product's life cycle need to be assessed on a case-by-case basis. Models for calculating the impact of emissions from production processes are, for example, the US Economic Input-Output Life Cycle Assessment (http://www.eiolca.net) or the German Global Emission Model for Integrated Systems (GEMIS) (http://www.oeko.de/service/gemis/en/index.htm).

Examples for "climate neutral" products are the "climate neutral" production and distribution of CDs or DVDs, building materials (http://www.hansebeton.de) or cars. For example, the UK car retailer GoinGreen (http://www.goingreen.co.uk) compensates the emissions from manufacturing, shipping and the first 16,000 miles of driving.

4.1.2 Evaluation

In principle, there is no distinction between the various emission sources that could be targeted for compensation. Actually, one of the basic assumptions of emissions trading and the corresponding shifting of emission reductions is that the climate impact stays the same no matter where emissions are reduced. Still, there are various emission sources which are currently not covered by policy instruments and therefore especially lend themselves to compensation schemes. The prime example is emissions from aviation, which are rising rapidly, but still there is hardly any climate policy response.

4.2 The Return to the Customer

4.2.1 Description

The service of the providers usually takes the form of certificates generated by emission avoidance/reduction or sink projects. Each certificate equals one tonne of CO_2 equivalent (CO_2eq). These certificates are usually cancelled from the market afterwards since otherwise one tonne of emissions reduction or carbon sequestration could be used to "compensate" various tonnes of emissions.

However, some providers offer a kind of labelling instead of the provision and cancellation of certificates. These labels can be but are not necessarily based on the realisation of climate protection projects. Instead, some imply internal improvements within the company itself, e.g. a more efficient use of energy, like the "Cleaner and Greener^{sm} Certification Seal" (http://www.cleanerandgreener.org) offered by the Leonardo Academy Inc., a non-profit organisation, some a certain share of internal improvements plus compensation projects like the "Carbon Neutral" labelling by Future Forests (http://www.futureforests.com), while others provide labels for supporting renewable energy, like the Bonneville Environmental Foundation's "Green Tags" (http://www.b-e-f.org).

A third form of return is the tax-deductible donation receipt. These can either be the sole return to the customer or they can be issued in addition to either of the above options. At the moment only a minority of providers offers donation receipts since this usually depends on the respective country's tax legislation. In Germany, for example, only accredited organisations ("gemeinnützige Organisationen") are allowed to issue tax-deductible donation receipts.

4.2.2 Evaluation

The advantage of the first option – tradable certificates plus cancellation – is that it leads to actual and verified emission avoidance or reductions since they are based on an institutionalised procedure with verifiable results. Since the project-based mechanisms are currently very much under discussion, this option also lends itself to marketing purposes.

The labelling option is even more geared towards supporting and improving the customer's marketing activities. But as long as there is no widely accepted compensation label with high quality standards it has to be doubted if labels really serve their purpose. A customer would have to scrutinise the labels very carefully, with the result of increased transaction costs. In the case of labels that also imply internal improvements on the customer side, the link between internal improvements and the resulting emission reductions is usually not spelled out.

The advantage of donation receipts is their tax-deductibility, which means that the customer can recoup part of the costs. But they give no indication as to whether the claimed emission reduction has actually been achieved.

As a result, the tradable certificate plus its cancellation is the best option because it gives the best guarantee that the compensation is really taking place. A donation receipt can only be a bonus but not a substitute. However, an improvement of existing labels or the adoption of new labels focusing on the combination of reducing own emission and compensation is desirable.

4.3 Calculating Relevant Emissions

4.3.1 Description

For identifying the quantity of emissions to be compensated, first the relevant emissions have to be calculated. As regards individuals and private households, most providers offer this calculation in the form of an online calculator as outlined in the introductory example. As there is a number of different ways to calculate emissions, online calculators use different calculation methods and consider different aspects. Therefore, results can be quite different from each other.

Obviously, calculating companies' emissions requires a more complex procedure and usually includes third-party involvement. 3C (http://www.3c-company.com), for example, co-operates with the Öko-Institut e.V., Institute for Applied Ecology, in this respect.

4.3.2 Evaluation

As already mentioned above, online CO_2 calculators use different methods and consider different aspects. The results therefore vary extremely and cannot be compared with each other. This is the reason why CO_2 calculators are usually provided only for individuals or households, where only small amounts of emissions are generated. At this level, any other procedure would probably be completely out of proportion. Still, there is a mark of distinction since some providers have the design of their calculators checked by external experts whereas others don't. Moreover, regarding aviation some calculators take the Radiative Forcing Index (RFI) into consideration whereas others don't. The RFI has been introduced by the IPCC to quantify the additional climate impact of aviation which arises because flights do not only generate GHG emissions but also NO_x, aerosols, water vapour, cirrus clouds and condensation trails (IPCC 1999).

Third party validation is used for the determination of companies' emissions, but it is not always obvious who this 'third party' is. Sometimes it seems to be the provider itself, sometimes the determination is referred to another company / institution. From the climate protection point of view it is obvious that a credible determination of the emissions needs to involve an independent third party.

4.4 Types of Compensation Projects

4.4.1 Description

After the amount of emissions has been calculated, the next step is the decision about the projects to be supported. Some providers offer the possibility to choose one certain project, while others decide on the allocation of money to the projects by themselves.

Some providers specialise in sink projects, for example Future Forests (http://www.futureforests.com), Prima Klima (http://www.prima-klima-weltweit.de), and American Forests (http://www.americanforests.org).

The second type of supported projects concerns emission sources. These can be renewable energy projects which support the replacement of conventional energy supply by energy generation with the help of solar energy, biomass, hydro power or landfill gas, or energy efficiency projects which deal with more efficient ways of heating or the use of energy efficient light bulbs, for example. There are also projects which combine efficiency measures with the use of renewable energies.

In addition to the mere avoidance or reduction of emissions, especially small scale projects also claim to attain significant social-economic benefits

at the community level, such as employment, access to essential services like water or sanitation, education or distributional equity (see Boxes 2 and 3 below for two examples). They can therefore be separately defined as a third and fourth category (sinks and sources respectively).

4.4.2 Evaluation

There is a fierce controversy about sink projects (for an overview of the debate see Langrock / Sterk / Wiehler 2003). Their supporters argue that deforestation is a major source of emissions and that sink projects can also bring about many other ecological and socio-economic benefits. But while their opponents would agree that there is a case for good forestry projects, they do not at all agree that they should be used to compensate emissions. First, it is feared that this could draw attention away from the cause of climate change, i.e. fossil-based energy systems and infrastructures. Second, the sequestration of carbon is not equivalent to the avoidance or reduction of emissions since a tonne of emissions avoided will never enter the atmosphere whereas carbon stored in biomass might at any time be re-released into the atmosphere. Sinks therefore offer only a temporary respite whereas what's needed is lasting emission reductions. There are also technical problems with quantifying the sequestration of carbon.

The debate is also politically charged at yet another level because many forestry projects such as large-scale monoculture plantations have in the past led to grave ecological and socio-economic effects such as a loss of biodiversity or the displacement of the local population. This controversy has been further stoked by the decision of the parties to the Kyoto Protocol on modalities for sink projects which allows the use of genetically modified plants and invasive alien species (UNFCCC 2003). Anyone using sink projects for compensation purposes therefore risks a huge public relations fallout.

The obvious advantage of climate protection projects dealing with sources is that they keep GHGs out of the atmosphere once and for all and that they contribute to the long-term technological change that is necessary to prevent dangerous climate change. From the authors' point of view the coupling of emission avoidance/reduction and CO_2 sequestration in the Kyoto Protocol and afterwards is very unfortunate. In the future, they should be decoupled by dealing with them in two distinct legal instruments, as has been proposed by the German Advisory Council on Global Change (WBGU 2003b).

Small scale projects dealing with sources frequently rate at the top in sustainability assessments comparing different project types (Factor Consulting/Dasag 2001: 18-20; Green 2002: 10). Depending on the concrete project, of course, they therefore have the added value of not only compensating emissions but also of bringing tangible and significant

benefits to the local population. They do, however, have the disadvantage that they are more difficult to transact than large projects, especially if they are to be carried out as CDM projects (see below).

4.5 Project Standards – From Self-Developed to CDM Gold Standard

4.5.1 Description

To determine the project's emission avoidance/reduction or carbon sequestration, the project developer establishes a so-called "baseline", i.e. a reference scenario of what would most likely have happened in the absence of the project. In establishing the baseline, the project must demonstrate that it would not have happened anyway, i.e. that the project is not the baseline. In the parlance of the climate regime, the project must be "additional".

The emission avoidance/reduction or carbon sequestration that is going to be credited to the project is constituted by the difference between the baseline emissions/carbon sequestration on the one hand and the actual emissions/carbon sequestration of the project on the other. E.g., if the baseline emissions are 50,000 t CO_2eq per year and the project's emissions are 20,000 t CO_2eq, the project has achieved an emission reduction of 30,000 t CO_2eq.

Since the establishment of the baseline and the assessment of the project's additionality are by definition hypothetical, the standards which have to be met in this respect are key to ensuring a project's environmental integrity. If emission reductions are credited to a project that would have happened anyway, these reductions are fictitious and the customer's emissions are in fact not compensated. The project standards are also key to assessing the other environmental and/or social impacts of a project, such as local pollution, employment generation etc.

Three categories of standards can be distinguished: self-developed standards, the official CDM/JI standards and the "CDM Gold Standard" developed by the non-governmental organisations (NGOs).

Some providers define a set of own criteria which are supposed to safeguard the fundamental quality of the projects and also take into account anticipated customers' interests. These projects generate the so-called Verified Emission Reductions (VERs). These criteria are similar to those established by the Kyoto regime (see below) but are usually condensed and focused on certain project types. The auditing of the projects is carried out either internally or with third-party involvement.

The Clean Development Mechanism (CDM) and Joint Implementation (JI) are the project-based mechanisms established by the Kyoto Protocol with

the aim of providing the countries which have adopted quantified emission limitation and reduction commitments, the so-called Annex B countries, with flexibility in achieving these targets.

The basic principle is that countries or, the usual case, authorised private companies (the project developers) can register emission avoidance/reduction or carbon sequestration projects as CDM/JI projects. After the project has undergone a cycle that is laid out mainly in the so-called Marrakech Accords, emission certificates equivalent to the amount of the avoided/reduced emissions or CO_2 removed from the atmosphere are issued to the project developer. The Annex B countries can buy these certificates and count them towards the emissions target they committed to in the Kyoto Protocol. One of the main distinctions between the CDM and JI is that CDM projects are carried out in non-Annex B countries, whereas JI projects take place in Annex B countries. The certificates generated by CDM projects are called Certified Emission Reductions (CERs), whereas those from JI projects are called Emission Reduction Units (ERUs).

Box 1: The CDM Project Cycle

A CDM project has to undergo a project cycle consisting of the following steps:

1. Preparation of the Project Design Document (PDD) by the project developer. For the purpose of calculating the emission avoidance or reduction achieved by the project, the PDD has to establish a so-called baseline. The PDD also has to contain a plan for monitoring the project's emissions. Baseline and Monitoring Plan either need to be designed according to methodologies that have already been approved by the CDM Executive Board, or you need to develop your own methodology and submit it to the CDM Executive Board for approval.
2. Validation of the PDD, i.e. an examination if the PDD meets all requirements, by a certification company accredited with the CDM Executive Board, a so-called Designated Operational Entity (DOE).
3. Registration of the project with the CDM Executive Board.
4. Implementation of the project and monitoring of all relevant emissions by the project developer.
5. Verification of the emission avoidance/reductions by another DOE.
6. Certification of the emission avoidance/reductions by the DOE.
7. Issuance of the Certified Emission Reductions (CERs) by the CDM Executive Board.

For further details see

http://cdm.unfccc.int/pac/howto/CDMProjectActivity.

The regulations the projects have to fulfil for being accepted and able to generate CERs or ERUs include detailed rules for determining a project's emission avoidance/reduction or carbon sequestration as well as audits of the project and of the achieved emission avoidance/reduction or carbon sequestration by independent and specially accredited certifiers. Box 1 outlines the steps that need to be taken when implementing a CDM project. The details for JI have yet to emerge.

The CDM Gold Standard, which was developed by a panel of stakeholders and experts at the initiative of the World Wide Fund for Nature (WWF), is a high quality standard for CDM projects. The CDM Gold Standard aims to enhance the ecological and socio-economic integrity of the CDM by defining quality criteria that exceed those established within the Kyoto regime and thus creating a 'premium product' on the market for emission certificates. It is based on the expectation that buyers will be willing to pay more for certificates generated by high-quality projects. The Gold Standard's criteria include especially a more detailed examination of the project's additionality, an assessment of the project's other ecological and social impacts and minimum standards for stakeholder participation. More information on the CDM Gold Standard can be viewed at http://www.panda.org/about_wwf/what_we_do/climate_change/what_we_do/business_industry/gold_standard.cfm. In addition, the Wuppertal Institute has written two policy papers on the standard (in German), which can be downloaded at http://www.wupperinst.org/jiko. There are also plans to adapt the Gold Standard for use with JI.

Box 2: Example of a Gold Standard CDM Project

atmosfair – Solar Kitchens in India

The German provider atmosfair (http://www.atmosfair.com) claims to be the first that uses only Gold Standard projects for compensation. One of their supported projects is located in India (http://www.atmosfair.com/2/projekt_indien.htm). So far, Indian community kitchens have usually used kerosene, diesel or firewood, which not only leads to GHG emissions but also to indoor air pollution and attendant health problems.

In this project, ten community kitchens in schools, hospitals and monasteries that provide meals for 500 to 5,000 people every day are going to be converted to solar thermal energy. The technology implemented uses concentrated sunlight to generate steam for the cooking purposes. The solar kitchens also feature steam storage facilities so that they will remain fully functional after sunset. Co-firing by conventional means will only be necessary if the sky stays overcast for several days in a row. The project will thus save about 570 tonnes of CO_2 annually. Moreover, the project will reduce indoor air pollution, reduce firewood gathering in the surrounding forests and create up to 20 high-quality maintenance jobs.

4.5.2 Evaluation

Project standards that are self-developed by providers have to be handled with care. It is not easy to judge from a customer's perspective if these standards contain every important issue or if some are missing. However, self-developed standards cannot generally be assumed to be of minor quality because there is also the possibility that established standards are extended. One therefore cannot generally advise against self-developed standards, but the customer should check them for their quality, which implies increased transaction costs. One feature that is indispensable is the auditing of projects by independent third parties; otherwise the compensation cannot be regarded as credible.

Box 3: Example of a VER project

myclimate – Solar Energy in Eritrea

The Swiss provider myclimate is going to produce and install 200 solar collectors to provide hospitals, schools and households in Eritrea with solar thermal systems (http://www.myclimate.org/kli_eritrea.php). The solar collectors are going to be produced in cooperation with the Eritrean company Tesinma and the boilers are going to be manufactured locally. Therefore, the whole product is going to be produced in Eritrea without any additional imports.

The project is not an official CDM project. Myclimate states that their projects have to fulfil the CDM Gold Standard and also other sustainable development criteria defined by myclimate itself and that the achievement of these criteria is verified by a roster of external experts. But since the project has not undergone the procedure prescribed for the CDM and the CDM Gold Standard, the project cannot claim the label of being a Gold Standard CDM project and it is up to the customer to decide whether these claims are true.

The CDM/JI standards have the undeniable advantage of being fixed and guaranteed by a dedicated international structure set up by governments. The customer can therefore save the transaction costs involved with checking standards for their quality, but the downside is that this guarantee comes along with very high transactions costs for the projects. These are especially hard to bear for small scale projects, which have been identified as a very good option in the previous section (Sterk 2004: 13f). If the CDM and JI cannot be made to accommodate small scale projects, there would be a case for accepting small scale projects conducted outside the Kyoto infrastructure but based on credible standards and procedures as equivalent to proper CDM/JI certificates as far as voluntary compensation is

concerned. The Wuppertal Institute is currently conducting a discussion process on the potential of small scale CDM projects (see http://www.wupperinst.org/jiko).

The quality guarantee of the CDM is yet further extended by the CDM Gold Standard, which aims to ensure that projects produce not only climate but also other sustainability benefits. Especially the rules on ensuring these benefits and on public stakeholder participation are relatively slim in the official CDM regulations. The downside of the CDM Gold Standard is that it further increases transaction costs, though to what extent is yet unknown. But from the climate protection point of view Gold Standard CDM projects are definitely the best option. Once the CDM Gold Standard has been adapted for use with JI, JI Gold Standard projects would rate at the same level. The Gold Standard also lends itself well to marketing purposes.

4.6 Location of Compensation Projects

4.6.1 Description

Most of the supported climate protection projects dealing with sources are taking place in non-Annex B countries and in the central and eastern European countries with economies in transition. However, there are some offers which include compensation projects within the provider's country of origin. For example, the German provider 3C (http://www.3c-company.com) offers a portfolio of six German emission reduction projects for its German clients.

Realising or supporting projects in non-Annex B countries is the predominant concept since there is a huge potential for inexpensive emission reductions, especially in the newly industrialising countries. Due to the tropical conditions which are auspicious for forestry, the majority of sink projects is also located in non-Annex B countries. Offers for supporting projects in Annex B countries are so far very limited because they are perceived to be more complex and cost-intensive.

4.6.2 Evaluation

It is not easy to say which project location is preferable from the viewpoint of climate protection. Projects in non-Annex B and in Annex B countries both have their pros and cons:

Because of the inefficient structures in non-Annex B countries there are many possibilities for climate protection projects at low costs, especially in the newly industrialising countries. A good project like the examples outlined above can also bring very significant benefits to those affected, i.e. small outlays can achieve huge effects. On the other hand, projects in non-

Annex B countries can raise the impression of shifting the responsibility for emission reductions from Annex B to non-Annex B countries. But as mentioned above, it is first of all the responsibility of the former to make significant efforts at climate protection. Due to the less developed infrastructure, local expertise etc., the risk that the claimed emission reduction does actually not take place is probably also greater than in Annex B countries. And there is the problem that provisions for stakeholder participation are next to non-existent in many non-Annex B countries, so that additional safeguards are needed to prevent human rights violations and other negative effects. Customers should demand credible reassurance on this point, such as provided by the CDM Gold Standard.

Reducing one's own emissions is the first-best option and compensation in Annex B countries is the most similar alternative. It can also lead to increasing marketing effects if the project is done in the locale of the company and with visible benefits to the local population. Transaction costs and risks, especially country risk, are often lower than in non-Annex B countries. Nor can it be said that there is only limited potential to reduce emissions, the European Climate Change Programme has in fact identified a massive reduction potential, especially in the area of energy efficiency (ECCP 2001).

However, there is a massive downside since from the start of the first commitment period of the Kyoto Protocol in 2008 onwards projects in Annex B countries entail a double counting problem. Based on their emission targets, these countries receive a budget of certificates called Assigned Amount Units (AAUs). For example, a country A with a Kyoto emission target of 1,000 Mt CO_2e will receive 1,000 million AAUs. At the end of the Kyoto commitment period, each country will have to hand in an amount of AAUs plus other certificates that is equal to its actual emissions during the commitment period, i.e. if 1,100 Mt CO_2eq originated from country A, it would have to hand in 1,100 million certificates. Obviously, each emission reduction achieved in an Annex B country frees up the equivalent amount of AAUs, which the country can then sell to other countries or otherwise make use of. If the service provider also claims the emission reduction, it will in effect be counted twice. This problem could only be resolved if the corresponding amount of AAUs was cancelled. This is in fact what is going to happen in the case of JI projects, but in the case of non-JI projects the service provider would have to make similar arrangements with the host country.

To sum up, in principle one cannot draw a quality distinction between projects in Annex B and non-Annex B countries. But from 2008 on projects in Annex B countries will need to take care of the double counting problem, otherwise there is no compensation effect.

Components	Variations			
Emissions to Be Compensated	Own direct/indirect emissions from individual sources	Emissions from services / products entailing various sources		
Return to Customer	Emission certificate plus cancellation	"GHG-neutral" Labelling of products	Donation receipt (as sole return)	
Emissions Calculation	Online calculator for individual customers	***Calculation by provider***	Calculation by provider with third party verification	
Compensation Projects	***Sinks (Biomass Sequestration)***	Avoidance/reduction at sources (Energy Efficiency / Renewable Energy)	Small scale sink projects with significant benefits for local communities	Small scale source projects with significant benefits for local communities
Project Standards	Standard developed by provider	CDM/JI Standard	Gold Standard	
Project Location	Annex B	Non-Annex B		
Legend	Unproblematic Option	Quality Option	Problematic Option	***Bad Option***

Table 2: Evaluation of compensation components

5. Conclusions

Next to reducing own emissions, compensation is only a "second-best" option. The components of a compensation scheme should therefore be of very high quality. Building on the evaluation in the former chapter, conclusions are drawn by putting together a design of compensation scheme with preferable combinations. Political actors should aim to set a good example by their own actions and work to ensure that customers can make an informed choice. The best way to do this would be to introduce a label for high-quality compensation schemes.

From the climate protection point of view, the reduction of own emissions is for various reasons the first-best option. But where this is not possible, a high-quality compensation scheme can be a viable second-best option. It can serve to neutralise the climate damage done and also achieve other sustainability benefits. It thus gives customers an additional means to bring their own actions in line with their views on environmental protection and can play a significant role in raising public awareness.

Especially political actors and institutions can be expected to accompany their political statements with concrete efforts at their own personal level. For example, it should be made government policy to compensate all travel emissions caused by government officials. Such an initiative could also serve to raise the awareness of the climate problem among the general public.

Moreover, there is clearly a danger that peoples' willingness to invest in climate protection might get exploited by low-quality providers. Compensation efforts by politicians and other actors with a high name recognition could serve to forestall this danger by setting a good example and thus a benchmark for what constitutes a high-quality compensation scheme. The relevant political actors like environmental ministries and other actors like consumer protection agencies could also pursue other awareness-raising activities and produce information material to enable customers to make an informed choice.

The best way to achieve transparency and separate the wheat from the chaff would be to introduce a label for high-quality compensation schemes. Ideally, such a label should be introduced by governments.

On the one hand, such a label should take into account the quality of the provider itself. A high-quality provider should be expected to provide sufficient information on the climate change problem and to point out to its

customers that compensation is only a second-best option. It should also offer transparency on how the customer's money is used, e.g. which part is actually used to finance the projects, and how the application of funds is controlled.

On the other hand, such a label should take into account the quality of the compensation scheme as such. The authors' evaluation of the individual components of compensation schemes can be summarised as follows:

Regarding the first component, from the climate policy point of view there is in principle no distinction between the different sources of emissions that could be targeted for compensation.

For the second component there is currently no better option than to use tradable certificates plus cancellation. This is the only kind of return from the provider that guarantees quality and actual compensation. Donation receipts can be used as a bonus but not as a substitute.

Regarding the calculation of relevant emissions, for individuals the only available and probably the only viable option are online calculators. For companies a more elaborate procedure is in order and the results need to be verified by an independent third party in order to be credible.

Temporarily storing carbon in biomass cannot really be compared to keeping the atmosphere free of GHGs altogether and therefore projects dealing with sources should be preferred over sink projects. Given the significant ecological and socio-economic benefits often associated with small scale projects, these can in many cases be even better than large-scale projects.

The best choice concerning project standards is the CDM Gold Standard because it guarantees the highest quality. It builds on the internationally supervised CDM approval procedure and extends it by including further ecological aspects as well as benefits for the local population.

Concerning project location there is in principle none that is especially advisable or inadvisable, but projects in Annex B countries will need to take care of the doubling counting problem in order to be credible. Since for the time being the Gold Standard is available for the CDM only, this also suggests carrying out projects in non-Annex B countries. But if the Gold Standard is adapted for JI, Gold Standard JI projects will rate just as high.

To sum up, from the climate protection point of view a compensation scheme should preferably use certificates from small scale Gold Standard CDM projects (or Gold Standard JI projects if and when these become possible) addressing emission sources. Where possible, the emissions to be compensated should be verified by an independent third party.

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