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Rent Capture in Carbon Offsetting: the Case of Fertilizer Production

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Environmental integrity of carbon offsetting

A key difference between the design of Joint Implementation (JI) and the Clean Development Mechanism (CDM) under the Kyoto Protocol is that JI host countries have assigned amount units (AAUs) and that JI project credits (Emission reduction units or ERUs) that are sold to foreign investors are taken out of the host country's AAU budget. This was considered an important condition for environmentally sound JI projects.

After all, should such a country have too lenient an approach to additionality demonstration, it would cancel an over-proportional amount of AAUs compared to the GHG emissions actually reduced. Thus the country increases the economic burden of achieving its Kyoto target as it has no AAU surplus as a buffer and has to make up for the AAU deficit through other policies and measures. The amount of GHG in the atmosphere is not affected by this misjudgment (overcrediting is compensated), but the finances of the country are. However, soon discussion arose about the distinction between countries with surplus AAU amounts (i.e. AAU budgets are (much) higher than the actual GHG emissions in the country) and host countries without such a surplus.

Determination of the additionality of a project's emission reduction is tightly linked to the issue of baseline setting, especially in industrial sectors. A country with an AAU deficit would probably first try to put in place domestic policies to tap into cheap abatement options, while JI could be used as an additional tool. Countries could do this by setting more ambitious, stringent baselines compared to countries without such policies. A good illustration of this logic is the case of JI projects in France and Ukraine aimed at reducing nitrous oxide (N_2O)[1] emissions from the production of nitric acid (HNO_3).[2]

Rent capture

Having a forecasted AAU surplus of less than 0.5% for the first Kyoto commitment period (Gray and Greenwood 2011), France had to be stringent on additionality for JI. In the case of projects reducing N_2O emissions from the production of nitric acid, France adopted an innovative approach of 'rent capture'. An ambitious, *i.e.* conservative, baseline, 2.5 kg N_2O per ton HNO_3 produced in 2009-2011 and 1.85 kg N_2O per ton HNO_3 produced in 2012, was established. At the same time, the only national regulation limited these emissions at the level of 7 kg N_2O per ton HNO_3, with another layer of regulations being applied at a regional level.

For example, the Grandpuits N_2O (GPN) abatement project (FR1000169) is subject to a local DRIRE's (Directions Régionales de l'Industrie de la Recherche et de l'Environnement) limitation at the level of 4 kg N_2O per ton HNO_3 produced, starting in December 2009. Thus the amount of N_2O emissions reduction achieved 'between' the regional regulations and the JI benchmark (2.5 and 1.85 kg N_2O) could be accounted as a net contribution to the Kyoto compliance of France. Moreover, the French government applied the '90% rule' to all JI projects, whereby only 9 ERUs are issued for 10 tons of CO_2e abated[3] (French Ministry of

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1 One ton of N_2O has a global warming potential of 310 tCO_2e.

2 Nitric acid is mainly used in fertilizers. Production of nitric acid corresponds to the NACE code "the manufacture of fertilizers and nitrogen compounds" (Ecofys, 2009).

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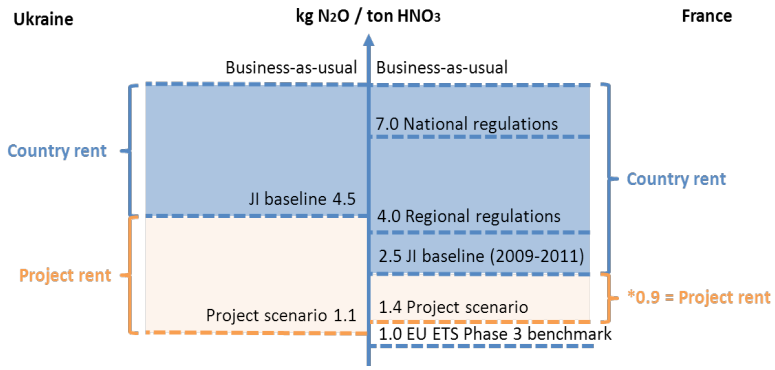

Figure 1. Comparison of rent capture in JI projects UA1000225 and FR1000169 (source: PDDs)

Environment, 2007), which is a further tightening of the additionality procedures. Stringent benchmarks and the '90% rule' both contribute to sharing the economic rent (the difference between market price and abatement cost) between the project developer and the government. The share of the government can be seen as an insurance provision against non-additional projects that would manage to pass the additionality test, so that France runs a lower risk of losing AAUs from JI projects.

Conversely, countries with large AAU surpluses, such as Russia or Ukraine, have no strong economic incentive to be stringent on the additionality requirement, as there is hardly any risk of non-compliance and the cost of not ensuring additionality is thus much lower than in a country with an uncertain AAU position. In this case, lax treatment of additionality might jeopardize environmental integrity of the scheme, as potentially non-additional carbon offsets would be used to compensate for not taking real abatement measures. Especially in the CDM, this has led to stringent additionality and GHG accounting procedures.

In the case of N_2O emissions from the production of nitric acid, the baseline for the Ukrainian JI project (UA1000225) are much less ambitious (4.5 kg N_2O per ton HNO_3 produced) compared to the above-mentioned project in France. As it is explicitly mentioned in the project design document, there is no national legislation to limit the N_2O emissions from the production of nitric acid in Ukraine. Due to the comfortable AAU position of the country, together with the absence of any direct regulations, the JI project could determine the least ambitious baseline possible, *i.e.* the conservative emissions factor of 4.5 kg N_2O per ton HNO_3 produced as defined by the IPCC. It is worth mentioning, however, that the same baselines are applied in the CDM (e.g. Project 1481: Liuzhou Chemical Industry Co., LTD N_2O Abatement Project in China). Therefore, it can be argued that in this particular sector the environmental integrity of JI, within the boundaries set by the Kyoto Protocol, is fully preserved even though Ukraine has a large AAU surplus.

The comparison of the amounts of emissions reduction rent that is captured by the governments of Ukraine and France is schematically illustrated in Figure 1.

Conclusion

The case of reducing N_2O emissions from the production of nitric acid in France and Ukraine demonstrates how the Kyoto compliance position of a country affects its treatment of additionality and benchmark setting in JI. It also shows how JI complements domestic climate policies as in the case of France or substitutes them as in the case of Ukraine.

For a more detailed review of JI practices please refer to the Climate Report No. 33 of CDC Climat Research (March 2012): http://www.cdcclimat.com/Climate-Report-no33-Joint-Implementation-a-frontier-mechanism-within-the-borders-of-an-emissions-cap.html?lang=en

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[3] China has employed the same scheme keeping up to 65% of CER revenues generated from HFC-23 and N_2O destruction projects and 2% of CER revenues from projects in prioritized sectors – renewables and energy efficiency. In the case of China however, it is a direct economic rent capture, in the form of yuans, rather than an indirect one, in the form of AAU.

Montenegro Prioritises Technologies for Climate and Development

by Marina Markovic and Wytze van der Gaast*

In May of last year, Montenegro began a Technology Needs Assessment (TNA) project with support from the Netherlands Government. With this project, the country aims at identifying options for climate change mitigation and adaptation which also support national sustainable development. The process is conducted under the overall coordination of the Ministry of Sustainable Development and Tourism of Montenegro (Division to support the National Council for Sustainable Development, former Office for Sustainable Development) with active participation of stakeholders from a broad range of sectors. Funding for this Government-to-Government (G2G) project has been provided by the Netherlands Ministry of Infrastructure and Environment. Project execution is done jointly by NL Agency and the Ministry of Sustainable Development and Tourism in Montengro, in collaboration with Marina Markovic and JIN.

Identifying priorities

On 7-8 November 2011, in the picturesque municipality of Kolasin, stakeholders from different sectors and regions in Montenegro met to consider the country's medium to long term development priorities in the context of climate change, and to identify strategic sectors for realising these priorities. As a starting point for that, stakeholders discussed the National Strategy for Sustainable Development together with other official documents on sustainable development in Montenegro, as well as sectoral strategies and the country's first National Communication submitted to the UNFCCC (on 12 October 2010).

In terms of social priorities, stakeholders underlined the need for reducing the social disparities in Montenegro between the more densely populated areas and the mountainous regions. In the latter regions, the number of socially disadvantaged people is significantly higher compared to the rest of the country. Stakeholders recommended that social data files for obtaining an overview of socially deprived groups be created as this would be an important condition for improving social development circumstances and social cohesion between different population groups and for reducing poverty. Not only would this lead to better insights into where improvements are needed, it is also a requirement for tailoring support towards these needs: *e.g.*, energy efficiency, household water availability, and indoor health conditions.

Another social priority mentioned was improved conditions for public health support, especially given the (already occurring and expected) higher frequency of heat waves and cold spells due to a changing climate. Improved medical care and early warning systems for weather extremes were mentioned as priorities. Health improvement was mentioned as part of an overall discussion on how quality of life could be improved, such as through water and energy security. In relation to energy supply, it was already pointed out how domestic renewable energy sources could play a role in this respect. Moreover, stakeholders considered retrofitting of existing buildings as an important quality improvement measure.

In terms of economic priorities, stakeholders identified the following main aspects:

- Reduced dependency on foreign energy imports by use of, in particular, hydro energy sources in the country. Especially in the mountainous regions, Montenegro has a large potential for small-scale hydro facilities. Other renewable energy sources were also emphasised as a means for reducing energy import dependency (while achieving emission reductions goals). It was also stressed that decisions on new energy generation capacities should be based on a comprehensive sustainability analysis.
- Increased efficiency in transportation: stakeholders saw several opportunities for energy efficiency improvements in the transport sector, in the areas of infrastructure improvement, modal shift, and more efficient vehicle engines.
- Through improved logging techniques biomass could be produced from Montenegro's forests without deteriorating the forest. More efficient techniques would reduce the amount of wood needed for wood products, *etc.*
- Stakeholders underscored the increasing importance of tourism for the country. Montenegro has an Adriatic coastline in the South and mountain resorts in the North. Utilizing this potential requires infrastructure improvements and it was concluded that these measures are generally cross-sectoral: *e.g.*, energy security, road and train infrastructure, and retrofitting buildings for energy efficiency.
- Other economic priorities discussed included

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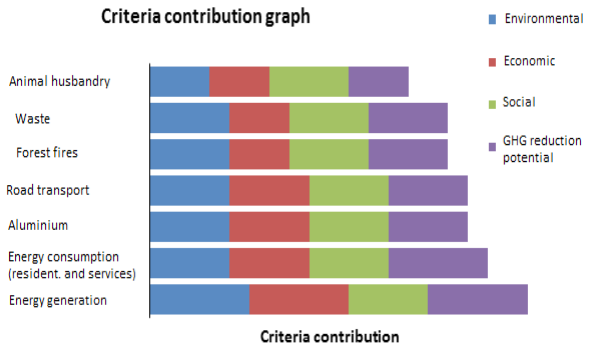

Figure 1. Cumulative scores for sectors in Montenegro against climate (mitigation) and development criteria

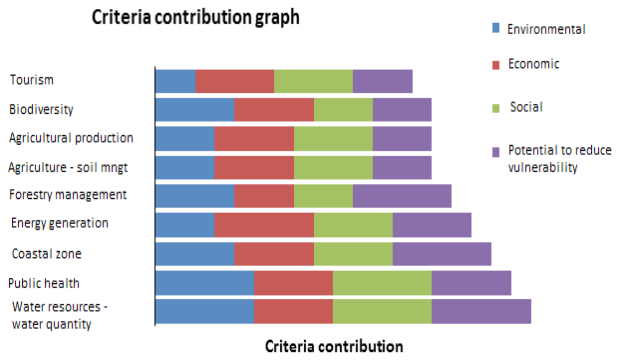

Figure 2. Cumulative scores for sectors in Montenegro against climate (adaptation) and development criteria

employment (green jobs creation), agriculture, wood processing, improvements in planning and construction standards, and development of science and technology.

As environmental priorities stakeholders identified the following key areas:

- Similar to the economic priority explained above, the need for sustainable logging was mentioned to protect forests and reduce their vulnerability to forest fires.
- Maintenance of a high air quality for a better quality of life through improved control of pollution from mobile and stationary sources and emission reductions.
- Improved management of waste, including cleaning of waste dumps and constructing of more landfills.
- Protection of water sources.
- Nature and biodiversity protection.

Prioritising sectors for climate and development

With these country-level sustainable development priorities for the short and medium to long term in mind, stakeholders then assessed in which sectors or areas the strongest development and climate change mitigation and adaptation improvements can be expected. The discussion was separated in one assessment on development and climate change mitigation benefits and one assessment on development and adaptation benefits. For this, a baseline description of the sectors was prepared (*e.g.* what are the GHG emissions in electricity production, what are the emissions of other pollutants, where do the energy sources come from, what is the status of technologies used in the electricity grid?) and subsequently stakeholders discussed in which sectors the strongest climate and development benefits could be achieved beyond this baseline. These benefits were subsequently scored on a 5-point scale in a simple multi criteria decision analysis.[1]

The end result of the discussion were cumulative scores for sectors reflecting how within a given sector climate and development benefits are expected beyond business-as-usual. Figure 1 shows the resulting graph for the sectors for mitigation. For instance, it shows how in Energy generation the strongest mitigation and development benefits are expected (reflected by the longest bar) followed by Energy consumption in residential dwellings and commercial services buildings, Aluminium production and Transport. The diagram also shows a breakdown of scores on the priorities (reflected by the colours). Figure 2 shows sectors where stakeholders expect the largest potential improvements on adaptation and contribution to sustainable development.

Based on these assessments it was decided to prioritise the following sectors/areas for mitigation and adaptation:

- **Mitigation**: Energy consumption in residential dwellings and commercial buildings, Electricity generation, Aluminum production, and Road transport.
- **Adaptation**: Water resources, Public health, Coastal zone management, Agriculture, and Forest management.

Technology prioritisation

For the sectors thus prioritised, the Montenegrin TNA task force (with representatives from Ministries and governmental agencies, sector experts, and the TNA consultants) subsequently identified a long list of options for mitigation and adaptation. Through a number of meetings in February of this year, stakeholders from the prioritised sectors were familiarised with these options and together with sector experts the list was shortened by crossing out technologies which are not considered feasible within the context of Montenegro (*e.g.* due to required scale or energy resources). For the remaining technology options, sector experts prepared technology fact

[1] In case an improvement in one sector was considered very beneficial in terms of realising one of the development priorities, this was reflected by a maximum score of 5; in case no improvement was expected on a priority, a score of 0 was given, etc.

sheets, thereby using information sources such as: http://ClimateTechWiki.org, UNEP Risoe Centre Guidebooks for adaptation sectors, first National Communication, *etc*. These fact sheets described the potential benefits and costs of a technology option assuming penetration at its full technical potential in Montenegro during a time frame of 25 years.

These fact sheets were subsequently shared with sector stakeholders at a workshop held in Podgorica on 12-13 March of this year in order to decide which technology options would be most preferred within each priority sector. For this the multi criteria decision analysis tool *TNAssess* was used as explained in the *Handbook for Conducting Technology Needs Assessment for Climate Change*. With this tool stakeholders scored each option in terms of contribution to mitigation or adaptation, and to economic, social and environmental development (based on the country priorities determined at the November workshop in Kolasin, see above). For each criterion stakeholders identified the most and least preferred technology options and then scored the other options relative to these. Stakeholders then added weights to the scores by analysing for each criterion the difference between the least and the most preferred option and how important this difference would be in terms of ability to reach Montenegro's development priorities. For instance, if the least preferred technology would reduce energy security whereas the most preferred technology would strongly increase energy security, stakeholders could add a high weight to these scores if they consider this an important difference.

Technology options for mitigation

Table 1 shows the results of the technology prioritisation for mitigation and development in Montenegro. As can be seen in the table, technologies were grouped in different categories depending on their applicability in terms of time and scale, so that technologies could be better compared and possible bias to, *e.g.*, short term or small scale technologies could be prevented.

In terms of Energy consumption, stakeholders expected the strongest short-term benefits to be achieved through insulation of existing buildings and use of solar systems for water heating. In the longer term, more advanced technologies in the area of climate controlling were prioritized. With these technologies, stakeholders took note of the possible temperature increases due to climate change and the need to manage in-house temperatures. In the Electricity production sector stakeholders underlined the importance of using domestic hydro resources, especially in the mountains, and solar energy. This would lead to increased energy security without the need to increase energy imports.

In the Aluminium sector three main technology options were discussed which would have more or less equal GHG emission reduction impacts. Therefore, no large weight was attached to this criterion. In addition, all three technologies would similarly increase the energy efficiency of the current aluminium production capacity in Montenegro. Stakeholders concluded that all three technologies should be considered for further

Table 1. Priority technologies for climate change mitigatation and development in Montenegro

		Short term/ small scale	Short term/ large scale	Medium to long term/small scale	Medium to long term/ large scale
Energy consumption		• Solar systems • Insulation of buildings	-	High efficiency air conditioning (residential and service buildings)	Automatic energy management in buildings
Energy production		• Small hydro power plants • Solar photovoltaic	• Large hydropower* • Solar thermal plants	-	Plazma technology (waste management – gasification)
Aluminium		Changing electrolyte composition (higher energy efficiency and working temperature of electrolytic cells)	Dotted dosing of alumina and improved process control	-	Inert anodes
Transport	**Public Transport**	• Public transport improvement • Liquefied petroleum gas			
	Passenger cars	Liquefied petroleum gas		• Plug-in hybrid engines • Hybrid engines • Electric engines • Increased efficiency of diesel engines	
	Infrastructure	• Intelligent Transport Systems • Bicycle lanes			

- Stakeholders considered large-scale hydro power as an important option for Montenegro (esp. energy security and reduced need for energy imports) but expressed concerns about the environmental impact, especially when implemented in protected areas. They underlined the importance of environmental impact assessments.

development and modernization of existing aluminum production in Montenegro as there is no dominant technology: Interventions related to electrolyte compositions is much cheaper and available and affordable in the short term than, for instance, Inert anodes, but the latter has become international standard. Also combining the options of electrolytic cell interventions and improved process control was recommended as such combinations are currently being tested.

For Public transport, system improvements were considered most important, *e.g*. separate lanes for buses. This could be combined with Intelligent Transport Systems (ITS), which should, according to stakeholders, be the starting point of transport modernization. With ITS, traffic congestions can be predicted and therefore better managed and more space can be created for public transport, which would lead to significant environmental benefits. ITS would considerably improve the capacity of existing infrastructure (and that of additional infrastructure in the future). It was recommended to pursue ITS in combination with passenger car and public transport engine improvements.

For both public transport and passenger cars, liquefied petrol gas (LPG) was considered a promising option in the short run. LPG is easy to implement in existing cars and much cheaper (in terms of fuel costs). It is also already used in Montenegro, especially in taxis. LPG powered passenger cars have about 10% lower tailpipe CO_2 emission than comparable gasoline powered cars. When compared to a diesel car, there is no significant CO_2 emission reduction per km driven; however, LPG powered vehicles have substantially lower NO_x emissions than diesel powered vehicles. Biofuels were not considered among the highest priority technology options in Montenegro as they are not used yet in the country and stakeholders were concerned about the environmental impacts.

Technology options for adaptation

Table 2 shows the prioritisation result for adaptation and development in Montenegro. As regards adaptation measures and technologies for water resources, the prioritization process showed that in the short term the highest priority was given to those interventions that could contribute to water conservation and provision of adequate quantity and quality of drinking water. At a large scale, the highest priority was assigned to regular maintenance and rehabilitations of water supply systems as it was found that these would generate twofold benefits: reduced leakages and water losses, and positive impacts on drinking water quality. Water treatment was also highly prioritised due to its potential to maintain resilience of water resources through preserved water quality, as well as due to positive impacts on efficiency/ possibility to reuse water for different

Table 2. Priority technologies for climate change mitigatation and development in Montenegro

	Short term/ small scale	Short term/ large scale	Medium to long term/small scale	Medium to long term/large scale
Water resources	• Improved drinking water treatment at household level • Rainwater collection	• Reduction in losses, maintenance of water supply systems • Water treatment and reuse	Use of more water efficient household appliance	-
Public health	Strategies and action plans for prevention and alleviation of health impacts of climate change	• Control of drinking water quality • Supervision and control of contagious diseases	Medical research	Capacity development in the health sector, especially for emergency services
Agriculture	• Efficient irrigation systems (dripping, sprinklers) • Proper manure use and soil fertility control	• Combined agricultural production • Extension services in agriculture – practical training for farmers	-	Integrated plant protection
Coastal zone	-	• Integrated coastal zone management • Protection and/ or rehabilitation of coastal wetlands	-	Systematic observation and monitoring
Forestry	-	• Sustainable management (forest protection measures) • Management planning – improved methodologies	-	-

purposes. Benefits of water treatment for protection of human health and biodiversity were also emphasised. Stakeholders concluded that existing practices of using drinking water for technological purposes or irrigation should be eliminated. At the level of households, specific techniques (such as use of water filters) to ensure adequate drinking water quality were prioritized, while at the same time it was concluded that rainwater collection was an important tool to address water shortages in some of the rural areas where other supply options are unavailable. Collection of rainwater was mainly seen as a way of providing for water uses other than drinking. Use of more water-efficient household appliances was prioritised for a medium to long term.

With respect to public health, stakeholders assessed that the strongest short-term benefits would come from development of adequate strategies and action plans for coping with health impacts of climate change, both at the individual and community level, as well as at the level of health protection systems. In addition, improvements in the control of drinking water quality and in the area of controlling contagious diseases were highly prioritized in a short run. Medical research on climate – health linkages (alone and in combination with other health risks) and development of the health sector's capacities to address negative impacts of climate change were seen as priorities for the medium to long term.

In order to increase resilience of agriculture to climate change, various measures addressing both soil quality and agricultural production were considered. Irrigation systems and adequate manure using techniques were prioritised as short-term, small-scale measures (applicable at the farm level) that would have the highest benefits for adaptation through preservation of favourable soil conditions under changed climatic conditions. At the sectoral level, short-term measures that were prioritized included combined agricultural production and development of farmers' skills and knowledge. Integrated plant protection was seen as a priority measure the for longer term.

Finally, for both coastal zone and forests, application of integrated and sustainable management approaches were prioritized as measures that would generate the highest development and adaptation contributions. Other prioritised short-term measures included wetlands protection and restoration for the coastal zone, and improved management planning techniques for forests. With a view to the longer term, for both areas compilation of comprehensive information on coastal zone protection and forests conditions and trends through a systematic monitoring and observation were deemed as priority.

Next steps

A next step in the project will be to analyse what needs to be done in Montenegro to enable roll out of the prioritized technologies at the scales desired. Such scales could be implementation at full technical potential or at a level that corresponds with achieving long term targets, such as EU renewable energy and energy efficiency targets. At a following workshop, in May of this year, stakeholders will explore market barriers and system inefficiencies for prioritized technologies and suggest solutions for these as input for a national strategy for accelerating technology options for climate and development. The latter strategy will form the conclusion of the TNA project in Montenegro, later this year.

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Opportunities for Co-ordinating and Harmonising TNA and LEDS processes

By Wytze van der Gaast*

Introduction

During recent climate negotiations and in the literature, there has been an increasing awareness of the interlinkages between climate and development. For instance, Tilburg et al. (2011) explain that measures which only focus on GHG emission reduction without necessarily rethinking the structure of the economy are probably very difficult and costly to carry out. Moreover, Anderson (2010) argues that climate change will make Millennium Development Goals in Africa more difficult and expensive to reach. With the concepts of Low Emission Development Strategies (LEDS), Nationally Appropriate Mitigation Actions (NAMAs), and National Adaptation Plans (NAPs), the COP has introduced provisions for climate change mitigation and adaptation in light of countries' sustainable development pathways.

The increasing convergence between 'climate-first' and 'development-first' can also be seen in the update of the *Handbook for Conducting Technology Needs Assessment for Climate Change* (TNA Handbook, UNDP 2010). In a TNA a country's development priorities are used as criteria for identifying strategic sectors for climate and development and subsequently for prioritising technology options for mitigation and adaptation within these sectors. The TNA process is concluded by analysing how development and transfer of these options can be accelerated in the country as part of an overarching strategy. Currently, 36 developing countries are conducting TNAs with financial support through the GEF and with guidance from UNEP Risoe Centre (http://tech-action.org).

Given the commonalities between these provisions (even though they have different 'roles' under the Convention), this article explores possible interlinkages between and opportunities for co-ordinating/harmonising TNA and LEDS practices, and how this could support the formulation of NAMAs and NAPs.

Description of TNA and LEDS processes

For LEDS no uniform methodology has been endorsed yet under the UNFCCC, although for several LEDS (study) programmes step-wise methodologies have been developed (Ecofys and IDS (2011)). For TNA a detailed stepwise process methodology has been endorsed by the UN Expert Group on Technology Transfer (EGTT).[1]

A core objective of a LEDS is to integrate climate change concerns into socio-economic policy making (Clapp et al. 2010) so that a country's development objectives are met with lower than business-as-usual GHG emissions. In addition, a LEDS can enhance co-ordination and communication between government agencies and key stakeholders, guide the low-emission planning of the economy, and can provide investment signals. According to Ecofys and IDS (2011), the LEDS processes analysed have a clear focus on the identification of mitigation options. It remained unclear from the survey to what extent methodologies developed for LEDS currently cover adaptation or intend to do so. One example of a climate and development strategy formulation process which explicitly includes a focus on mitigation and adaptation is UNDP's Low Emission and Climate Resilient Development Strategies (LECRDS) programme.

Technology Needs Assessment

The updated TNA process contains two main stages, which are highly participatory. During the first stage, country stakeholders identify those technologies or measures which maximise climate and development benefits against given resources. For this technology prioritization process, the TNA process suggests a multi criteria decision analysis method and a technology familiarization step (to avoid that in a TNA only those technologies are considered that stakeholders are familiar with). TNA stakeholders are subsequently encouraged to assess technologies at the level of the subsector by asking: 'at what scale could this technology be implemented within the subsector given its technical potential and how would that contribute to social, environmental and economic development?' The output of this first TNA phase are sector-level portfolios of technologies for climate and development. These technology options are not necessarily limited to 'hard' technologies, but could also be 'soft' technologies or measures such as behavioural change, improved transport operation systems, awareness campaigns, *etc*.

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1 The EGTT endorsed the updated Handbook for Conducting Technology Needs Assessment for Climate Change (UNDP 2010) at its sixth meeting on Development and Transfer of Technologies (Bonn, Germany, 19-20 November 2010).

In the second stage of the updated TNA process, stakeholder groups examine how the development and transfer of the prioritised technologies can be accelerated in the country at the scale desired. The updated TNA process therefore underlines that identification of technologies and possibly implementing them in projects may not be enough to initiate a system change for widespread technology innovation in a country. While identification of technologies is an important step in low emission and climate resilient development, overarching strategies will be required to accelerate development, deployment and diffusion of the technologies countries' systems or markets.

Possible interlinkages between TNA and LEDS and formulation of NAMAs

The consideration in a TNA of a country's development priorities is similar to the objective of a LEDS to consider national development plans and climate policy goals in an integrated manner as a starting point for the analysis, and in accordance with the requirement that NAMAs should be formulated in the context of sustainable development. According to UNDP (2010 p. 23), "the objective of a technology needs assessment is to prioritize technologies for mitigation and adaptation in the light of countries' development objectives and to explore how this could be fed into strategic development plans at a country level, as well as into Nationally Appropriate Mitigation Actions (NAMAs) and National Adaptation Programmes of Action (NAPAs)."

Provided that a TNA and LEDS focus on the same priority areas and (sub)sectors, prioritised technologies and measures in a TNA could be fed into a LEDS formulation process. For example, a LEDS could identify poverty alleviation and solving health problems due to in house cooking in rural area households as key priorities for the country. In a TNA, these priorities could be used as criteria for selecting sustainable cooking technologies with an assessment of system barriers to these technologies and suggested measures to address these. Subsequently, a LEDS could work these measures into policies and identify sources of finance for that (UNFCCC 2011), which could, in their turn, be fed back into a TNA for formulating a technology acceleration strategy.

The country can conduct both processes simultaneously or in a logical sequence, so that resources are used efficiently and the output from one process is used as input into the other process. In such a co-ordinated TNA-LEDS approach, stakeholders in both processes could be the same, although TNA stakeholders could have a more technical background within a sector, whereas in a stakeholders could have a more financial and policy level background. Co-ordination of processes could thus help combining technological and policy level expertise in the country.

Both the outcomes of LEDS and TNA processes could be used for formulation of NAMAs and NAPs. As there is currently no established process for NAMA formulation under the Convention (UNFCCC 2010, Jung et al. 2010), the interlinkages between TNA and LEDS with NAMAs can be diverse. For instance, as argued by Jung et al. (2010), on the basis of an analysis of five pilot NAMA studies, a NAMA could be one technology project, or a set of measures as part of a comprehensive plan, or an overall strategy itself, including actions to improve the functioning of markets or systems for successful development and transfer of low emission technologies.

TNA and LEDS could contribute to NAMA formulation at these different levels as:

- Strategies are identified for country-context specific systems of technology development and transfer at the technology, sector and national levels;
- These strategies incorporate activities on capacity-building and finance needs, policies and measures, networks, organisational change, supporting activities for the system, as well as intellectual property rights requirements for successful technology development and transfer; and
- Action plans can be developed for implementing the strategies which allow time planning, allocation of responsibilities and resources, and MRV to maximise the benefits.

Co-ordination of TNA, LEDS and NAMA processes

Harmonisation or integration of TNA and LEDS process steps makes sense not only to enable more efficient use of developing countries' resources, but also to obtain a clearer picture of a country's needs in terms of technologies, finance and capacity building for reaching their sustainable development goals. This would, for instance, support the work of the Technology Mechanism in terms of providing products/tools, services and partnerships to enhance the implementation of identified actions for mitigation and adaptation (UNFCCC 2011). It would also enhance the matching of finance needs with available funds under the Convention or other bilateral or multilateral funds.

In principle, harmonisation of TNA and LEDS processes could take place in a relatively flexible way, such as co-ordination of work in different process steps, or more structured, such as in the form of merging or jointly conducting both processes or process steps. Figure 1 illustrates how steps in TNA and LEDS could be co-ordinated. The diagram also shows how this co-ordinated work could benefit from external processes, such as Technology Roadmap formulation (see section 2), and deliver outputs for formulation of NAMAs (and NAPs). The diagram shows how the work in each stage of the TNA and LEDS process could be co-ordinated by, *e.g.*:

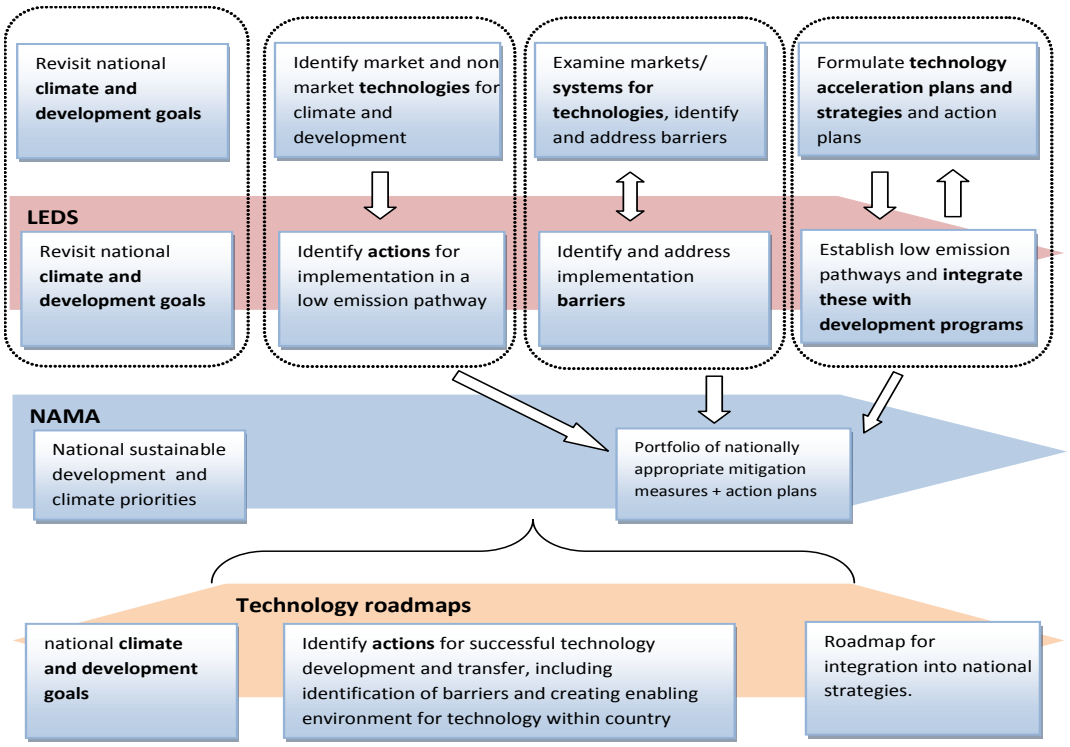

Figure 1. Illustration of TNA - LEDS coordination. The knowledge and resources needed for that could, for instance, be mobilised through existing networks such the The Low Emissions Development Strategies (LEDS) Global Partnership (http://en.openei.org/wiki/LEDSGP).

- Using similar background material for revisiting a country's long term development vision with development priorities within which the further analysis will have to be embedded, including strategic sectors for achieving climate and development goals;
- Prioritising technologies in a TNA by exploring their climate and development benefits at a desired scale in the country (e.g., full penetration or scale for achieving development and climate benefits), which can subsequently be fed into a LEDS as part of the identification of actions for a low emission pathway;
- Considering in a LEDS the solutions for technology implementation barriers and technology innovation blockages, as identified by a TNA, as a basis for technology innovation strategies.

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A Reformulation of 'Success' in the Climate Change Negotiations

by Job Taminiau and John Byrne*

Introduction

Previous JIQs have detailed the progress and momentum of the international negotiations on climate change and recently asked the question: when can we be satisfied with negotiation outcomes? This question concerns the notion of what constitutes 'success' in the negotiations. Appraising the Durban Agreement as a 'historic breakthrough'[1], many see Durban as a positive development. However, this appraisal is based on a certain formulation of success which we consider as misguided and incapable of realizing an international agreement that can be considered equitable, sustainable, and just.

The current formulation of succes

The shared belief in markets and the view that the transition is largely an economic and technological question reflects Annex B's core commitment to a commodity-based paradigm of policy-making. In this, the current formulation of success is to realize an agreement that gives priority to resolutions of environmental conflicts that are least-cost and, where possible, conducive to economic growth. To that end, the market-based 'flexibility mechanisms' were introduced. Reducing the atmosphere to a resource, 'good' climate change policy then represents an opportunity to obtain optimal value for the atmospheric services. Durban reinforced this commitment to a commodity-based paradigm (Taminiau 2011). Despite efforts within the commodity-based paradigm, the international community is yet to realize significant emission reductions of GHGs.

A bifurcation in perspective

We posit that such a formulation of success restricts the potential for the international community to formulate an equitable, sustainable and just agreement. This recognition revolves around the bifurcation in perspective between developed and developing countries. Instead of a low-cost commodity-based paradigm emphasizing emission reductions, developing countries prioritize a political discourse of development. This bifurcation produces undesirable consequences of agreement in terms of equity and justice and it results in tremendous difficulty in realizing agreement of sufficient environmental integrity. Several of these arguments are briefly discussed here.

Developing countries emphasize the principle of equity and conclude that this principle is not being upheld. For example, the developing countries note the dichotomy in responsibility for and vulnerability to the issue of climate change and the differentiation in origin of GHG emissions in terms of developing country survival and developed country lifestyle choices (Agarwal & Narain 1995).

The focus on market efficiency leads to developing country concern that this reflects an effort to minimize the burden of mitigation activity on polluter industries and countries while neglecting vulnerable communities and countries (Najam, Huq, & Sokona 2003). While often touted as an active support of sustainable development, the CDM's efficiency gains (*i.e.* monetary outputs) are prioritized and privileged over the contribution to sustainable development and thus does not significantly contribute to sustainable development (Olsen 2007). The highly skewed CDM portfolio towards a handful of countries further elucidates the failure to fulfill needs and wants equitably.

While commodification of the atmosphere[2] is seen by some as an appropriate management structure, others see the potential of corporate interest reflected in the established exchange structure (Schreuder 2009). Instead of being driven by the need for emission reductions, it is driven by the profit motive (Byrne & Glover 2001). Such an approach neglects the political

* This JIQ article is based on a forthcoming position paper prepared for COP-17 by the Center for Energy and Environmental Policy (CEEP; Newark, DE, USA).

1 See e.g. European Commission Memo/11/895 : http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/11/895&format=HTML&aged=0&language=EN&guiLanguage=fr.

2 The term 'commodification' is used here to refer to a social process by which phenomena (social and natural) are transformed from their intrinsic and autonomous existence into a social, political, and/or economic value; it thus becomes a fungible object available for use and exchange.

economy realities of an unequal nature in an unequal world (Byrne et al. 2002).

The current definition of success is antithetical to our objectives and needs

The prominence of the commodity-based paradigm and the bifurcation in perspective between developed and developing countries leads to a current approach and formulation of success that fails to provide in both sustainability and equity, reduces developing country autonomy to select development pathways, and allows the developed countries to shift and evade their responsibilities to the developing countries. We conclude that the current definition of success is antithetical to the world's shared objectives and needs.

Envisioning a reformulation

Instead, CEEP argues for the adoption of principles of ecological justice as the basis of acting on issues of climate change. In CEEP's approach, ecological justice for climate action concerns the simultaneous pursuit of ecological sustainability and social justice through international policy. In this, we argue for the reformulation of success away from the imposition of emission reduction targets achieved through market-based policies towards country-context specific sustainable development objectives. In this, we view it as a prerequisite that developed countries take domestic mitigation responsibility while supporting developing countries' sustainable development efforts. We identify developments in the international community that together provide a new foundation for action and new mechanisms and processes to formulate such action, and renewed motivation and momentum for such action. Momentum for change is provided by the *Rio+20* worldwide review of progress towards sustainable development.

A new foundation for action

'Durban' potentially provides for a future climate policy regime. In the meantime, however, climate change action will be articulated through a bottom-up and decentralized pledge-and-review framework (Taminiau 2011). However, the current pledges and actions are insufficient to realize the emission trajectory required to limit climate change to 2° C and it does not provide incentives for ambitious action (CAT 2011). In effect, while the pledge-and-review approach was capable of increasing participation levels, it has done so by trading off strict compliance mechanisms and stringency. We consider it to be a reflection of the lowest common denominator.

However, it offers several characteristics that can form the foundation for a fulfillment of country-specific sustainable development objectives (see Table 1). For instance, the bottom-up characteristic allows developing countries to indicate their potential for action and communicate these to the international community. Bottom-up activities have the potential to produce meaningful and ambitious climate action. For example, in the U.S., local and regional strategies have surpassed and are likely to continue to surpass, in their quantitative and qualitative goals and actions, the commitments adopted by the COP process (Byrne et al. 2007). This can be explained as an outgrowth of the governance opportunities that bottom-up strategies offer (Byrne et al. 2007).

The active components of a new approach

The issue of sustainable development has gained more prominence in recent years. This is reflected in the introduction of, *e.g.*, NAMAs, NAPs, the Technology Mechanism, Low-Carbon Development Strategies (LCDS), and the participatory Technology Needs Assessment (TNA) process. For example, NAMAs are placed "in the context of sustainable development" (UNFCCC, 2010 para. 48) and TNAs proritize developing countries' sustainable development as the basis for identifying and selecting technologies (UNDP 2010).

Also, low-carbon technologies will be a significant component in climate change action. While promising, it is important that such technologies fit the country-context (ENTTRANS 2008). Considering the substantial differences in developing country circumstances, modern technology transfer without explicit consideration for the country context is unlikely to contribute to sustainable development (Wilkins 2002). This identifies a clear understanding of the local socio-ecological circumstance and the autonomy to articulate associated needs and wants of the local

Table 1. Main differences between pledge-and-review and targets-and-timetables

Targets-and-timetable	Pledge-and-review
Top-down (multilateral agreement)	Bottom-up (country driven)
Stringency divided in two groups	Continuum of stringency possible
Internationally binding	Domestically binding
Single component commitment	Multicomponent commitments
Static	Flexible

Source: authors

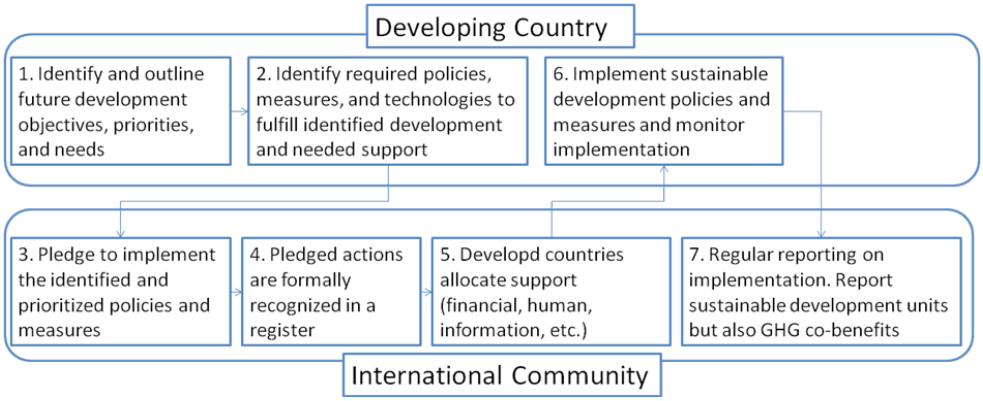

Figure 1. The phases of the proposed focus. Source: authors, adapted from RSA (2006)

community as a prerequisite for effective action. Stressing the link between climate change and sustainable development, Van Der Gaast & Begg (forthcoming) describe in detail how these mechanisms and processes can be used to refocus climate change into the wider context of sustainable development. They show that these mechanisms can be effectively used by developing countries to identify and prioritize sustainable development actions. As such, these mechanisms form important building blocks for supporting countries in formulating long-term pathways in line with socio-ecological and economic development objectives.

Financial support is a key aspect for developing countries (Shrivastava & Goel 2010). It is important to realize that the current financial institutional framework actively supports the processes of industrialization, economic growth, material expansion, and globalization. As such, we find it prudent to reconsider the 'green bank' proposal that outlines a new global financial institution sensitive to the shortcomings of the World Bank, the IMF, and the WTO. Arguing that environmental markets are in a class of their own the introduction of an 'International Bank for Environmental Settlements' (Chichilnisky 1997) could support doing better with less instead of doing more with more.

Prioritization of sustainable development

With these developments in mind, we propose a new focus and a new formulation of success for the international climate change negotiation process which resembles the sustainable development policies and measures approach put forward by South Africa (RSA 2006). In short, we envision a modification of the newly formalized pledge-and-review platform towards a prioritization of sustainable development. In this, Parties use the participatory mechanisms of LCDS and TNA to identify their low-carbon and sustainable development pathways in line with their objectives, priorities, and needs. Through the modified platform, they can communicate the LCDS and TNA outputs to the international community (Figure 1).

With regard to decision-making, citizen involvement would entail – or at least support – local, participatory and accountability-based action, as supported by diverse institutions and processes for agenda setting and evaluation. In turn, as regards the outcomes of such decision-making, the commons-based approach promotes greater equity of impacts along ecological dimensions, where protection of the broader life web is explicitly valued (Byrne et al. 2006). The new focus moves away from the current economic least-cost activities and instead emphasizes issues such as public health, poverty alleviation, *etc*. Livelihoods-centered energy and economic development (Agarwal & Narain, 1995; Byrne et al. 2002) and participatory governance become hallmarks of the new approach. The new approach places shared social and environmental progress – for all communities – at the forefront of adjudicating technological choice and economic value. Whereas the current focus risks 'lock-in' of the dominant paradigm due to its excessive focus on efficiency, our proposed focus allows for a fundamental reorientation towards the inclusion of a social and ecological perspective (see Table 2).

Concluding remarks

In the current paradigm, the reality of production and consumption of commodities is structured and motivated by the logics of technology and capital. Environmental consequences and social harm are, at best, a residual concern. Whereas more comprehensive approaches that address economies from a more structural vantage point (*e.g*., sectoral or programmatic CDM) might be better suited to realize economy transformation and reflect broader interests, we view these attempts as an insufficient challenge to the hegemony of the commodification process over social and ecological relations. We argue that, when the final outcome of the Durban process follows the same formulation of success within a commodity-based paradigm, the international negotiations have lost sight of the basic questions of justice and are incapable of realizing sustainability and equity.

Table 2. Main differences between the current and the focus proposed in our position paper

Current focus of the negotiations	Proposed focus
Emission reduction targets	Sustainable Development objectives
Ecological colonialism/imperialism	Autonomy to outline development pathway
Techno-economic rationale	Values and needs based approach
Top-down approach	Bottom-up approach with international support
Static	Flexible
Commitment divided in Annex I and non-Annex I	Continuum of commitment possible
Minimal incentive to participate	Action positioned along domestic priorities
Imposed process	Ownership of process

Source: Authors

We have formulated an approach which prioritizes social and ecological relations and emphasizes an equitable distribution of capabilities to fulfill human needs and wants. The prioritization of sustainable development along a bottom-up discourse and a commons-based paradigm specifically incorporates sustainability, equity, and justice into the international efforts to address climate change. We would consider the reformulation of success and a refocusing of the international community towards this target a historic breakthrough. Such a new paradigm measures success in terms of the formulation of low-carbon and sustainable development pledges in line with domestic priorities and objectives (identified through the use of TNA and LCDS) and how the identified mitigation and adaptation actions (in the form of NAMAs and NAPs) are intended to realize the formulated development.

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Brown, S., A. Grais, S. Ambagis, T. Pearson, 2012. 'Baseline GHG Emissions from the Agricultural Sector and Mitigation Potential in Countries of East and West Africa', CCAFS Working Paper 13 <http://ccafs.cgiar.org/sites/default/files/assets/docs/ccafs-wp-13-baseline_ghg_ag-web.pdf>

This paper explores where climate change mitigation actions in the agriculture sector can be taken in nine East and West African countries without compromising their food security. The paper first estimates the business-as-usual GHG emissions for four East African countries (Ethiopia, Kenya, Tanzania, and Uganda) and five West African countries (Burkina Faso, Ghana, Mali, Niger, and Senegal). Then it examines the annual quantity of CO_2 equivalents per ha that could be sequestered in soil and vegetation (agroforests and native ecosystems) above business-as-usual for several potential mitigation options across the nine countries.

Carbon Market Institute, 2012. Carbon Market Integrity: a Review of the Australian Carbon Pricing Mechanism. Bond University, Centre for Law, Governance and Public Policy <http://carbonmarketinstitute.org>

In line with the global response, the Australian Government has re-evaluated domestic legislation and standards in place before the global financial crisis, including the problem with inadequate regulation and market oversight. The report notes that the Australian rules are complex and new, and they are enacted in many different acts and regulations. Importantly, many key regulations are yet to be promulgated.

It is evident that the design rules for the Australian carbon markets as enshrined in the Clean Energy law package and other relevant associated acts and regulations in part reflect lessons learnt from the overseas carbon markets. However, a key question is whether the institutional framework for operation, regulation and oversight provided by the Clean Energy law package and relevant associated acts and regulations will be sufficient to protect the nascent Australian carbon markets from disruption and loss caused by theft, fraud and other undesirable practices. The Carbon Market Institute cautions that the answer to this question will unfold with the promulgation of key regulations for the Australian ETS, and thereafter, as the carbon market evolves.

Fujiwara, N., M. Alessi, and A. Georgiev, "Carbon Market Opportunities in Southern Mediterranean Countries", MEDPRO Technical Paper, March 2012 < http://www.ceps.eu/book/carbon-market-opportunities-southern-mediterranean-countries>

To date, Southern Mediterranean countries have hosted a limited number of projects under the Clean Development Mechanism (CDM). There are three challenges to the participation of middle-income countries in future carbon markets: the limited size of future demand for offsets or credits, restrictions on the use of CDM credits in Phase III of the EU Emissions Trading Scheme, and the lack of prompt preparation for the start of new market-based mechanisms. This study examines existing and emerging activities in Southern Mediterranean countries that could fit into new market-based mechanisms. It explores options for the evolution of mechanisms and discusses the merits of post-2012 carbon funds in bridging the gap between the end of the first commitment period of the Kyoto Protocol and the entry into force of a new international agreement.

N. Fujiwara, "Sector-specific Activities as the Driving Force towards a Low-Carbon Economy: From the Asia-Pacific Partnership to a Global Partnership", CEPS Policy Brief, January 2012 <http://www.ceps.eu/book/sector-specific-activities-driving-force-towards-low-carbon-economy-asia-pacific-partnership-gl>

From 2006 to 2011, the Asia-Pacific Partnership on Clean Development and Climate (APP) provided a non-legally binding framework based on a public-private partnership to support projects towards clean development and climate objectives in seven countries in the region. The seven partner countries concluded that the APP activities were successful and could lead to other successes in similar initiatives with similar working formats. For example, three of the eight sectoral APP task forces (on power generation and transmission, cement and steel) are to continue their activities under the Global Superior Energy Performance partnership (GSEP).

A recent CEPS study commissioned by the European Commission showed that a majority of participants viewed information exchange and networking in APP activities as valuable in themselves and access to existing technologies and know-how as beneficial. Factors perceived as barriers included a lack of funding and a lack of capacity for data collection and management. This Policy Brief

builds on the key findings of the study done for the Commission, incorporating updated material and policy recommendations and specifying where EU involvement could be most effective.

Leguet, B. (Chair), N. Fujiwara and A. Georgiev (rapporteurs), "The EU Emissions Trading Scheme as a Driver for Future Carbon Markets", CEPS Task Force Report, March 2012 <http://www.ceps.eu/book/eu-emissions-trading-scheme-driver-future-carbon-markets>

Taking stock of the experience of the EU Emissions Trading Scheme, this CEPS Task Force report analyses its purposes and potential for improving the cost-effectiveness of mitigation actions by expanding its scope to new sectors, linking with future flexible mechanisms and enhancing the long-term price signal. The performance of the ETS sector in mitigation is important for the EU's ability to meet its current target of 20% GHG emissions reductions by 2020 compared with a 1990 baseline and will be instrumental in meeting any increased level of reductions.

The report also addresses carbon finance along with innovation and low-carbon technology deployment as possible achievements that may be expected from the ETS. It has been suggested that the ETS has made some positive impacts on abatement activities but not enough on innovation and technology deployment at the levels required for the EU's long-term goal of keeping the global temperature increase below 2°C above pre-industrial levels. The report proposes a set of recommendations on the purposes and outcomes of carbon markets, the making of future carbon markets and the way forward for the EU ETS.

Mazouz, S. and E. Jackson (2012), Emissions Trading Coalitions – Leveraging Emissions Trading to Achieve Greater Levels of Global Mitigation Ambition, Discussion paper, The Climate Institute, Sydney. < http://www.climateinstitute.org.au/images/reports/tci_regionalemissionstradingcoalitions_discussionpaper_mar2012.pdf>

In the Durban Platform agreement, countries renewed their commitment to increase the level of ambition of national efforts to reduce emissions. This paper proposes bi- or pluri-lateral arrangements that may help to boost the level of global mitigation ambition. These would allow developing and developed countries to trade in emissions permits. Such a structure has similarities to the regional and bilateral trade agreements that have risen largely from the lack of pace in global trade reform and would operationalize a trading based 'flexibility mechanism' in the lead up to a comprehensive legal agreement by 2015 for 2020 and beyond. This paper briefly outlines the concept of emissions trading coalitions, then provides some context by looking at the relative successes and shortcomings of the existing multilateral climate mechanisms aimed at reducing global mitigation costs, the 'flexibility mechanisms'. Lastly, the paper covers selected ETC issues, including aligning incentives, measurement, reporting and verification (MRV) and potential costs and benefits to participants.

Shishlov, I., V. Bellassen and B. Leguet, 2012. Joint Implementation: a frontier mechanism within the borders of an emissions cap, Climate Report n°33

Based on specific projects rather than economy-wide emissions reductions, and driven by the demand from the installations covered by the EU ETS, JI turned out to be a largely private sector mechanism. Besides attracting private investors in GHG abatement projects, JI creates an opportunity for countries to exploit the arbitrage price spread between different carbon offsets. Some countries, like for instance Ukraine, quickly realized the added value ofJI and boosted its development, while in others, like Russia, JI lacked political support and efficient frameworks took time to be established.

According to the ERU supply forecasting model developed by CDC Climat Research, Annex I countries are expected to generate up to 356 million ERUs for the first Kyoto commitment period. Around 80% of these credits shall originate from Russia and Ukraine, and up to 70 million shall be generated from countries participating in the EU ETS. Within the EU, JI has been used as a 'frontier mechanism': JI projects mostly explored abatement opportunities not covered by the scheme and, as highlighted by the case of nitrous oxide emissions from the production of nitric acid, played an important role in identifying abatement technologies and providing information to extend the scope of the EU ETS.

One of the most complex issues related to JI is the practice of additionality. The cases of France and Ukraine demonstrate that the stakes associated with additionality may differ depending on a country's compliance position. In Ukraine, additionality was not perceived as a significant economic risk due to a large anticipated AAU surplus. In France, on the other hand, additionality was perceived as a threat to the treasury due to the uncertain compliance position of the country. In that case, additionality becomes more a matter of economic efficiency than environmental integrity.

The **Joint Implementation Quarterly** is an independent magazine with background information about the Kyoto mechanisms, emissions trading, and other climate policy issues. *JIQ* is of special interest to policy makers, representatives from business, science and NGOs, and staff of international organisations involved in climate policy negotiations and operationalisation of climate policy instruments.

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Abbreviations

AAU	Assigned Amount Unit
Annex A	Kyoto Protocol Annex with GHGs and sector/source categories
Annex B	Annex to the Kyoto Protocol listing the quantified emission limitation or reduction commitment per Party
Annex I Parties	Industrialised countries listed in Annex I to the UNFCCC; countries not included in Annex I are called Non-Annex I Parties
Annex II Parties	OECD countries (listed in Annex II to the UNFCCC)
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CER	Certified Emission Reduction (Article 12 Kyoto Protocol)
COP	Conference of the Parties to the UNFCCC
COP-MOP	COP serving as Meeting of the Kyoto Protocol Parties
DOE	Designated Operational Entity
DNA	Designated National Authority
ERU	Emission Reduction Unit (Article 6 Kyoto Protocol)
EU ETS	European Union Emissions Trading Scheme
EUA	European Union Allowance (under the EU ETS)
GHG	Greenhouse Gas
JI	Joint Implementation
JISC	Joint Implementation Supervisory Committee
LCDS / LEDS	Low carbon (or emission) development strategy
LULUCF	Land Use, Land-Use Change and Forestry
NAMA	Nationally Appropriate Mitigation Actions
NAP	National Adaptation Programmes
PDD	Project Design Document
REDD	Reducing emissions from deforestation and forest degradation in developing countries, including conservation, sustainable management of forests and enhancement of forest carbon sinks
SBSTA	Subsidiary Body for Scientific and Technological Advice
SBI	Subsidiary Body for Implementation
TNA	Technology Needs Assessment
UNFCCC	UN Framework Convention on Climate Change

JIQ Meeting Planner

14-25 May 2012, Bonn, Germany
Bonn Climate Change Conference - May 2012 with SBI 36, SBSTA 36, AWG-KP, 17, AWG-LCA 15
Contact: http://unfccc.int

4-6 June 2012, Rio de Janeiro, Brazil
Rio+20 - United Nations Conference on Sustainable Development (UNCSD)
Contact: unfccc.int

16–17 June 2012, Pontifícia Universidade Católica, Rio de Janeiro, Brazil
"Solutions for a sustainable planet" International conference
Contact: www.iied.org

26 November - 7 December 2012, Doha, Qatar
Doha Climate Change Conference - 18th Session of the UNFCCC Conference of the Parties
Contact: unfccc.int