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Editor's note

Certain about certification?

Mandatory mixing of biofuels with traditional fossil fuels in the transport sector has spurred a vivid debate on sustainability. One result is that the European Commission (EC) has recently watered down its 2020 target of adding 10% biofuels to conventional fuels. Another result is the increasing pressure to develop certification systems for biofuels.

It seems fair to develop sustainability checks on biofuel production, since there are risks in terms of pushing out food crops, rising food prices, and adverse environmental effects. Moreover, the overall mitigation effect of biofuels is often disappointing when considering the entire chain (especially with regard to first-generation biofuels).

Nonetheless, it can be questioned whether the response of biofuel certification is not too simple and one-side oriented.

First, certification of biofuels does not address the fundamental problem that the mobility sector has thus far failed to seriously introduce diversification of inputs. On the contrary, the sector's input is still dominated by oil-based liquids such as kerosene, gasoline and petrol – the sector is just 'addicted to oil'. Unlike the power sector, where virtually any energy input can be used to produce power, and where input flexibility is already significant, nothing comparable has been developed in the mobility sector. The share of e.g. electricity, natural gas, and renewables as a basic transport fuel is still negligible. One can speculate about the question why input variation and flexibility in mobility has so far remained so little (a silent understanding between 'big oil' and 'big car'?), but it is clear that, in order to reduce greenhouse gas emissions in the transport sector, there needs to be a change.

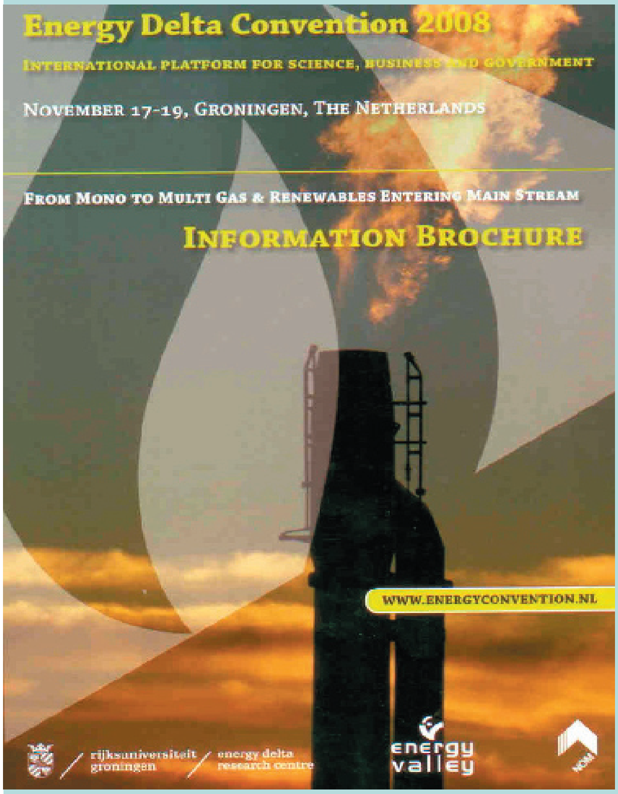
Second, certification of biofuels raises the question why other internationally traded commodities or even services would not need to be certified as well. If the real concern is the well-being of, on average, poor people and the environment, etc., why would sustainability checks not be extended towards other obvious 'candidates' such as food products or other traded products varying from energy carriers to financial services. Another related question would be that if biofuels from mainly developing countries were checked on sustainability, why would the sustainability of production of, say, industrialised products from mainly industrialized countries not be checked as well? In other words, selective sustainability certification may easily escalate into an overall protectionist mood.

Third, certification is not easy, as, for instance, sustainable forest certification has shown. The crucial question is: who sets, applies, monitors, and verifies a standard? Typically, a range of standards (either local, national or international) have been developed mostly in exporting areas, so that gatekeeper-based systems need to be designed in the importing areas to determine which certificates, standard, or standard systems are in compliance with their requirements. In practice, such systems of checks and double-checks leave significant room for interpretation of the sustainability concept, so that general acceptance is often hard to get. So, getting a complete certification system off the ground that meets broad international acceptance is like walking through the minefields for about a decade.

Fourth, there is some hypocrisy in talking about sustainability checks on biofuels, while at the same time there is little success in implementing a consistent international sustainability check in the much more obvious area of international climate policy and the CDM in particular. Under the Kyoto Protocol, the check of whether and how a CDM project will contribute to sustainable develop-

In this issue

4th Edition Energy Delta Convention Groningen Upcoming



Further information about EDC 2008 can be found at: www.energyconvention.nl
(email: info@energyconvention.nl)

On 17-19 November of this year, the 2008 edition of the Energy Delta Convention (EDC 2008) will be held in Groningen, the Netherlands. EDC 2008 will focus on the growing importance of renewable energy in the mainstream energy mix and the role of natural gas as transition fuel, as well as on the role of green gas and CO_2 capture and storage in a sustainable energy future. The organisers, the Energy Delta Research Centre of the University of Groningen, Energy Valley foundation and N.V. NOM, have put together a programme with the overall aim of bringing together experts from business, policy making and research/ science.

Keynote speakers at the EDC2008 will be:

- **Prof. Claudia Kemfert**, Humbolt University of Berlin, Germany;
- **Dr. Robert Dixon**, Head Energy Technology Policy Division, IEA, Paris, France;
- **Dr. Peter Kalas**, Former Minister of Environment in the Czech Republic; currently advisor to CR Prime Minister.
- **Dr. Marcel Kramer**, CEO N.V. Nederlandse Gasunie
- **Prof. Nebosja Nakicenovic**, Vienna University of Technology & IIASA, Vienna, Austria.

ment in developing countries has been left to host countries (as in the Marrakech Accords). However, this does not rule out that CER-buying countries can take their responsibility in this respect by introducing their own sustainability requirements, just as in the forest certification example. Actual practice with CDM projects has shown that host countries not only apply different criteria and standards for sustainability when approving projects, but neither check whether initially promised sustainability benefits have actually been achieved by projects. This implies that there is a risk that only those benefits which are directly related to GHG emission reductions are achieved, and that the monitoring and verification of other sustainability benefits does not take place. For instance, "the CDM Executive Board [has not] arranged for the monitoring of CDM projects' contributions to sustainable development."[1] Similar criticism applies to the CER buyers' side where principles, criteria and indicators defining their notion of sustainability are seldom explicit, transparent, systematically checked or monitored. If one is so relaxed about checking CDM projects on sustainability (including biofuel/biomass projects!), why would we be so keen on checking biofuels' sustainability?

In other words, don't think that certification, as far as saving the biofuels is concerned, is the key solution, let alone an easy solution!

Catrinus J. Jepma
Chief Editor

[1] IOB Evaluations, 'Clean and Sustainable?', April, 2008 (No. 310), The Hague. For more information on this study see p. 15 in this issue of JIQ.

Netherlands Government Report on CDM Contribution to Sustainable Development Published

In 2006, the Policy and Operations Evaluation Department (IOB) of the Netherlands Ministry of Foreign Affairs launched a study to evaluate the contribution of Dutch AIJ and CDM project portfolio to sustainable development in the host countries. The starting point for the study was that sustainable development in a country-context specific concept, which has for the CDM been underscored by the Marrakech Accords.

In earlier issues of JIQ, intermediate results were presented (JIQ, September 2007; JIQ, December 2007). Recently, in April of this year, the final report “Clean and sustainable? An evaluation of the contribution of the Clean Development Mechanism to sustainable development in host countries” has been published by IOB, which was followed by a letter to the First Chamber of the Dutch Parliament by the Minister of the Environment and the Minister for Development Co-operation in May. This article focusses on the reports conclusions and recommendations. The report can be downloaded from: http://www.minbuza.nl/binaries/kamerbrieven-bijlagen/2008/mei/115dmw-bijlage-iob.pdf.

The aim of study (see Box 1 for title and authors) was to explore how Dutch GHG emission reduction projects have thus far contributed to sustainable development in host countries and what contributions can be expected in the future. For the first part of this aim, five Dutch AIJ projects have been studied on the basis of project documents (plans and realised outcomes) and field trips (including interviews with stakeholders). For the second part, 44 CDM projects have been studied on how they expect to contribute to sustainable development.

Box 1. Information about the report

“Evaluating the Contribution of Netherlands’ AIJ and CDM Projects to Sustainable Development in the Host Countries”

by Joyeeta Gupta, Pieter van Beukering, Wytze van der Gaast and Friso de Jong (editors)

Commissioned by the Policy and Operations Evaluation Department (IOB), Ministry of Foreign Affairs, The Hague, The Netherlands.

The report can be downloaded from: http://www.minbuza.nl/binaries/kamerbrieven-bijlagen/2008/mei/115dmw-bijlage-iob.pdf.

The central question of the study was how and to what extent do AIJ/CDM projects carried out in the context of the Netherlands’ UNFCCC and/or Kyoto Protocol policies contribute to sustainable development in the host countries. It was addressed by looking at three specific areas:

- Netherlands policies in the international context;
- AIJ projects implemented under the Netherlands pilot programme in the late 1990s;
- The portfolio of CDM projects in which the Netherlands is currently investing.

The Netherlands AIJ/CDM policies in the international context

Although it is the prerogative of the host country to determine whether a project contributes to sustainable development, the Netherlands Government can influence the selection of CDM projects in its portfolio by offering a higher CER price for projects with a relatively strong contribution to sustainable development. Moreover, the intermediaries contracted to purchase CERs on behalf of the Netherlands Government must apply the Dutch minimum sustainable development criteria for CDM projects. Yet a project’s achievement can only be assessed if the project participants and countries involved are willing to share information on the project’s impact on sustainable development, so therefore the Netherlands Government does not automatically have full control over the sustainable development impacts of its projects.

Since the Netherlands invest in CDM via intermediaries, the involvement of the Netherlands Embassies in CDM project development is rather limited (see Box 2). However, VROM may request advice from its Embassies on, for example, whether a particular project is in accordance with host countries’ needs and priorities. Some of the Embassy officials interviewed indicated that a more coordinated approach to CDM project development would benefit the outreach and exposure of the Netherlands in developing countries.

The Netherlands differs from several other countries in its approach for procuring CDM credits and capacity building as it has strictly separated its CDM capacity development programme from its CER procurement programme. The report has recommended that the division of tasks within the Netherlands Government between CDM capacity building (responsibility of Ministry for Development Cooperation) and CER acquisition from actual projects (responsibility

Box 2. The Dutch CDM CER acquisition and capacity building programmes

The Ministry of Housing, Spatial Planning and the Environment (VROM) is responsible for the overall climate change policy of the Netherlands and is designated as the responsible CDM authority (see as well Chapter 3). The Netherlands Government has allocated more than € 402 million (to VROM) for the purchase of CERs (non-ODA). At the same time, the Netherlands Government has been involved in programmes to build capacity for CDM project cooperation in developing countries. Via these programmes, potential CDM host countries are assisted in establishing a DNA for the CDM and are trained on the modalities and procedures of the CDM as formulated in the Marrakech Accords. Within the Netherlands Government, the Ministry of Foreign Affairs (Development Cooperation) is responsible for these capacity building programmes. The Ministry of Agriculture is responsible for Land use, land use change and forestry (LULUCF) under the CDM (particularly in relation to approval of CDM projects), while the Ministry of Economic Affairs and VROM have a shared responsibility for emissions trading policy.

of Ministry of Housing, Spatial Planning and Environment, VROM) should be more effectively organised. For instance, it has been recommended that development co-operation expertise be used to support host countries in formulating a sustainable energy strategy and identify CDM projects that would be in line with that strategy. CERs would then be acquired from these projects. This would both satisfy the financial additionality clause, because ODA money would not be used for CER acquisition, while it is ensured that CDM projects become strategic rather than ad-hoc investments.

AIJ project assessment

In general, the Netherlands contribution to sustainable development via AIJ proved to be positive. Four of the five AIJ case studies (see Table 1 for some basic characteristics) have genuinely attempted to contribute to the sustainable development of the host country. Of these four projects, the biogas project in Vietnam scores very well, both in terms of sustainable development and in reducing CO_2 emissions per euro spent. It was also the only project which had explicitly formulated sustainable development objectives. The sunny greenhouse project in China, on the other hand, has performed poorly with only very few users so that envisage benefits have not been achieved.

The assessment shows that projects are more successful when the technology is based on what is needed in the country or within the community rather than when supply-driven with a poor project design for operation and maintenance of the technology.

CDM project assessment

In the assessment of a representative sample of 44 Netherlands CDM projects, a distinction has been made between sustainable development benefits that are directly related to the GHG emission reduction component of projects and those that are not directly related to GHG abatement. Direct benefits will automatically follow from a successful GHG abatement (*e.g.* technology transfer needed for the GHG reduction, energy supply diversification, improved energy efficiency). It was found that about half of the CDM projects studied claim to generate sustainable development benefits which are not directly related to their GHG abatement component. Examples of such claimed indirect benefits are job creation, local community support, poverty alleviation, improved sanitation conditions, increased tourism, *etc*.

Table 1 Background information on the AIJ projects studied

	Host country				
	Costa Rica	**Vietnam**	**South Africa**	**China**	**India**
Location	Tejona	Across country	Bethlehem	Shandong	Bihar
Investment	Wind power	Ssc. biogas	Mini-Hydro	Sunny greenhouses	Biomass Gasifier
Total project cost	€ 21.9 m	€ 2.1 m	€ 6.4 m	€ 0.8m	n.a.
Nl contribution	€ 3.5 m	€ 2.0 m	€ 0.8 m	€ 0.5 m	€ 0.7 m
Investment/tCO_2	€27.5	€ 1.9	€9.7 per	n.a.	n.a.

One of the main findings of the study is that achieving these indirect benefits is generally uncertain, as the monitoring of these indirect benefits is not structurally incorporated in the project design. Although the project idea and design documents contain information about sustainable development benefits, in the eventual project design and contract generally no procedures are envisaged for enforcing these benefits. Consequently, when a project generates its CO_2-eq. emission reductions but fails to deliver all envisaged sustainable development benefits, this will generally have little contractual consequences for the project partners. Even in cases that host country governments intend to enforce the compliance of the project to its design, they may lack the means to do so.

Issues and dilemmas

The study has generated a wide range of insights with regard to the actual or expected contribution to sustainable development of AIJ and CDM projects with Dutch involvement. The main issues and dilemmas that Netherlands decision makers will face in the near future with respect to CDM project involvement are the following:

1. Reduction of uncertainties

The present set-up of the CDM implies that the GHG emission reductions are carefully monitored and subsequently verified by an independent third party, whereas the verification of projects' sustainable development contribution is left to the countries involved or to intermediaries, if at all. The main question (or even dilemma) for the Netherlands Government remains what to do if CDM projects deliver their promised GHG emission reductions but not the expected (indirect) benefits to sustainable development. To what extent can the Netherlands Government be considered responsible for such non-compliance, and, perhaps more importantly, what measures can the Netherlands, as investor country, take to increase the likelihood achieving the expected benefits to sustainable development?

Indirect benefits on sustainable development are more likely to be achieved if investing governments add a premium on top of the CER price if these benefits are achieved and verified. Or, investor governments could agree with the project participants that they will pay less for CERs if not all sustainable development benefits have been achieved. The advantage of the latter sanction-based system would be that the only sustainable development benefits promised are those that can be realistically achieved (which prevents long lists of unrealistic benefits in project design documents). However, in order to acquire more CDM projects host countries may be less picky when judging the sustainable development component of a project.

2. ODA and CDM

At the moment, there is no link between CER acquisition and Dutch development assistance. For instance, the Dutch funded CD4CDM capacity-building project does not generate project ideas for the Netherlands Government. It was found that the contribution of CDM projects to sustainable development in host countries could be stronger if there were a more integrated approach for CDM capacity building and CER acquisition. Such an approach has the benefit that projects can be identified (using Development Assistance expertise) that are fully in line with the sustainable development needs and priorities of the developing host countries. The capacity building project could contain an assessment (involving local stakeholders and governments) of countries energy service needs, which technologies would best fit with these needs (including supply chain requirements such as feedstock delivery, availability of spare parts, etc.), and how the CDM could support implementation of these technologies. This information could then be offered to the Ministry of VROM for consideration in relation to CER acquisition.

This approach could also help creating a more balanced geographical distribution of CDM projects.

3. Selection criteria

The selection procedure of CDM projects funded by the Netherlands remains ambiguous. On the one hand, VROM has applied a list of preferred project types and contracted multilateral intermediaries specialised in community development and small-scale energy service projects. On the other hand, the strong increase in international demand for CERs in 2005 prompted the Netherlands Government also to engage in projects that reduce emissions of HFC-23 and fugitive gases, which have a strong benefit in terms of CO_2-equivalents, but which, by their nature, contribute little in terms of sustainable development (*i.e.* other than GHG reduction).

The option mentioned above of selecting projects from an energy needs assessment in the host country (thereby using development assistance expertise) would help taking more explicit account of host countries' local sustainable development priorities and suitable low-carbon technologies and would enable the Netherlands Government to optimise the contribution of CDM projects to sustainable development.

Domestic Offsets: Expanding the ETS Market to non-ETS Sectors

By Erik Ebbekink and Wytze van der Gaast[1]

EU Member States have agreed on ambitious climate and energy policy targets for the year 2020. The EU ETS will be an important policy instrument for reaching these targets. However, as the ETS covers 'only' half of the EU economy, this article explores how CO_2 emission reduction measures in non-ETS sectors could also benefit from the CO_2 credit price set by the ETS market. The concept discussed is called domestic offsets and resembles the JI concept under the Kyoto Protocol.

Under the Kyoto Protocol, EU Member States (except Malta and Cyprus) have been assigned with a national amount of GHGs that they can emit during the period 2008-2012. Through the EU emissions trading scheme (ETS) part of these so-called assigned amounts have been further allocated to European installations in energy-intensive sectors. The ETS is a so-called cap-and-trade system which has been operational since 2005. Slightly less than half of EU CO_2 emissions are covered by the ETS.

The management of the remaining part of Member States' assigned amount is generally carried out by governments through carbon/energy taxation, subsidies, voluntary agreements, green/white certificates, *etc*. Target sectors/groups are: built environment, decentralised green energy production, and transport. Thus far, activities within and outside the ETS have taken place separately, although the common aim is to reduce GHG emissions. One possibility to combine the two is through so-called domestic offset projects. These would reduce GHG emissions within the EU in non-ETS sectors and sell these as emission allowances to ETS installations.

Domestic Track 1 projects

Presently, ETS installations have a number of options to comply with their allocated annual targets. Obviously, they could adjust their production processes to keep their annual CO_2-eq. emissions equal to or below the number of allocated allowances. They could also purchase allowances from other ETS installations or CO_2-eq. credits generated through CDM and JI projects. JI projects could be implemented in both EU Member States and in other industrialised countries. CO_2-eq. emission reduction project implemented in an EU Member State in a non-ETS sector are generally referred to as Domestic JI or Offset (DO) projects. Possible DO project types are: energy performance improvements beyond the EU Directive standards, biogas/green gas production, geothermal heat, *etc*.

For the CO_2-eq. accounting of DO projects the procedures established for JI Track 1 could be used, which would imply that the validation and verification of the project plan and performance would be supervised by the governments concerned. In a typical DO project in, say, the Netherlands, credits would be calculated as CO_2-eq. emission reductions below a baseline (and by incorporating possible project-related emissions). These credits would then be transferred as allowances to an ETS installation in, say, the UK, whereby the installation delivers the project credit to the JI focal point in the UK and gets issued an allowance in exchange for it.

Another way of financing DO projects would be to use the revenues from the auctioning of part of the EU allowances in the National Allocation Plan for supporting projects in non-ETS sectors. Recently, the German Government has announced that it will invest this year € 400 million in domestic projects (€ 280 million) and international projects (€ 120 million) to support replacement of lighting in public buildings with energy efficient lighting, biomass technology projects, the installation of small-scale combined heat and power plants, etc.

Although this 'German model' is different from the JI Track 1-based DO project co-operation, it shows an interesting example of how, similar to DO projects, sustainable energy investments in non-ETS sectors could financially benefit from the CO_2-eq. market price established on the ETS market (in this case the auction price).

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Credits replacing subsidies

Linking DO projects with the ETS market would have a number of advantages:

1. DO projects stimulate development of low-carbon energy technologies within the EU and unlock enormous amounts of CO_2 savings in non-ETS sectors.
2. They broaden the scope for ETS installations to comply with their targets.
3. The economic value of GHG credits reduces the need for government subsidies, *e.g.* feed-in tariffs, to support low-carbon energy technologies projects.

A study by Van der Gaast *et al.* (2007) has shown that the value of CO_2 emission reductions could cover between 10 and 30% of the non-profitable part of a clean energy investment in the Netherlands (assuming ETS market prices between € 15 and 30 per allowance). Hypothetically, when relating these figures to a 4-year feed-in subsidy programme in the Netherlands for sustainable electricity production, subsidies paid to several projects could have been reduced by € 143 to 475 million during the 4-years of the programme.

At the same time, the availability of these credits will have a downward impact on ETS prices so that end-users/tax payers benefit twice: less tax money used for green energy subsidies and reduced levelling off of ETS compliance costs by ETS installations.

Figure 1 shows what such a combination between CO_2 credits and feed-in tariffs could look like. It illustrates the interaction between the different sources of income for a DO electricity production project (SE in the figure). It assumes a required internal rate of return for a financially feasible investment of 15% of which 8% can be covered by the sales of electricity. The remaining 7% is covered by a combination of the revenues from the GHG credits and a feed-in tariff. The example shows that with higher GHG credits prices the required feed-in tariff could become lower and reduce projects' income dependency on 'conventional' national feed-in tariff systems, and vice versa.

Bookkeeping and double counting

However, in case DO projects would follow the JI Track-1 route, a number of issues must be tackled before a large-scale DO project application can take place within the ETS context:

1. DO projects do not directly contribute to complying with Member States' Kyoto Protocol commitments, and
2. There is the issue of double counting when the emission reductions of a project are counted twice on the ETS market.

The first issue is related to the bookkeeping rule that a transfer of ETS allowances between two installations must be accompanied by a transfer of Kyoto Protocol assigned amount units (AAUs) between the governments of the Member States where the installations are located. This is to avoid the risk that ETS allowance trading between installations would jeopardize Member States' Kyoto Protocol compliance. Consequently, as a first effect, the sale of DO project credits also leads to a reduction in the country's AAUs, so that the project does not bring the Member State closer to 'Kyoto' compliance. For Member States that have already achieved their Kyoto commitments, this could be less of a problem than for those that still need emission reductions for compliance.

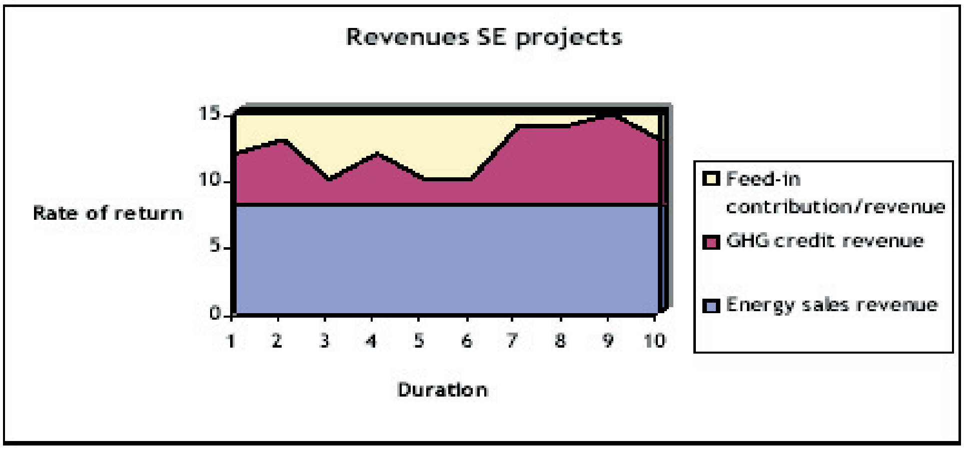

Figure 1. Interaction GHG credits and sustainable energy subsidies (Vander Gaast *et al.*, 2007[2])

[2] Van der Gaast, W. P., E. Spijker and J. Cozijnsen, 2007, Domestic Offsets in het Europese Emissiehandelssysteem, Study for the Energy Valley Foundation, Groningen, the Netherlands, www.jiqweb.org; executive summary in English "Linking Domestic Offsets to the EU ETS"; jin@jiqweb.org.

However, on a 'more positive note', there could be cases in which a DO project generates more CO_2 emission reductions than transferred to the ETS. For instance, it could be agreed that a project would only be able to sell CO_2 credits to the ETS for a 5-year period so that the emissions reductions achieved after that period would help the Member State to comply with a climate policy commitment without the need to transfer AAUs to other Member States. It is also possible that in a DO system a project owner can sell CO_2 emissions up to the point where the benchmark IRR has been reached. The emission reductions achieved beyond that point will then not be traded, but they will lower the Member States' overall emission level.

The second issue relates to the fact that the production and delivery to the grid of, *e.g*, clean electricity leads to a reduction in (existing or estimated) demand elsewhere. When ETS-based power producing installations are confronted with lower electricity demand due to DO projects, this could lead to lower production and therefore lower CO_2 emissions, which could be traded on the ETS market. This could imply that one emission reduction credit achieved through a DO project would be traded twice on the ETS market.

A sollution for this double counting issue is to set aside within the National Allocation Plan of EU Member States an amount of allowances that will not be traded and that would thus compensate for any double counting that might occur. Several Member States in Central and Eastern Europe already have such 'set asides' for JI projects they had become involved in before their EU accession.

Possible ways forward

Establishing a link within EU Member States between low-carbon technology investments in non-ETS sectors and the ETS market would be beneficial from the point of view that ETS installations would co-fund clean technologies within the EU so that fewer subsidies would be needed for making such investments financially feasible. With respect to implementation of a DO project system, there are a number of possibilities:

1. A DO project is established unilaterally or bilaterally with an EU ETS installation within or outside the same Member State, via the JI Track 1 route. The project owners are paid for the CO_2 credits by the installation. Should these revenues still be insufficient to reach the relevant benchmark internal rate of return (IRR-bench), the Government of the Member State provides the missing part through a subsidy. Subsequently, the Member State transfers AAUs to the Member State of the buying installation. The number of DO projects is limited to the amount of allowances set aside within the NAP to compensate for double counting. In case the CO_2 credits from the DO project are sold to an installation within the same Member State, no reduction of AAUs takes place. However, in case the credit buying installation is located in a different Member State, the reduction in CO_2 in the country where the project takes place is accompanied by an equal reduction of AAUs.
2. The DO project transaction in 1) could be connected to a CDM project transaction in order to compensate the selling Member State for the loss of AAUs. By doing so, the DO project developers would make use of the price difference that presently exists between EU allowances and CDM credits (also depending on whether the CDM credits have been issued or are based on a forward contract).
3. The DO project could be funded from the revenues of auctioning EU allowances to installations as in the 'German model' described above. The AAU 'loss' in case allowances are sold at the auction to foreign installations has been envisaged as a consequence of the auction, but these could be compensated by financially supporting projects that reduce CO_2 emissions domestically (in case the allowances were sold to domestic installations, then funding DO projects would even bring the country closer to its Kyoto Protocol targets). The government could decide to earmark auction revenues for domestic CO_2 reductions only. Projects would then need to calculate their CO_2 emission reductions, as in JI, for which they receive the EU ETS price. The remaining money to reach IRR bench would then come from other subsidy streams. In order to save project transaction costs, the government could establish standardised CO_2 emission reduction figures (*e.g.* gram CO_2 per kWh) for different project types.

However, a potential problem with the latter kind of compensation would be that projects would need a multi-year contract or certainty from the Government that their CO_2 emission reductions will be paid for from the revenues of the annual auction. Direct selling of project credits to the ETS market would in this respect be more flexible as a project owner could directly agree with an ETS installation on delivery of credits or generate the credits and sell these upon issuance.

Run of River Hydro for Large Scale Electricity Supply

The EU-funded research activity ENTTRANS describes a number of low-carbon sustainable energy technologies in different categories: cooking, heating and cooling, electricity production, energy efficiency, lighting, and carbon capture and storage. For each of these technologies, the main characteristics and functions are explored, as well as their availability in different parts of the world, their implementation chain characteristics, and how the CDM could enhance their implementation. JIQ briefly describes these technologies in a series of articles. This issue: Run-of-River Hydro for large-scale electricity supply.

The background description for this article has been prepared by ENTTRANS partner National Technical University of Athens (NTUA-EPA, Greece).

Run-of-river hydro projects use the natural downward flow of rivers and micro turbine generators to capture the kinetic energy carried by water. Typically water is taken from the river at a high point and diverted to a channel, pipeline, or pressurised pipeline (or penstock).[1] Run-of-river projects generate electricity relatively consistent, although the amount of electricity that stations generate varies depending on the volume of water in the river. Thus, the technology is applied best where there is a considerably fast moving river with steady seasonal water.[2] How much electrical energy can be generated by a hydroelectric turbine depends on the flow/quantity of water, and the height from which it has fallen ('the head'). The higher the head, and the larger the flow, the more electricity can be generated.

Figure 1 shows the process of electricity production with a run-of-river hydropower plant. Run-of-river (or water diversion) facilities typically divert water from its natural channel to run it through a turbine, and then return the water to the channel downstream of the turbine.[4] The water is dropped through a penstock, inside which the water pressure increases so that it can turn the turbine and produce electricity. Some large-capacity hydroelectric generating stations use a combination of large flow rates and high natural waterfalls.

A large run-of-river hydro plant generally consists of more than one generating unit and the overall discharge depends on the plant's scale. The best geographical areas for exploiting run-of-river hydro power are those with steep rivers flowing all year round, such as, e.g., the hill areas of countries with high year-round rainfall, or the great mountain ranges and their foothills, like the Andes and the Himalayas. Islands with moist marine climates, such as the Caribbean Islands, the Philippines and Indonesia are also suitable. Low-head turbines have been developed for small-scale exploitation of rivers where there is a small head but sufficient flow to provide adequate power.[4]

To assess the suitability of a potential site, the hydrology of the site needs to be assessed to determine actual flow and head data. Hydrological information can be obtained from the meteorology or irrigation department in the country. This data gives a good overall picture of annual rain patterns and likely

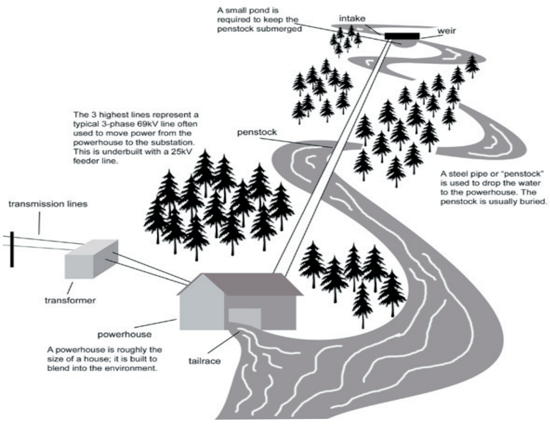

Figure 1. A typical run-of-river hydro facility[3]

[1] Renewable Energy UK, 2006. Run of River Hydro Power, http://www.reuk.co.uk/Run-of-River-Hydro-Power.htm.
[2] Pollution Probe, 2003. Primer on the technologies of renewable energy, http://www.pollutionprobe.org/Reports/renewableenergyprimer.pdf
[3] Hydromax, no date. Run-of-River Hydro Power. http://www.hydromaxenergy.com/Green+Power/Run-of-River+Hydro+Power/Run-of-River+Hydro+Power.htm
[4] California Energy Commission, 2001. Hydroelectric Power in California, http://www.energy.ca.gov/electricity/hydro.html

fluctuations in precipitation and, therefore, flow patterns. Flow data should preferably be gathered over a period of at least one full year in order to ascertain the fluctuation in river flow over the various seasons.

Run-of-river components offer long operational lifetimes of about 80 years with minimal maintenance.[5] Most electricity is generated in the winter when it is also needed for heating and extra lighting. The payback time for small grid connected systems is often just a few years at the best locations, and less than 10 years for most other locations.

Figure 2. Fish ladder

Importance of technology in meeting sustainable development objectives.

Run of river is one of the most cost-effective and reliable energy technologies and offers the following advantages:

- The power source is domestic and secure since it is not subject to disruptions from foreign suppliers, cost fluctuations, and transportation issues.
- It is highly efficient with turbines capable of converting more than 90% of available energy into electricity, which is more efficient than any other form of generation.
- It is climate-friendly and does not produce air pollution or any toxic by-products.
- It is a long-lasting and robust technology with a technological lifetime of 50 years or more.
- Hydroelectric energy has relatively low operating and maintenance costs.[5]
- A high level of predictability, varying with annual rainfall patterns.
- Slow rate of change; the output power varies only gradually from day to day instead of minute-wise.
- There is a relatively good correlation with demand, i.e. output is maximum in winter.[6]
- Run-of-river installations are also environmentally benign as they do not have the same kinds of adverse effect on the local environment as large-scale hydro.
- The technology could have a strong impact on reducing poverty alleviation.[7]

Of the two major types of hydro projects (dams and run-of-river plants), the environmental 'footprint' of run-of-river facilities is considered relatively small in comparison with facilities that have large storage reservoirs.[8] Good design could mitigate the stresses placed on the environment. For instance, a fish ladder can allow fish to swim around the station (see Figure 2). Diverting water out of the stream channel can dry out streamside vegetation, whereas hydropower projects can also affect aquatic organisms directly; downstream-moving fish may be drawn into the power plant intake flow and pass through the turbine.

Financing requirements and implementation

Financing run-of-river hydro power plants can be difficult sometimes due to the unforeseeable power production in the short term and uncertainty about permits and grid connection. In some countries there is a lack of legislative support for hydropower projects with subsequent problems with gaining permission to use water from rivers, and also due to perceptions that projects might affect fishing. In addition, there could be difficulties in gaining affordable connections to the grid.

The capital required for run-of-river hydro plant depends on the effective head, flow rate, geographical features, the equipment (turbines, generators, etc.) and civil engineering works, and whether the flow of water is constant throughout the year. The capital investment cost varies from € 900 per kWh to € 4,000 per kW, while generation costs vary from € 0.025/kWh to € 0.125 per kWh.[5] Moreover, once established, hydropower plants have long and productive lives. For example, the Bhakra Nangal plant in India, now more than 40 years old, has operating costs of only USD cent 0.002/kWh.

[5] EUSUSTEL: European Sustainable Electricity; Comprehensive Analysis of Future European Demand and Generation of European Electricity and its Security of Supply, EU - FP6, http://www.eusustel.be/
[6] British Hydropower Association. 2005. A guide to UK mini-hydro developments, January 2005, London, UK.
[7] International Hydropower Association, Hydropower, 2002. A Key Tool or Sustainable Development, http://www.hydropower.org/downloads/
[8] Renewable Energy Access, 2005. Canada Opens New Run-of-River Hydro Facility, http://www.renewableenergyaccess.com/rea/news/story?id=387163%20Hydropower%20A%20Key%20Tool%20for%20Sustainable%20Development.pdf

Accessing low-cost capital is thus vital for keeping the cost of small hydropower at low levels. This is possible for big utilities with a large credit capacity (although they are generally less interested in developing small schemes), but much more difficult for small private investors without other assets. Small hydro power projects are usually privately financed, with partial recourse to different kinds of loans. Bigger projects are mostly financed by corporations but there are also third party financing models. The main project risk for hydro power plants lies in varying electricity prices. Therefore in countries with stable price agreements (with feed-in tariffs) projects are easier to be financed than in countries where energy prices oscillate.

Often short payback periods (10 years or less) are levied requiring high returns during the early years of operation. This approach places the operator at considerable risk, particularly if a drought is experienced early in the repayment schedule. Longer term finance is more appropriate to the nature of the asset, which carries low technical risk and long life, albeit with energy yield subject to annual variation.

Future market potential and developments

The technology is commercially and technically mature. Innovations in design, equipment and control/instrumentation would improve performance and increase access to export markets, as would systems to mitigate environmental impact. Many of world's hydro reserves still remain unexploited. Great potential exists in the developing world, offering opportunities for a mature European industry to compete in an expanding market.

Effective and realistic standards for meeting requirements to minimize any environmental problems are needed, while tariffs for electricity should reflect the technology's low environmental impact and high potential performance. Long-term finance is more appropriate to the nature of this technology which carries a long lifetime and alternations in energy yield subject to annual and seasonal variation. However, successful projects have been deployed and much experienced has been gained. So far, experience clearly shows than only feed-in systems and fixed-premium mechanisms have proven their ability to be effective in attracting investments, creating investors confidence, reaching the national targets and creating a technological diversity.

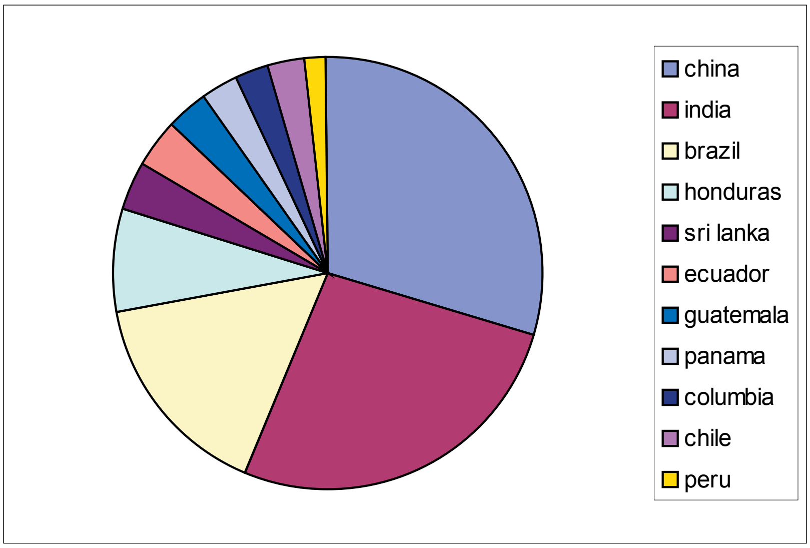

Figure 3. Geographic division run-of-river CDM projects

Hydro power and the CDM

As per June 2008, 121 run-of-river CDM projects have been registered by the CDM EB (out of 518 Hydropower projects, *e.g.* existing or new dams). Figure 3 shows the division of projects across host countries. Together, these projects are expected to generate around 10 Mt CO_2 emission reduction per year between 2008 and 2012.

Box. 2. Hydro power: traditionally clean

Approximately 70% of the earth's surface is covered with water, a resource that has been exploited for many centuries. The first recorded use of water power was a clock, built around 250 BC. Since that time, people have used falling water to provide power for grain and saw mills. The first use of moving water to produce electricity was a waterwheel on the Fox river in Wisconsin, USA, in 1882 and shortly thereafter the first of many hydro electric power plants at Niagara Falls was completed. Hydro power has played a major role in the expansion of electrical services since then, both in North America and around the world. Today's hydropower turbines are capable of converting more than 90% of available energy into electricity, which is more efficient than any other form of generation (the best fossil fuel power plant is only about 50% efficient).
in 2004, 90% of renewable electricity in the World was produced with hydro power; about 20% of globally supplied electricity is generated by hydropower and in some countries it provides more than 50% of the electricity supply (e.g. Norway 99%, New Zealand 75%.

Credit market discussion

EU ETS Overview 2005-7

On 30 April of this year, the first phase of the EU Emissions Trading Scheme (ETS, 2005-2007) officially ended. After a spectacular trading and price development during the first 16 months, prices later fell to far below € 1 per tonne CO_2 or allowance (compared to a record level of around € 30 in July 2005 and April 2006). The reason was that soon during the second year of the ETS, 2006, it turned out that the number of allowances issued to European installations covered by the scheme was larger than their actual CO2 emissions.

Eventually, now that the country reports have been published via the Community Independent Transaction Log, which arranges the trade of allowances within the ETS (see http://ec.europa.eu/environment/climat/emission/citl_en.htm) trading patterns observed during 2005-2007 can be analysed. In a recent report (June 2008) Caisse des Dépôts has presented a detailed and insightfull analysis on "Allowance Trading Patterns During the EU ETS Trial Period: What does de CITL reveal?" (Climate Report, Issue No.13, June 2008, authors: Raphaël Trotignon and Anaïs Delbosc). The report analyses the emissions of installations in the EU-25 during 2005-7 (therefore it does not yet contain the figures for Bulgaria and Romania, which only joined the ETS in January 2007).

Total CO_2 emissions of the EU ETS installations during 2005-2007 amounted to 6,091 Mt CO_2 whereas they had been allocated a total of 6,247 Mt. Consequently, overall CO_2 emissions were 155 Mt lower than installations' total allowances over the three-year period. Countries with a net surplus of allowances were, among others, Poland (90.7 Mt), France (65.3 Mt), Germany (46.3 Mt), the Czech Republic (37.1 Mt), and the Netherlands (22.4 Mt). These countries were responsible for about 55% of all exported allowances within the EU ETS. Among the countries with net deficits were the United Kingdom (-116.5 Mt), Italy (-55.3 Mt), Spain (-49 Mt) and Ireland (-7.1 Mt). Overall, 97% of EU allowance imports took place in the EU-15 countries, of which the UK (37%), Germany (16%), Spain (14%) and Italy (12%) were the biggest importers.

However, among the Member States there were differences between sectors of which some were in surplus ('long'), whereas others had a deficit ('short'). In total, according to Trotignon and Delbosc, short installations faced an under-allocation of 651 Mt (10% of total allocation), whereas long installations were over-allocated by 806 Mt (which gives the difference of 155 Mt long on aggregate, see above). Between sectors it could be noted that only the fossil fuel combustion sector (mainly for electricity and heat production) had a deficit as it came 0.9% allowances short to cover the overall CO_2 emissions. It was also the sector where the largest differences between installations could be observed with one group of installations having an overall 'short' position of around 680 Mt and another group with an overall 'long' position of around 550 Mt. All other sectors had a net long position, with iron and steel showing the largest long position. According to Trotignon and Delbosc, "since the combustion sector, …, is less exposed to international competition than other CITL sectors (heat and electricity are difficult to transmit over long distances), it was often chosen by Member States to carry most of the emissions reduction burden".

A final interesting observation by Trotignon and Delbosc is that EU allowances during 2005-2007 were largely concentrated around a relatively small number of companies and installations. It is stated that 10 European companies held 33% of total EU allowances, 30 companies held around 50% of allowances and 100 companies held approximately three-quarter of all allowances. Therefore, allowance trading was largely concentrated within a small group of companies. However, several of these companies had more than one installation under the ETS so that when looking at the installation level concentration figures were much smaller. For instance, the 100 companies holding three-quarter of the EU allowances in fact represented 600 installations.

ETS Second phase price development

Since 1 January of this year, the second phase of the EU ETS has been operational. During the first three months of the new phase, the price for an EU allowance contract with an expiration in December 2008 circled around € 20, but since April the price has moved up to reach almost € 30 per allowance by the end of June. After that, Dec-08 prices dropped again to below € 25 per allowance by 22 July. In the meantime, the prices for EU allowance contracts with expiration dates after 2008 also increased to levels above € 30 per allowance, but this price has also decreased to below € 27 for a Dec-10 contract.

An important reason for the initial price development has been the strong oil price rise. The effect of energy price developments on EU allowances prices was nicely illustrated by mid-July when oil prices substantially dropped and the Dec-08 allowance price fell by € 1.70 per tonne. Shortly after that, coal prices became lower so that EU allowance prices increased again. The rationale is straightforward. When oil prices increase (and linked to that natural gas prices), it becomes more attractive to switch to coal, which, however, leads to higher CO_2 emissions and therefore a stronger need to buy EU allowances.

The picture becomes complex though as coal prices have also come under an increased upward pressure because of increasing coal demand from China and India, as well as the increasing shift toward coal in power generation due to the oil price increase. During 2007-2008, the price of coal as used for power generation increased by 40% (De Volkskrant (on 22 July 2008, http://www.volkskrant.nl/economie/article1046777.ece/Elektriciteit_duurder_door_record_kolenprijs). This demand side effect is further enhanced by the supply side effect of increasing complexities with exploring new coal stocks and consequently higher coal production costs. Higher coal prices would have a downward effect on EU allowances prices.

Other factors affecting the EU allowance prices are reports on lower than expected amounts of issued CERs from CDM projects (see also the reports section on p.15 in this issue), so that CERs entering the EU ETS market through the Linking Directive may be more expensive. In addition, the inclusion of the aviation sector into the ETS as of 2012 will increase the demand for EU allowances (the 3% emission reduction target for the sector in 2012 will correspond with an extra demand for allowance of 80 million, see http://www.emissierechten.nl/marktanalyse.htm). Finally, the perspective that EU allowances can be purchased 'now' and banked for use during the third phase of the EU ETS (as of 2012) has increased demand for allowances as well.

In its weekly e-magazine "Energy & environmental markets - CO_2 weekly" (issue of 22 July 2008; contact: katrin.fuhrmann@fortis.com) Fortis analysists have raised an interesting issue with respect to the present market link between energy and CO_2 allowance prices. They observe that "This direct link to the oil market, which exists till the end of last year, should not persist in the long term and is rather of psychological nature. It will be interesting to see where EUAs are going to settle when this link disappears." Fortis state that since the EU ETS is expected to have an overall deficit during this second phase, the process of ETS allowance prices following the oil prices can go on until a certain point at which it is not profitable anymore to stick to coal. Fortis have calculated a price level at which such a switch from coal to natural gas becomes economically attractive. For mid-2009, this price level is estimated at € 43 per tonne CO_2.

Presently, ETS allowance prices can be followed on a daily or weekly basis, at several Internet sites. A very good example of an interactive price analysis tool can be found at http://www.reutersinteractive.com/Carbonprices, where you can find interactive charts with EU allowance price history and forward contract prices under the heading 'market data'.

CER price developments and CITL-ITL link

Together with the EU allowance prices, the CER prices based on CDM projects have also increased considerably. On 21 July, the prices paid for issued CERs were above € 21 per tonne, which is an increase of 17% since the beginning of this year. Obviously, prices of CERs differ depending on the status of the credit. For instance, prices for CERs originating from projects that have not yet been registered and which are considered medium risk-credits (in terms of likelihood of eventual issuance) are between € 8 and 12 (low-risk CERs cost between € 12 and 15). CERs expected from projects that have been registered by the CDM Executive Board cost between € 13 and € 18.

Among the problems quoted by several sources is the problem with connecting the Community Independent Transaction Log (CITL) with the International Transaction Log (ITL). CITL is the registry system for EU allowance trading and ITL is the international registry established under the Kyoto Protocol. Technically, EU Member States have earmarked part of their Kyoto Protocol emissions budget (assigned amount units, AAUs) as EU allowances and allocated these to individual companies and installations. Consequently, each trade of EU allowances must be accompanied by a corresponding transfer of AAUs, which requires an efficient connection between CITL and ITL.

Recently, the European Commission announced a system trial of the link between both registries before 4 August of this year. A basic problem is that not all EU Member States have complied yet with the eligibility criteria for trading of emission reduction credits (including AAUs) under the Kyoto Protocol (*e.g.* Greece), so that these Member States cannot be connected yet to the ITL. So far, the European Commission has taken the position that the CITL will only be linked to the ITL when all Member States have complied with the eligibility criteria to trade AAUs under the Kyoto Protocol (via the ITL). As this is expected to be achieved by the end of November of this year, it has inspired Commissioner Dimas to announce that by 1 December of this year both systems will be connected.

As a consequence, only six Member States have issued the ETS allowances for 2008 to their companies and installations: Austria, Czech Republic, Denmark, Finland, Luxembourg and Spain; Portugal and Slovakia will soon follow. On the other hand, the UK and Ireland have stated that they will postpone the issuance process until the CITL will have been connected to the ITL. Recently, Caisse des Dépôts in their "Mission Climat" showed that of the 2,061 Mt allowances to be issued each year (excluding reserves and auctioning), the issuance of 314 Mt have been delayed due to delayed notification of revised national allocation plans (NAPs) by the Member States to the Commission, whereas 1,103 Mt have not been issued because revised NAPs need to be approved by the Commission. The remaining 645 Mt allowances have been given the green light by the Commission, of which 315 Mt still need to be issued by the Member States (see the above examples of UK and Ireland). Only 330 Mt per year (16% of total allowances) have been issued by Member States.

AAU auctions

Finally, slowly but surely some Annex I Parties are preparing themselve for selling their surplus assigned amount units (AAU) under the Kyoto Protocol. On 27 May of this year, the Czech Republic announced that it would auction part of its AAU surplus (150 Mt CO_2-eq. for the period 2008-2012) by the end of this year. Also, the country is in bilateral talks with Japan about a transfer of AAUs. Based on an interview with Pavel Zamyslicky from the Czech Ministry of the Environment, Reuters News of 27 May 2008 (www.reutersinteractive.com; keywords: CO_2 CZECH) said that Japan could buy 10 to 20% of the Czech AAU surplus, at prices exceeding € 10 per tonne. It is the intention of the Czech Government to sell 100 million AAUs through bilateral deals and auctions and to keep the remaining 50 million AAUs as a reserve.

In order to be able to sell its AAU surplus, also Hungary has made the step to connect itself to the ITL (presently joining the group of Japan, Russian Federation, Switzerland and New Zealand). Being an EU Member State, Hungary is part of the CITL and since the connection between the CITL and ITL has not been established (see above), the country wanted to connect itself individually to the ITL, although only for the purpose of selling its AAUs to other industrialised countries. The country intends to invest the revenues from the AAU sales into so-called Green Investment projects.

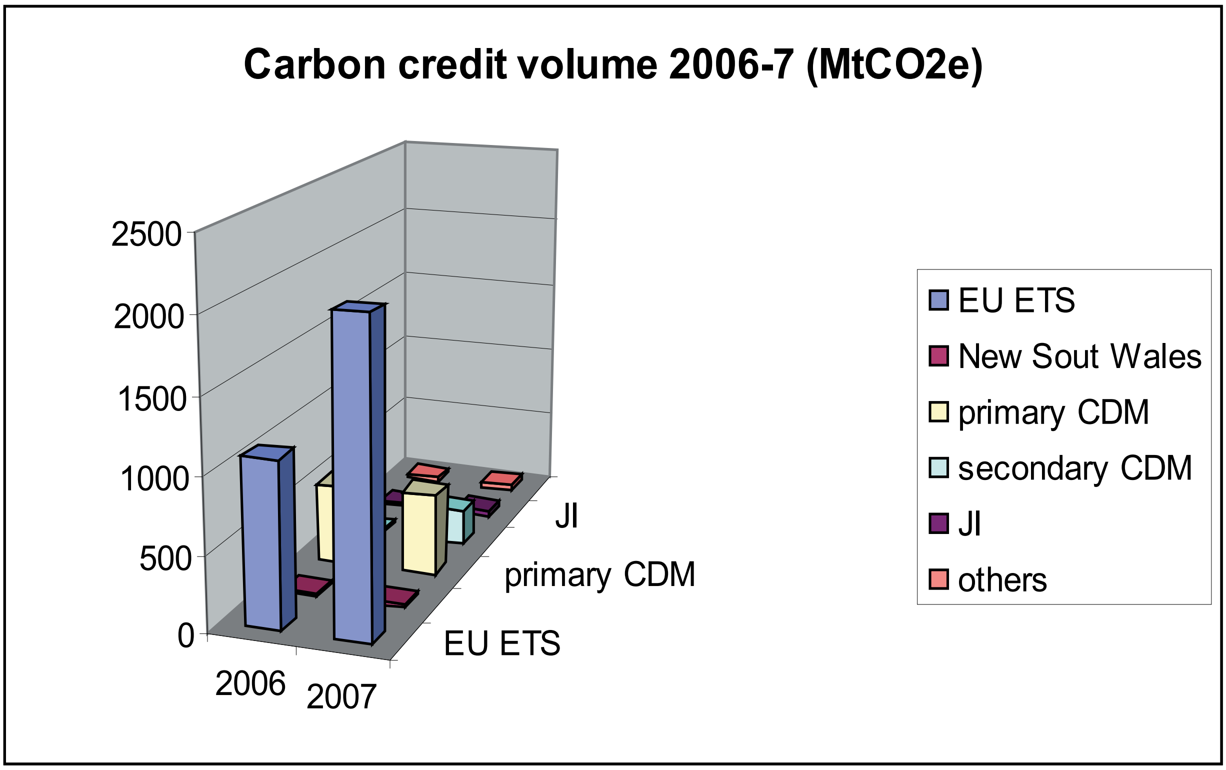

Figure 1. Overview carbon credit markets 2006-7
(source: World Bank, 2008, State and Trends of the Carbon Market, p.1)

Reports

Gupta, J., P. van Beukering, W. van der Gaast and F. de Jong (editors), Clean and Sustainable? An evaluation of the contribution of the Clean Development Mechanism to sustainable development in host countries, IOB Evaluations, No.310, April 2008.
The report analyses the expected contribution of the Dutch CDM projects to sustainable development. The authors also evaluate five Dutch AIJ projects in Vietnam, China, India, South Africa and Costa Rica. The second part of the report provides an assessment of the expected contribution of CDM projects to sustainable development in host countries.

IGES White Paper, Climate Change Policies in the Asia-Pacific: Re-uniting Climate Change and Sustainable Development.
This paper is a summary of current climate change policies in the Asia-Pacific region and new recommendations based on IGES research. It proposes climate strategies taking into account the needs of developing countries in the region. The impact of climate change on the Asia-Pacific is analyzed from various aspects: international framework, market mechanisms, forestry, biofuels, waste, water and business. The paper contains policy recommendations integrating climate change policies and sustainable development.

Kollmuss, A. and J. Lane, Carbon Offsetting and Air Travel Part 1: CO_2 Emissions Calculations, Stockholm Environment Institute, May 2008.
The aviation sector is responsible for 2-5% of anthropogenic GHG emissions and it is still growing with 5.9% per year. The aim of the paper is to examine the key factors which have to be considered when calculating air travel emissions for the purpose of carbon offsetting. Apart from that the aircraft parameters necessary for calculations are analysed.

Michaelowa, A., "Unilateral CDM – can developing countries finance generation of greenhouse gas emission credits on their own?", International Environmental Agreements, No. 7, pp. 17-34.
The sluggish implementation of incentives for industrialized country companies to embark on CDM projects and low carbon prices led to a preference of just buying Certified Emission Reductions (CERs) instead of investing in projects. Unilateral projects can become attractive if the host country risk premium for foreign investors is high despite a high human, institutional and infrastructural capacity and domestic capital availability. Moreover, transaction costs can be reduced compared to foreign investments that have to overcome the bureaucratic hurdles. On the other hand, technology transfer is likely to be lower, capacity building has to be undertaken by the host country and all risks have to be carried by host country entities.

Purohit, P. and A. Michaelowa, "CDM potential of bagasse cogeneration in India," Energy Policy, No.35, 2007, pp. 4779-4798.
This study assesses the maximum theoretical, as well as realistically achievable CDM potential of bagasse cogeneration in India. Annual gross potential availability of bagasse in India amounts to more than 67 million tonnes. The potential of electricity generation through bagasse cogeneration in India is estimated at around 34 TWh, *i.e.* about 5,575 MW in terms of the plant capacity. The annual CER potential of bagasse cogeneration in India could theoretically reach 28 Mt. The projections based on the past diffusion trend indicate that in India, even with highly favourable assumptions, the dissemination of bagasse cogeneration for power generation is not likely to reach its maximum estimated potential in another 20 years.

Restuti, D. and A. Michaelowa, "The economic potential of bagasse cogeneration as CDM projects in Indonesia," Energy Policy, No. 35, 2007, pp. 3952-3966.
The economic potential of bagasse cogeneration as CDM projects in Indonesia with the main deliverables of total emission reductions per year and CER earnings is analyzed. The authors show that with the electricity displacement potential at 260 GWh, Indonesia could generate annually 0.2 million CERs, leading to earnings of about USD 1 million.

Schüle, R. and W. Sterk, Options and Implications of Linking the EU ETS with other Emissions Trading Schemes, EU Parliament, Policy Department Economic and Scientific Policy, IP/A/CLIM/NT/2007-18.
The note quantitatively and qualitatively assesses different options of linking the EU ETS with other emissions trading schemes. The assessment also covers the economic and environmental impacts and the design implications of the options discussed. Economic analysis concentrates on the role of cap-setting and global emissions constraints for the economic impacts of international linking of the EU ETS. The institutional analysis, on the other hand, indicates that some design issues of the emerging schemes have important implications for the equity, the economic and the environmental effectiveness in a combined scheme.

The **Joint Implementation Quarterly** is an independent magazine established to exchange the latest information on the Kyoto mechanisms and emissions trading. *JIQ* is of special interest to policy makers, representatives from business, science and NGOs, and staff of international organisations involved in the operationalisation of the Kyoto mechanisms, including emissions trading.

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Abbreviations

AAU	Assigned Amount Unit
AIJ	Activities Implemented Jointly under the pilot phase
Annex A	Kyoto Protocol Annex listing 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 (OECD, Central and Eastern European Countries, listed in Annex I to the UNFCCC)
Annex II Parties	OECD countries (listed in Annex II to the UNFCCC)
non-Annex I Parties	Developing countries
CCS	Carbon Dioxide Capture and Storage
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
DOE	Designated Operational Entity
DNA	Designated National Authority
ERs	Emission Reductions
ERPA	Emission Reduction Purchase Agreement
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
IET	International Emissions Trading
ITL	International Transaction Log
JI	Joint Implementation
JISC	Joint Implementation Supervisory Committee
KP	Kyoto Protocol
LULUCF	Land Use, Land-Use Change and Forestry
MethPanel	Methodology Panel to the CDM Executive Board
MOP	Meeting of the Parties to the Kyoto Protocol
PIN	Project Information Note
PDD	Project Design Document
SBSTA	UNFCCC Subsidiary Body for Scientific and Technological Advice
SBI	UNFCCC Subsidiary Body for Implementation
UNFCCC	UN Framework Convention on Climate Change

JIQ Meeting Planner

6-8 August 2008, Energy Security and Climate Change: Issues Strategies and Options, Bangkok, Thailand.
Organised by the Regional Energy Resources Information Center.
Contact: enreric@ait.ac.th

15-17 August 2008, Financing for Climate Change - Challenges and Way Forward, Dhaka, Bangladesh.
Organised by Unnayan Onneshan - Centre for research and action on development
Contact: Nazmul Huq, Unnayan Onneshan, tel.: +880 2 8158274, fax: +880 2 8159135, e-mail: nazmul.huq@unnayan.org; Internet: www.unnayan.org

3-5 September 2008, Africa Carbon Forum, Dakar, Senegal
Organised by UNFCCC Secretariat, IETA, Nairobi Framework multilateral agencies
Contact: lars.rosendahl@risoe.dk;
Internet: http://www.ieta.org/ieta/www/pages/index.php?IdSitePage=1548

8-9 September 2008, International Workshop on Post-2012 Climate and Trade Policies, Geneva, Switzerland
Organised by Adam and UNEP
Contact: Mr Benjamin Simmons (benjamin.simmons@unep.ch); Internet: http://www.unep.ch/etb/events/benjamin.simmons@unep.ch

9-10 September 2008, UNFCCC Workshop on Joint Implementation, Bonn, Germany
Organised by the UNFCCC Secretariat
Contact: ji-info@unfccc.int;
Internet:http://ji.unfccc.int/CallForInputs/PublicInputSeptember_2008/index.html

29-30 September 2008, Carbon Markets India Congress, Mumbai, India
Organised by Green Power Conferences
Contact: http://www.greenpowerconferences.com/carbonmarkets/carbonmarkets_india_2008.html