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Summary
Under the 1997 Kyoto Protocol, economies in transition are eligible for both emissions trading (Article 17) and joint implementation (Article 6). Guiding rules for implementing these mechanisms were decided through the Marrakech Accords in November 2001. These countries may benefit substantially from those mechanisms if they are implemented appropriately. However, with the departure of the USA from the Kyoto Protocol, the likely revenues from international emissions trading for the economies in transition are likely to be limited at least during the first commitment period. A key criterion on whether countries should undertake emissions trading is the comparison of projections of emissions until 2012 with the target under the Kyoto Protocol. For joint implementation, the investment climate and the emission reductions potential of a specific project are more important. Countries that are bound by the Kyoto Protocol need to implement a clear institutional structure, which includes a JI office or a position solely in charge of JI. Even if a country decides not to engage in JI, such an office could help guide possible foreign investors.

Keywords: Climate change, Kyoto Protocol, emissions trading, joint implementation.

JEL: K32, K33, P33, P39

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Introduction

Although the adoption of the Kyoto Protocol (KP) dates back to 1997, it was only in November 2001 that essential guiding rules for the Kyoto Mechanisms were adopted as part of the Marrakesh Accords. The Kyoto Mechanisms comprise emissions trading (Article 17 KP), joint implementation (JI, Article 6 KP), and the Clean Development Mechanism (CDM, Article 12 KP). Sometimes the provision for several countries to commit to a joint emissions target (Article 4 KP), is also referred to as one of the mechanisms (Missfeldt, 1998).[2] The Marrakesh Accords (UNFCCC, 2001/b) present framework rules for those issues that had been put forward for further elaboration through the Buenos Aires Plan of Action (1998).

Among the Kyoto Mechanisms, emissions trading and JI apply to the economies in transition. In principle, EITs could also invest into CDM projects in developing countries. However, none of the countries in the region has shown any interest to do so. Many have maintained that the economies in transition may stand to gain substantially from the Mechanisms, especially from emissions trading (Korppo et al, 2001; Missfeldt and Villavicencio, 2000). Most economies in transition have adopted an emission reduction target under Annex B of the Kyoto Protocol, and are therefore considered as 'Annex B' Parties (UNFCCC, 1992). 'Non-Annex B' Parties are those countries without legally binding emissions reduction target, which mostly are developing countries. Nevertheless countries such as Kazakhstan, Kyrgyzstan, Uzbekistan, Turkmenistan, Tajikistan, Georgia, and Azerbaijan are economies in transition without a legally binding target. In the following discussion we will focus on those countries that are member of Annex B.

Among the economies in transition, both Russia and Ukraine have been allocated particularly lenient targets of a stabilisation of their emissions at 1990 levels by 2012. Because of the dramatic slump of economic output in both countries, greenhouse gas emissions dropped. This leaves both countries a substantial amount of tradable units in an international emission trading market.

In March 2001, President Bush stated that the USA did not intend to ratify the Kyoto Protocol (Korppoo et al, 2001). In order to ratify the Kyoto Protocol without the USA, the EITs, Japan and the European Union are necessary. This follows from Article 25, which sets out that if a minimum 55 Parties have to have ratified the Kyoto Protocol, representing a minimum of at least 55% of total CO_2 emissions in 1990 (UNFCCC, 1997). Both the European Union and Japan have ratified the Kyoto Protocol.

The withdrawal of the USA also casts a question mark over the future of the Kyoto Mechanisms. Estimates by Hagem and Holtsmark (2001) indicate that the drop in demand as induced by the withdrawal of the USA would result in a drop of greenhouse gas market prices from 10-12 USD/tC to around 5 USD/tC. If credits from the forestry and agricultural sector for the uptake of CO_2 emissions are included, this number is likely to be lower.

[2] The tradable units in the Kyoto Mechanisms market are:

- Assigned amount units (AAUs)
- Emission reduction units (ERUs)
- Certified emission reductions (CERs)

AAUs are those units assigned as part of a country's emission reduction target. If the AAUs are in excess of emissions in the first commitment period, these units may be traded as part of emissions trading. ERUs are generated by conducting JI projects within Annex B countries, and CERs are generated as part of clean development projects within non-Annex B countries.

In the following sections we discuss the potential benefits from using emissions trading and JI. We consider factors necessary fir successful implementation for emissions trading and JI. The institutional structure for implementation of JI in the public administration is key for the sustained success of the implementation of the Mechanisms. At the international level revenue can be maximised by limiting sales from the region.

The Kyoto Mechanisms post Marrakesh

JI is generally thought of as a project-based mechanism where emission reductions are measured on a credit against baseline method. Emissions trading is considered a cap and trade mechanism. Actual boundaries between both mechanisms in physical terms may be blurred. The in terms of the Kyoto Protocol biggest difference between emissions trading and JI is the requirement that JI has to be 'additional to what would have happened otherwise'. This means that the potential burden for JI would be higher, as it would involve a proof of such additionality. This has led some observers to suggest that they would undertake JI as a project-based mechanisms, but register it as an emissions trade in order to avoid any the burden of proof of additionality (personal communication, EBRD, 1998).

However, in September 2000 in a negotiating session to the UN Framework Convention on Climate Change (UNFCCC) the European Union and the USA-led 'umbrella group' had agreed in principle to a facilitating deal called the 'two-track approach'. The Marrakesh Accords specify the terms and conditions under which this approach will operate in the future. The two-track approach implies that a CDM-like approach for JI projects remains possible even if a country does not fulfil all eligibility requirements.

The first track implies that as long as countries are able to fulfil all eligibility criteria up to standards required under the UNFCCC/Kyoto Protocol, JI and emissions trading can go ahead without any further third-party review. The host country will be responsible for verifying the additionality of a project, and for issuing the emission reduction units (ERUs) (UNFCCC, 2001/b, Guidelines for the Implementation of Article 6 under the Kyoto Protocol, Annex, para. 23).

These eligibility requirements are:

- Ratification of the Kyoto Protocol;
- Calculation and recording of the 'assigned amount';
- A national system for the estimation of greenhouse gas emissions and sources is in place;
- A national registry is established;
- Submission of the most recent required inventory;
- Additional information about the 'assigned amount';

The 'assigned amount' is the amount of greenhouse gas emissions that a Party may spend in terms of greenhouse gas emissions, and that a Party may increase through the purchase of credits from the Kyoto Mechanisms. Excess 'assigned amount' can be sold through emissions trading.

If the eligibility requirements for this first JI track are only partially fulfilled, a clean development mechanism (CDM)-like process for accreditation of JI projects would be required.[3] This would mean that the emissions reductions are to be verified by an 'independent entity' who has been accredited through the 'Article 5 supervisory committee'. The independent entity will verify the project following the verification procedure set out for Article 6 activities. It will thereby take into account the criteria for baseline setting and monitoring developed in the Marrakesh Accord (UNFCCC, 2001/b, Guidelines for the Implementation of Article 6 under the Kyoto Protocol, Annex, Section E and Appendix B). Any country that is eligible for the simple track of JI may still resort to using the track 2 approach.

The minimum requirements for participation in track two of JI are: ratification of the Kyoto Protocol; calculation and recording of the assigned amount, and establishment of a national registry (UNFCCC, 2001/b, Guidelines for the Implementation of Article 6 under the Kyoto Protocol, Annex, para. 21 and 24). The simplification compared to the first-track of JI is not as big as it may appear. In order to establish the assigned amount Parties have to submit a complete set of inventories from the base year until the last year, and describe their national system. Six Parties in the region are currently actively pursuing the establishment of a registry. This does not include Russia and Ukraine, who would be among the largest potential sellers.

< Table 2 about here >

Table 2 illustrates what reporting requirements are currently being met by countries in the region. Four countries have ratified the Kyoto Protocol, and a ratification process is in the process in all countries in the region. Seven of 12 countries have in 2002 reported their annual inventories in accordance with the common reporting format (CRF), and five of 12 countries have submitted all three required national communications on greenhouse gas emissions, which illustrate policies and measures in the area of climate and report on emission trends in a country. This is only slightly worse than the performance of the European member states, where only 8 of 15 countries submitted all required national communications. The countries that will have the biggest problems fulfilling the eligibility criteria are Croatia, Lithuania, Romania, Russia, Slovenia and Ukraine. Noteworthy is the case of Slovenia, which neither has submitted a national communication nor presented any common reporting format.

For the purposes of the second track JI, the Marrakesh Accords establish a JI Authority, which will have ten members. Three members will come Parties included in Annex B that are economies in transition, three further members will come from Annex B not coming from an economy in transition, three other members will come non-Annex B countries, and one member will come from the small island development States. The JI authority will meet for the first time at the first meeting to the Parties of the Kyoto Protocol, i.e. after the ratification of the Kyoto Protocol.

Another important development at the international level is the 2001 EU Draft Directive on Greenhouse Gas Trading (European Commission, 2001). The draft envisages the stepwise

[3] Note, however, that the procedure under the CDM is somewhat more onerous. In addition to an ex post verification of a project, which leads to certification and issuance of certified emissions reduction credits (CERs), the project (project design document and monitoring plan) has to be validated by a separate independent entity. The terminology is also different: an independent entity under the CDM is called operational entity; the equivalent to the Article 5 supervisory committee is the 'executive board to the CDM'.

introduction of greenhouse gas trading for power plants of a size exceeding 20 MW(e). The European Council of Ministers is expected to adopt the Directive in 2002/2003. A voluntary trading regime would subsequently be established from 2005 - 2007. During this period it would only be possible to trade CO_2 emissions. From 2008 a legally binding regime is to follow, which would then also allow for the trading of greenhouse gases other than.

Although the draft Directive envisages voluntary participation in EU emissions trading, accession countries to the European Union will have to consider the implication of the Directive for their own policies and measures on climate change. This is particularly important for those countries that are considering the implementation of a domestic trading regime. This applies especially to the Slovak Republic, which has passed legislation for a CO_2 trading regime from 2005 (Bodnar et al, 2002). Also the Czech Republic is in the process of developing its own trading regime.

Benefits of the Kyoto Mechanisms

While the underlying goal of the Kyoto Protocol as part of the climate regime is to prevent dangerous levels of climate change from occurring, the Kyoto Mechanisms could provide additional benefits to EITs. These benefits are:

- Additional revenue
- Project finance
- Knowledge and technology transfer
- Synergies with existing policies (e.g. sustainable development)

As mentioned above, substantial revenue could be generated through participation in emissions trading, because it allows for the sale of 'hot air'. Such benefits could be substantially improved if the USA could re-join the regime. The countries that stand to gain most are Ukraine and Russia. Poland, Bulgaria and Romania may also expect significant inflows of revenue for the sale of emissions.

These potential windfall profits for economies in transition have been termed ‘hot air’. Revenues at current market prices of 5USD/tC range from 188.8 million USD for Ukraine to 0.3 million USD for Slovakia.

These estimates are substantially lower than earlier estimates, which assumed higher market prices. In the case of Ukraine, for example, a potential revenue of 3.7 billion USD had been estimated (Missfeldt and Villavicencio, 2000). As table 1 below indicates, a number of countries in the region will have to engage in additional emissions reductions or purchase additional emissions quota abroad if they want to meet the Kyoto target.

< Table 1 about here >

Whether and to what extent sizeable revenues will be realised depends on a number of factors that needs to be assessed for each country. They are the price development of tradable units and the actual and potential amount of credits for sale. The revenue also depends on the amount of credit for sale, which can be calculated as the difference between the emission target and the emissions trends of a country. While the target is set, the absolute trend in emissions can change both through active

measures and unexpected external changes. A comprehensive package of policies and measures, for example, can achieve real additional emissions reductions that may in turn be sold.

Structural change is still ongoing in economies in transition, even more than ten years after the transition process began. The importance of heavy industry is declining, while the service sector is growing. While this leads to a further stabilisation of emissions at their current low levels, the increase in private transportation has to be balanced against these trends. While the CO_2 intensity in these countries has decreased compared with pre-transition levels, the figures are still several times higher for most countries than the average values for the EU and the OECD countries as figure 2 illustrates. Only Slovenia has levels of CO_2 intensity that come closer to the OECD and EU levels.

< Figure 2 about here >

A benefit occurring in the context of JI projects is that additional project finance can be generated for projects that would not have happened in the absence of potential income from emission reduction units. In particular for small projects such as small energy efficiency projects and small renewable energy projects, the added value from such income can increase the internal rate of return of such projects substantially. As the host countries are entitled to issue emission reduction units nationally as long as the country is eligible for track 1 JI, establishing rules that allow for ex ante or early crediting of emission reduction units could increase the value of these credits further: it is usually in the beginning of the project where up-front capital is needed.

In conducting a JI project jointly in the host country, training and technology transfer from the investing partner to the host country will take place. The Swedish AIJ biomass boiler projects in the Baltic states are a good example for how capacity can effectively be built in this area. Finally, if JI projects are selected carefully they can assist and generate synergies with existing policies in the host countries. Such synergies could be in the areas of sustainable development and other environmental policies, employment policies, and helping EU accession policies.

Of the potential benefits, emissions trading is likely to generate the highest level of revenues, while JI will lead to more project finance, knowledge and technology transfer, and could entail higher synergies with existing policy goals. Thus, JI will generate more diverse benefits. On the other hand, it would be possible to earmark the revenue from emissions trades for projects so that similar benefits as in JI could be generated. As a result, more diverse benefits could be generated through emissions trading.

Successful Domestic Implementation

A framework for successful implementation of the Kyoto Mechanisms in the EITs requires a clear and stable institutional environment in accordance with the Kyoto policy framework; accurate data management and emissions projection; and accurate monitoring of implementation, especially in the context of JI projects. Beyond this, EITs can maximise the quantity of their sales by adopting suitable policies and measures.

The minimum requirement for participation in the mechanisms is the implementation of the Marrakesh Accords. Generally, the institutional environment for implementation of climate policies is the more stable the more stable the general macroeconomic environment of a country is including macro-economic growth, inflation, income distribution, and the stability of governments.

Accurate data management (in accordance with Articles 5.1 and 5.2 of the Kyoto Protocol) and annual reporting is at the core of meeting this requirement. In the language of the Marrakesh Accords this is referred to as the country's national system. It is key for those countries interested in participating in any form of trading to ensure consistent reporting from a fixed institutional base. Accurate reporting is also in the self-interest of any country involved, as any inaccurate projections of emissions and subsequent overselling of emissions quota will be penalised in accordance with the compliance agreement under the Kyoto Protocol.

Parties will also have to set up registries in order to track emission transfers at the international level. However, such registries would also be capable of handling trades at the national level. In addition to registering trades, the registries will keep the commitment period reserve of that country set aside in a separate account. This reserve prevents overselling of emission quota. Only countries that have their own registry established will be able to participate in both JI and in emissions trading. Smaller countries that may find it too costly to keep a registry can still participate in JI through the second track. There is no provision for establishing joint registries for a group of countries such as the Baltic States. However, several countries have indicated that they consider cooperation or even consolidation of registries with other countries. Among these are Bulgaria, Croatia, Estonia, Latvia, Poland, and Slovakia (UNFCCC, 2002).

If a country wants to pursue track 1 JI it needs to develop its own baseline and monitoring methodology, even if this methodology largely draws from existing international regulations such as for track 2 JI and the CDM. The accuracy of this methodology is important, as the EITs will have to comply with their Kyoto targets. National JI authorities also need to ensure that projects are in agreement with existing policy priorities in a country. (Petkova and Baumert, 2000). On the other hand synergies may exist with other policies such as in the transport sector, which in addition to climate change also has serious local environmental impacts. Streamlining of activities can help to reduce transaction costs and render projects more attractive to potential investors.

One of the initial problems during the precursor phase to JI, the activities implemented jointly (AIJ) pilot phase, has been the lack of clarity regarding the responsibility of signing the memorandum of understanding (MOUs) of an AIJ project. Complex situations may arise when foreign investors who are especially keen on getting engaged in JI obtain promises for emissions reduction units at the local or regional level without informing central government. But the national government that has undertaken an emission reduction commitment under the Kyoto Protocol needs to balance such sales in order to meet the target. Attributing responsibility for the signing of MOUs to a unique (public) body on a permanent basis would be key in creating a stable investment environment for JI. As is the case at the international level, the entity endorsing the credit and issuing it (which possibly is identical with the registry) should not be institutionally related to those entities that are earning the credit.

A key criterion of whether countries should undertake emissions trading is the comparison of projections of emissions until 2012 with the target under the Kyoto Protocol. A country has to be certain that its emissions in 2012 will be below those required under the Kyoto target. These projections should capture all policies implemented and planned with certainty at the time at which projections are made. Only if there is a sufficiently wide gap between the projections and the target should the country (or entities in the country entitled to engage in trading) undertake emissions trading. In order to arrive at a valid projection of greenhouse gas emissions trends of the most

important sectors in the economies need to be analysed. The quality of input data is crucial in achieving reliable estimates. Being able to account for GHG emissions on the basis of UNFCCC reporting guidelines is thus essential.

There are significant uncertainties as to whether there are excess emissions. An indication of the certainty with which a certain amount may be for sale can be given when those values are compared with the standard deviation of the data of greenhouse gas emissions between 1990 and 1997. In a number of cases the standard deviation of the data exceed by approximately double the amount of emission quota that can be predicted on the basis of existing data and projections. This is the case for Russia, Poland and Bulgaria (see table 1). This could imply that selling off emissions quota on the basis of current projections for those countries would not be safe, as the size of their 'hot air' lies well within the standard deviation of the data.

For JI, the investment climate and the emissions reductions potential of a specific project are more important. The country's investment climate is reflected in the general and projected performance of the economy as well as in how well implemented and enforced legislation is for businesses (property laws, anti-trust and anti-corruption laws). Another crucial question in relation to JI is who would be investing in such a project. The AIJ pilot phase could not attract private investors above and beyond demonstration cases (Evans et al, 2000). Circumstances are, however, different for JI, because in contrast to AIJ emission credits may be sold.

The attractiveness of projects to investors will depend on the economic returns a project can provide, including the returns from emission credits. A key component thereby is the rate at which credit can be financed in a country. An example on how discount rates and time patterns could affect the decision process in a market-oriented environment can be found in IDEE/FB (1999). The case study identified the development of hydro power as one of the promising options to limit CO_2 emissions in Argentina. According to existing regulations in the country, private investments on hydro power plants are bound to the following rules:

- 30-year term of license to operate the plant (period shorter than the useful life of the plant, estimated at 50 years);
- The payment of royalties to local governments for use of the resource; and
- A 15-year payback period for investments in the expansion of the transmission network.

Figure 1 shows the effects of discount rates on CO_2 reduction costs under three perspectives:

- The social perspective, where taxes are excluded and the payback period of the investments, including transmission facilities, spans the life-time of the project (50 years);
- The 'private before taxes' case corresponds to bringing forward payback periods to 30 years for the hydro power plant and 15 year for transmission lines; and
- The 'private after taxes' case with the same payback periods as the above but taxes and royalties are included.

The figure shows that even at 5% discount rate the hydropower option is unattractive for private investors, while at the same rate and given longer payback periods the option becomes profitable from the social viewpoint. At 11% discount rate (rate relatively low by private standards in Argentina) private mitigation costs are twice the corresponding costs from a social perspective.

< Figure 1 about here >

The above example raises a number of questions in relation to who would be a suitable co-funder of a project in the host country. It indicates that private co-finance may not as easily be found as public co-finance. Potential co-finance in EITs may come from the national environmental funds. These were established in most countries in the region upon transition. They were resourced initially through debt for nature swaps. The private sector remains under-developed and subject to continuous changes in its regulatory environment, for some countries not least as a result of the accession process towards membership of the European Union.

In donor countries, the same relationship as in Figure 1 applies in principle, except that private discount rates are closer to public discount rates, and both discount rates tend to be lower than in developing countries. This gives private investors in potential donor countries an advantage over private investors from economies in transition. JI may then well mean that foreign investors would reap the 'low hanging fruit', i.e. the very cheap mitigation options. An alternative view would be that such projects would not take place for years if it were not for the foreign investors.

Negotiating at the international level

As the economies in transition stand to gain from the Kyoto Protocol, it appears rational for them to become more active in the international debate. The factors that will influence the revenue from trading most are the price for tradable units, the quantity of potentially tradable emissions, and the quantity actually traded at any point in time. Influencing the market price of emissions and the actual quantity traded requires that countries act jointly, possibly in terms of a cartel.

Immediately after the breakdown of Communism in the early nineties, EITs did not form a negotiating group because the new governments could no longer identify themselves with the formerly existing ties. During that time influence of countries depended on individual negotiators, who through their skills could push the climate agenda in few areas. Only in the late nineties countries in the region began cooperating in the area of international climate negotiations with other existing negotiating blocks. Following the conclusion of the negotiations surrounding the Kyoto Protocol in 1997, Russia and Ukraine became part of the 'umbrella group'.[4]

In parallel, Central and Eastern European economies in transition that are preparing for European Union (EU) accession, began to adopt negotiation stances in line with the EU position. During the late nineties, there were frequent instances when the EU and a range of accession countries presented a common position. In June 2001 the Central Group of 11 was formed during the second part of COP 6 in Bonn. This group consists of those EITs that are EU accession countries.[5] One of the first successes of CG11 was to be consulted by the chair of the negotiations as a separate negotiating group along with the umbrella group and the EU when the deal of Bonn was struck. The Bonn deal enabled the adoption of the Marrakesh Accords.

[4] The 'umbrella group' acts as a loose negotiating group. Its members are Australia, Japan, the USA, Canada, Iceland, Norway, New Zealand, Russia, and Ukraine.

[5] The members of the CG11 are Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, the Slovak Republic, and Slovenia. Malta and Cyprus have been admitted as observers to the group. The chair of the group rotates with the alphabet. In 2002 Croatia was chair. Substantive issues are divided up between countries. For example, Poland has been in charge of following the Kyoto Mechanisms debate.

The activities of the EITs in relation to the Kyoto Mechanisms have until mid-2002 focused mainly on technical and financial issues and on increasing the potential size of tradable emissions available to them. For example Russia has successfully pushed for a doubling of the size of creditable sinks under Article 3.4 of the Kyoto Protocol from 17.63 to 33.0MtC/year, and under Article 3.3 of the Kyoto Protocol from 8.2 to 9.0MtC/year in its greenhouse gas inventory. The number was endorsed as part of the Marrakesh Accords (UNFCCC, 2001/b). While Russia argued for such sinks on scientific grounds, it also clearly used its bargaining position, which results from the fact that Russia will be needed for the ratification of the Kyoto Protocol. In June 2002 Croatia put forward proposals to adjust its base year and the size of its sinks. These submissions aim at alleviating the task of meeting the Kyoto Protocol target. In its proposal Croatia is being supported by the CG11.

On the basis that the anticipated trading price will be far below what was anticipated before the withdrawal of the USA it can be expected that EITs will a coalition with the aim of maximising the revenue from tradable units sold by postponing the sale of a certain amount of quota until the second commitment period. Even Russia alone as the largest supplier in the market, Russia could drive market prices up during the first commitment period from 2008 -2012 if it banked units for future periods. Total revenue could be increased through such monopolistic behaviour.

Estimates for prices in USD per ton of CO_2 after the withdrawal of the USA range from USD 0 (Blanchard et al, 2002; Boehringer, 2001; Boehringer and Loeschel, 2001) to USD 12.50 (Buchner et al, 2001), assuming a competitive market and no further behavioural action by trading partners. If strategic behaviour by Parties with a Kyoto target (but excluding the USA) is considered, prices have been estimated to reach between USD 1.10 (Jotzo and Michaelowa, 2001) to USD 30.20 (Manne and Richels, 2001). These estimates imply that strategic behaviour of EIT countries is well worthwhile.

Participation of Economies in Transition in emissions trading and joint implementation

Although Russia and Ukraine are the largest potential sellers of emission quotas, they have perhaps made the smallest step towards implementation of the Kyoto Mechanisms. While Ukraine does not have any concrete AIJ or JI project example, Russia has 11 examples. In order to discard concerns of buyer countries like Japan and the EU, Russia has suggested a Green Investment Scheme (GIS), whereby revenues from emissions trade are re-invested in JI-type projects in order to ensure additionality of emissions reductions. RAO-UES, the biggest electricity utility in Russia and largest emitter of CO_2 emissions has established the 'Energy Carbon Facility' (ECF), which could use as a basis for further trades. Otherwise, the 'Interagency Commission on Climate Change' is temporarily in charge of assessing JI projects, but institutional clarity still needs to be established on a permanent basis on who is in charge of signing the MOUs for JI projects on a permanent basis.

Following Russia and Ukraine, Poland is the third largest emitter of GHG emissions among the economies in transition. Despite the steep slump in economic production in the early nineties, Poland has been able to get back to GDP levels before transition began. As a result of a shift towards a more service-based economy, and thanks to the implementation of more energy efficient technologies, Poland's greenhouse gas emissions seem to have de-coupled from economic activity.

Poland has a well-established structure for the implementation of the Kyoto Protocol and the Climate Convention. As early as 1994, the Polish Ministry of the Environment established a JI secretariat, which became operational in September 1996. In 1999 the Secretariat became a sub-

department of the Climate Convention Executive office. Two other previously existing offices were relocated under this secretariat: the Greenhouse Gas Section and the Climate Convention Secretariat. The executive office is part of the national Environmental Fund. The offices fulfil three functions: a policy function (Climate Convention Secretariat), a reporting function (the GHG Secretariat), and a mechanisms function (the JI Secretariat) (Petkova and Baumert, 2000).

Poland has outlined a set of selection criteria for JI projects, which takes account of both needs under the Kyoto Protocol and specific needs in Poland. In addition to issues relating to baseline accuracy, coherence with Polish overall environmental priorities, no other environmental detriments, and exclusion of dumping of second rate technology, the guidelines emphasise that Polish partners need to be solvent in the long-term.[6] While this currently excludes most of the emerging Polish private sector as investor it guarantees that projects once they are begun can be completed (Petkova and Baumert, 2000; UNFCCC, 1998).[7] There is an uncertainty as to whether Poland wants to participate in emissions trading.

The Baltic States Estonia, Latvia and Lithuania have so far not shown any interest in engaging in emissions trading. They have, however, good experience in AIJ/JI through their cooperation with the Swedish NUTEK. Around 50 projects have been implemented by NUTEK in the region. Most of the are boiler conversion to biofuels and energy efficiency measures in distribution networks and residential buildings. For this group of countries it may be most cost effective to participate in second track JI.

Slovenia, the Slovak and the Czech Republics are considering the implementation of a CO_2 trading regime at the domestic level. This is to be understood also as a response to the development of the EU Directive on emissions trading. Both countries are hoping for accession of the EU in the near future. Bulgaria, Hungary and Romania have limited experience in the AIJ pilot phase. Croatia has not shown any interest in participating in the Kyoto Mechanisms.

Conclusion

With the departure of the USA from the Kyoto Protocol, the likely revenues from international emissions trading for the economies in transition are at least during the first commitment period likely to be limited. Therefore banking of excess emissions credits for a second commitment period may be more attractive than selling quota at a comparatively low price. In addition, the risk of overselling emission quota inadvertently is comparatively high given the significant economic changes those countries have gone through since the early nineties.

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[6] It is unclear why this rule does not apply to the foreign donor or investor into a JI project.

[7] Poland has so far undertaken 3 AIJ projects. It includes:

- A coal to gas conversion project with the Norwegian government with a total investment of 48 mn USD;
- The modernisation of heat supply in the town of Byczyna with the Dutch government with an investment of 632,000 USD; and
- Sustainable heat and power for public networks undertaken with the Dutch government with a total investment of 724,000 USD.

The total mitigation potential of these projects has been estimated at 3,129,807 tons of CO_2 equivalent.

A key criterion on whether countries should undertake emissions trading is the comparison of projections of emissions until 2012 with the target under the Kyoto Protocol. These projections should capture all policies implemented and planned with certainty at the time at which the projections are made. Only if there is sufficiently wide gap between the projections and the target should the country (or entities in the country entitled to engage in trading) undertake emissions trading, especially as the uncertainties of such projections in economies in transition are high.

For JI, the investment climate and the emissions reductions potential of a specific project are more important. The country's investment climate is reflected in the projected performance of the economy as well as in well implemented legislation for businesses.

This discussion indicates that although there are a number of general criteria that can give countries guidance on what may be suitable for them, country-specific circumstances may not be easily captured by such indicators. Thus, countries that are bound by the Kyoto Protocol should implement a clear institutional structure, which includes a JI office or a position solely in charge of JI. Any JI-deal or suggestion will have to go via them. Even if the country decides not to engage in JI, such an office would help guide possible foreign investors.

References

Blanchard, O., Criqui, P. and A. Kitous (2002). After The Hague, Bonn and Marrakech: The future international market for emissions permits and the issue of hot air. Cahier de Recherche no. 27 bis, Institut s'Economie et Polotique de l'Energy, Grenoble, January.

Bodnar, P., Hannes, B., Hauff, J., and G. Lipcsey (2002). CO_2 Emissionshandel in Mittel- und Osteuropa - eine Chance fuer Unternehmen des Energiesektors. *Zeitschrift fuer Energiewirtschaft (ZfE)*, **26**, 1, pp. 73 - 81.

Boehringer, C. (2001). Climate Politics from Kyoto to Bonn; From Little to Nothing? *The Energy Journal*, **23**, no.2, pp. 51 - 71.

Boehringer, C. and A. Loeschel (2001). Market Power in International Emissions Trading: The Impact of US Withdrawal from the Kyoto Protocol. Discussion Paper No. 01 - 58, Zentrum fuer Europaeische Wirtschaftforschung GmbH, (ZEW), Mannheim.

Buchner, B., Carraro, C., and I. Cersosimo (2001). On the Consequences of the U.S. Withdrawal from the Kyoto/Bonn Protocol, Nota di Lavoro 102.2001, Fondazione Eni Enrico Mattei, Milan, December.

Evans, M., Legro, S. and I. Popov (2000). The Climate for Joint Implementation: Case Studies from Russia, Ukraine and Poland. *Mitigation and Adaptation Strategies for Global Change*. **5**, 319 – 336.

European Commission (2001). Proposal for a Directive of the European Parliament and of the Council establishing a framework for greenhouse gas emissions trading within the European Community and amending Council Directive 96/61/EC. COM(2001)581, Brussels.

Hagem, C. amd B. Holtsmark (2001). From small to insignificant: climate impact of the Kyoto Protocol with and without US. CICERO Policy Note 2001:1, Oslo.

Instituto de Economía Energética (IDEE/FB) , 1999. Argentina. Country Study Series. Economics of Greenhouse Gas Limitations. UNEP Collaborating Centre on Energy and Environment, Risø.

Jotzo, F. and A. Michaelowa (2001). Estimating the CDM Market under the Bonn Agreement. Discussion Paper 145, Hamburg Institute of International Economics (HWWA), Hamburg.

Korppoo, A., Vrolijk, C. and J. Stern (2001). Energy and Climate: Russian-European Partnership

Manne, A. and R. Richels (2001). US Rejection of the Kyoto Protocol: The Impact of Compliance Costs and CO_2 Emissions. Working Paper 01 - 12, AEI Brookings Joint Centre for Regulatory Studies, Washington, D.C., October.

Missfeldt, F. (1998). Flexibility Mechanisms: Which Path to Take after Kyoto? in: *Review of European Community and Environmental Law (RECIEL)*, **7**, issue 2, pp.128 - 139.

Missfeldt, F. and A. Villavicencio (2000). The economies in transition as part of the climate regime: recent developments. *Environment and Planning B: Planning and Design*, **27**, pp.379 - 392.

Petkova, E. and K. Baumert (2000). Making Joint Implementation Work: Lessons from Central and Eastern Europe. World Resources Institute Climate Notes, Washington.

UNFCCC (1997). The Kyoto Protocol to the Convention on Climate Change. France.

UNFCCC (1998). Activities Implemented Jointly: National Programmes for Activities Implemented Jointly under the Pilot Phase. The national reporting formats for national programmes submitted by Parties. http://wwww.unfccc.int/program/aij/aij_np.html

UNFCCC (2001/a). Review of the Implementation of the Commitments and of Other Provisions of the Convention. Preparations for the first session of the Conference of the Parties to the Kyoto Protocol (Decision 8/CP.4). Consolidated negotiating text proposed by the President. Addendum. Decisions concerning Mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol. FCCC/CP/2001/2/Add.2

UNFCCC (2001/b). Report of the Conference of the Parties on its Seventh Session, Held at Marrakesh from 29 October to 10 November 2001. Addendum. Part Two: Action Taken by the Conference of the Parties. Volume II. FCCC/CP/2001/13/Add.2.

UNFCCC (2001/c). Emissions data. On-line searchable database of greenhouse gas inventory data (emissions of carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), carbon monoxide (CO), oxides of nitrogen (NOx), non methane volatile organic compounds (NMVOCs) and sulphur dioxide (SO2) for Annex I and non-Annex I Parties); Greenhouse gas inventory data from 1990 to 1998 (tables / graphs) (compilation of the greenhouse gas inventory data for Annex I Parties as of end of September 2000). http://unfccc.int/resource/ghg/tempemis2.html

Personal Communications

European Bank for Reconstruction and Development, 1998.

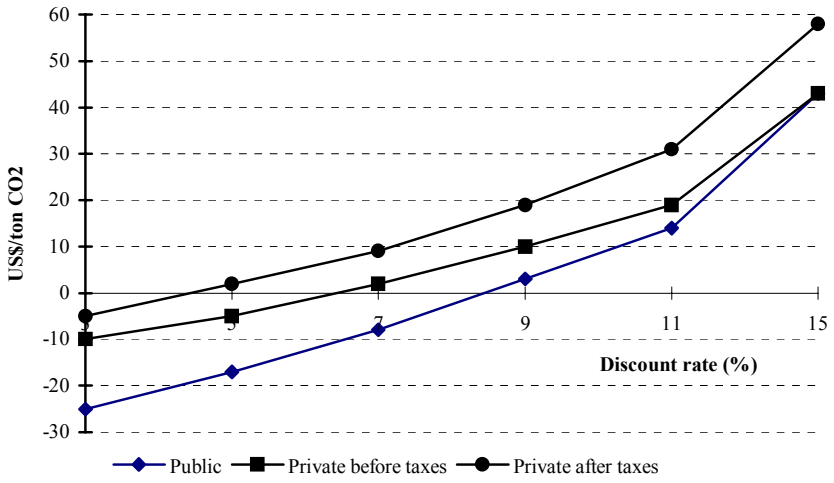
UNFCCC, 2002.

Tables and Figures

Table 1: Quantifying 'Hot Air'					
Annex B Countries	'Hot air' (all GHGs, thousand tons of CO_2)*	% of Base Year	Standard Deviation 1990-97 (all GHGs)	HOT AIR at 2002 Market Price (5USD/tC) in million USD	AIJ/JI Projects (number)
Bulgaria	8,581.60	6.07	16,595.44	- 11.71	2
Croatia	- 5,844.09	18.29	3,348.29	7.98	-
Czech Rep.	17,216.20	8.96	14,732.31	- 23.50	5
Estonia	- 14,578.98	35.80	5,013.86	19.90	21
Hungary	- 10,221.40	9.82	8,383.46	13.95	3
Latvia	- 12,676.48	35.54	6,607.43	17.30	25
Lithuania	3,253.84	6.31	4,058.31	- 4.44	9
Poland	- 18,250.40	3.19	46,609.76	24.91	8
Romania	- 58,437.68	20.48	33,537.53	79.77	9
Russian Federation	-128,532.00	4.23	337,990.70	175.45	11
Slovakia	- 180.40	0.25	6,820.59	0.25	4
Slovenia	1,758.29	9.15	27.11	- 2.40	-
Ukraine	-138,338.00	15.27	46,287.52	188.83	-

* Negative numbers imply that a country can sell emissions quota. ** Positive numbers indicate a likely income, negative numbers indicate an expenditure for purchasing quota.
Sources: UNFCCC (2001/c), LRTP (1998), own extrapolation of emissions.

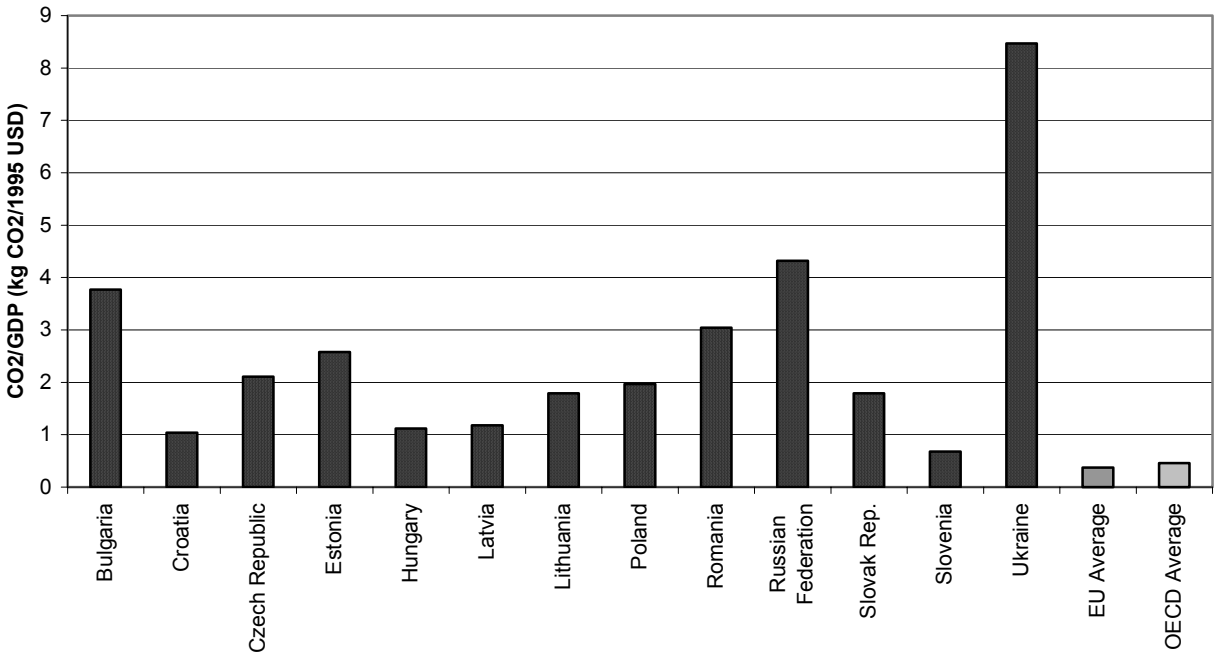
Figure 1: Public versus Private perspectives on CO_2 reduction costs



Source of data: Instituto de Economía Energética (IDEE/FB) , 1999

Table 2: Fulfilment of eligibility requirements for the Kyoto Mechanisms					
Annex B Countries	Kyoto Protocol ratification	Kyoto Protocol target*	Use of Common Reporting Format in 2001	Total number of National Communications submitted (3 were required)	Target for completion of the registry design (year)
Bulgaria	In process	- 8 %	Yes	2	2004
Croatia	In process	- 5 %		1	
Czech Rep.	Yes	- 8 %	Yes	3	2004
Estonia	In process	- 8 %	Yes	3	
Hungary	In process	- 6 %	Yes	2	
Latvia	In process	- 8 %	Yes	3	2003
Lithuania	In process	- 8 %		1	
Poland	Yes	- 6 %	Yes	3	2003
Romania	Yes	- 8 %		2	
Russian Federation	In process	0 %		2	
Slovakia	Yes	- 8 %	Yes	3	2003
Slovenia	In process	- 8 %		0	2002
Ukraine	In process	0 %		1	
* Specified in terms of percentage reduction as compared with the country's base year. Sources: UNFCCC (2001/c), personal communication UNFCCC (2002).					

Figure 2: Carbon intensities in EITs in 1999



Source: IEA (200)

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(lv) This paper was presented at the First Workshop of the Concerted Action on Tradable Emission Permits (CATEP) organised by the Fondazione Eni Enrico Mattei, Venice, Italy, December 3-4, 2001

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