European Bank
for Reconstruction and Development

The investment climate for climate investment: Joint Implementation in transition countries

Samuel Fankhauser and Lucia Lavric

Abstract

Under the Kyoto Protocol, transition countries are expected to become important players in the emerging market for greenhouse gas emission reductions, as they can reduce emissions at a relatively low cost. However, the attractiveness of the region as a supplier of emission reductions will not only depend on its cost advantage. It will also rely heavily on the business climate offered to carbon investors. Factors like a well-functioning legal and regulatory system, economic and political stability and the capacity to process emission reduction projects efficiently will be key. This paper looks at the carbon investment climate in the transition countries eligible for Joint Implementation (JI) – Russia, Ukraine, Croatia and the EU accession countries of the region. It concludes that JI investors will face a clear trade off between the scope for cheap JI on the one hand, and the quality of the business environment and JI institutions on the other. The countries with the highest potential for cheap emission reductions also tend to be the countries with the most difficult investment climate. The institutional capacity for JI is lowest in countries where the business environment and institutions are generally weak. It is also low in the most carbon-efficient countries, where there is less scope for, and hence less interest in, JI.

Keywords: business environment; climate change, Joint Implementation, transition

JEL Classification Number: L1, P2, P3, Q25, Q4

Address for Correspondence: Samuel Fankhauser, European Bank for Reconstruction and Development, One Exchange Square, London EC2A 2JN, UK.

Phone: +44 20 7338 6088; Fax: +44 20 7338 6110; E-mail: FankhauS@ebrd.com

Sam Fankhauser is Senior Economist at the EBRD. At the time of writing this paper, Lucia Lavric was with the Centre for the Study of Environmental Change and Sustainability, University of Edinburgh, and also an intern in the Office of the Chief Economist at the EBRD.

In writing this paper we have benefited from the comments and expertise of Alan Bevan, Robert Casamento, Jaquelin Ligot, Nathalie Roth, Peter Sanfey and Paul Soffe.

Working paper No. 77 **Prepared in January 2003**

INTRODUCTION

It now seems likely that the Kyoto Protocol, an international treaty to combat climate change, will come into force some time in 2003. The outcome hinges on the position of Russia, whose ratification is essential for the Protocol to become effective.[1] It is no coincidence that Russia should find itself in this position. Transition countries, and Russia in particular, are expected to play a key role in the international effort to deal with climate change. Unlike Western countries, they have some "headroom" in their Kyoto targets because of the slump in output and emissions during transition. Given the prevailing inefficiencies in large parts of their energy and industrial sectors, transition countries should also have scope to reduce emissions further at relatively little cost (see, for example, Victor et al. 2001; Chandler 2000).

The Kyoto Protocol allows such cost advantages to be exploited through three trading "mechanisms": Joint Implementation (JI), the Clean Development Mechanism (CDM) and international emissions trading (IET) – see Box 1. JI and IET are open to countries that have assumed emission reduction obligations under the UN Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol (so called Annex I countries). The CDM allows non-Annex I countries to deal with Annex I parties.[2] Thirteen transition countries belong to Annex I: Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, the Slovak Republic, Slovenia and Ukraine.[3] They are expected to become the main suppliers of emission reductions under JI and IET. Countries like Kazakhstan and Uzbekistan could become important suppliers of emission reductions under the CDM, but that mechanism is likely to be dominated by developing countries like Brazil, China and India.

Energy-economy models show that the use of the three mechanisms will reduce considerably the total cost of compliance, perhaps by as much as 50 per cent.[4] They also show that, if implemented fully, the mechanisms will result in a substantial volume of emission reduction trades. One early estimate puts the annual volume of greenhouse gas emission trades by 2010 at US$ 22 billion, of which US$ 6.6 billion would be sales and purchases by transition countries (Ellerman et al. 1998). Other observers see an annual trading volume in 2010 of at least US$ 10 billion (Joshua 2002; Halsnaes 2002).

Most of the models on which these forecasts are based use the standard economic assumptions of perfectly functioning markets and the absence of uncertainty. Constraints, if any, are limited to those imposed by the international trading regime (such as limits to trade due to supplementarity requirements), the imposition of taxes

[1] The Protocol will come into force once it has been ratified by at least 55 parties to the UN Framework Convention on Climate Change. These parties will need to represent at least 55 per cent of the greenhouse gas emissions by countries with emission reduction obligations, that is the so-called Annex I countries (Kyoto Protocol, Article 25).

[2] For an introduction to the Kyoto Protocol see Grubb and Vrolijk (1999). The concept of JI was first mentioned in a domestic US context under the term "offsets" (see Roland 1992). It was subsequently introduced as JI to the Intergovernmental Negotiating Committee negotiating the UNFCCC (see Dudek and LeBlanc 1990; LeBlanc 1991).

[3] Belarus, while part of Annex I, has not assumed emission reduction obligations, while Croatia has assumed a reduction target without being in Annex I.

[4] See the papers in *The Energy Journal*, Kyoto Special Issue, 1999.

(such as the adaptation levy), the magnitude of transaction costs for monitoring and verification, and the possibility of monopolistic behaviour by large suppliers.[5]

Yet we know that the functioning of markets is contingent on certain requirements, such as effective institutions and the prevalence of the rule of law. The importance of good institutions is emphasised both in the context of transition from central planning to a market economy, and in the creation of environmental markets. The EBRD (1999), for example, considers it a "central lesson of transition … that markets will not function well without supporting institutions, a state that carries through its basic responsibilities and a healthy civil society" (page 5). In a similar vein, Parkinson et al. (2001), Petsonk et al. (1998), and Tietenberg et al. (1998), among others, argue the need for a strong institutional framework to ensure the efficiency and integrity of the nascent carbon market.

Box 1: The Kyoto mechanisms

The basis for international trading in greenhouse gas emission reductions is provided in the UNFCCC and the Kyoto Protocol. The UNFCCC was signed at the Earth Summit in Rio de Janeiro in 1992 and provides the institutional framework under which international climate policy is determined. The 1997 Kyoto Protocol was negotiated under this framework and contains an initial set of greenhouse gas mitigation targets. Under the Protocol, developed countries and some transition countries (the Annex 1 countries) have agreed to reduce their greenhouse gas emissions by around five per cent below 1990 levels by 2008-12, the first commitment period.

The Kyoto Protocol includes provisions for three market-based instruments, the so-called Kyoto or flexible mechanisms, that allow countries to meet their obligations by exchanging emission reductions. The three Kyoto mechanisms are:

- *Joint Implementation (JI*). JI is a project-based mechanism. This allows project sponsors to invest in projects that reduce emissions relative to an agreed baseline and sell the difference. JI covers transactions where both the project/seller and the buyer of the emission reductions are located in an Annex I country. For example, a power producer in Poland may build a wind farm instead of a coal plant and sell the resulting emission reduction credits to the Netherlands.
- *Clean Development Mechanism (CDM).* The CDM is also project-based, but concerns projects located in non-Annex I countries (for example, district heating rehabilitation in Uzbekistan). Because the host country does not have an emission reduction target, the verification of the emission reductions may follow a more elaborate procedure than under JI, but the general principle is the same.
- *International Emissions Trading (IET)*. IET is not project-based. It allows Annex I countries to trade parts of their emission reduction obligations. For example, under an IET deal Ukraine may agree to undershoot its Kyoto target by 1 million tonnes of CO_2, allowing France to overshoot their target by the same amount.

The detailed regulatory regime governing the three mechanisms is still under development. Key building blocks are contained in the Kyoto Protocol itself and subsequent agreements by the parties to the UNFCCC, in particular the 2001 Marrakesh Accords.

At present, the institutional and regulatory underpinnings for an effective carbon market are still deficient. Emission reduction-specific know-how is scarce, monitoring and verification capacity is lacking and there is considerable regulatory uncertainty, both at the international and the national level. The translation of the Kyoto rules into

[5] The Kyoto Protocol provides that JI should supplement domestic action (Article 6.1d) and that a share of proceeds from CDM projects will be used to assist particularly vulnerable countries in adapting to a changing climate (Article 12.8).

national legislation has barely started and there is a shortage of what Yohe (2001) calls "mitigative capacity". In many countries these deficiencies are mirrored by similar shortcomings with respect to market-supporting institutions. Arguably they are most pronounced in the countries which have the highest potential for cheap greenhouse gas abatement – transition and developing countries. Investors in emission reduction projects still face considerable risks.[6]

The purpose of this paper is to investigate the investment climate for emission reduction projects in the Annex I countries of central and eastern Europe, that is in those transition countries that qualify for JI and (although this is less relevant for this paper) IET.[7] The paper provides indicators to identify the places offering the best combination of mitigation potential and business environment. The following *three elements* are considered to be key factors of the investment climate for JI transactions:

- the scope for cheap emission reductions, that is the marginal abatement costs of a country
- the institutional capacity of a host country to process JI deals, including prior experience gained through the Activities Implemented Jointly (AIJ) pilot phase
- the general investment climate, including factors such as political and economic stability, progress in privatisation, liberalisation and structural reforms, the quality of the legal system, and the prevalence of corruption.

The paper deals with each of these issues and provides a set of indicators as well as an indicative ranking of country performance. These rankings should be seen as suggestive, rather than firm measures of the relative JI investment climate in transition countries. They cannot answer the ultimate question about the efficiency and integrity of the carbon market. However, they may provide an indication of the attractiveness of transition countries in this market and the extent to which problems in the business environment may lead to a redirection of carbon investments. Investment may move away from the countries with the highest mitigation potential towards jurisdictions where abatement costs may be higher but the investment climate is more favourable.

[6] Risk mitigation under the Kyoto mechanisms is discussed in Janssen (2001).
[7] Similar questions have also been raised by DREE (2002) and Evans et al. (2000).

1. SCOPE FOR LOW COST JI

Perhaps the main determinant of JI investment flows is a country's ability to generate cheap emission reductions. Everything else being equal, JI investments are directed to the countries with the lowest marginal abatement costs. These are the countries with the highest scope for, and the lowest cost of producing, emission reductions.[8]

The cost of emission reductions is easily the most studied aspect of the JI investment flow. There have been numerous studies on the emission reduction potential and greenhouse gas mitigation costs of different countries, regions and sectors. The academic literature on mitigation costs dates back almost two decades. Most recently, it was reviewed by the Intergovernmental Panel on Climate Change (IPCC 1995, 2001) and in a special issue of the *Energy Journal* in 1999 (see footnote 4). Country level information is contained, to some extent, in the national communications submitted to the UNFCCC and, in the case of transition countries, in a series of studies commissioned by the World Bank (World Bank 1998a, b; 1999).

Unfortunately, most studies, at least at the country level, use different assumptions and modelling techniques. These are, therefore, difficult to compare. Several model comparison exercises have taken place (for example, by the Stanford Energy Modelling Forum), but they have tended to focus on global models where transition countries are treated as one aggregate region. There are no systematic, consistent or comprehensive cross-sectional mitigation cost data for transition countries.

The absolute emission reduction potential

To develop an understanding of the likely emission reduction potential of the 13 JI transition countries, we have considered two different but related indicators: carbon intensity and energy intensity.

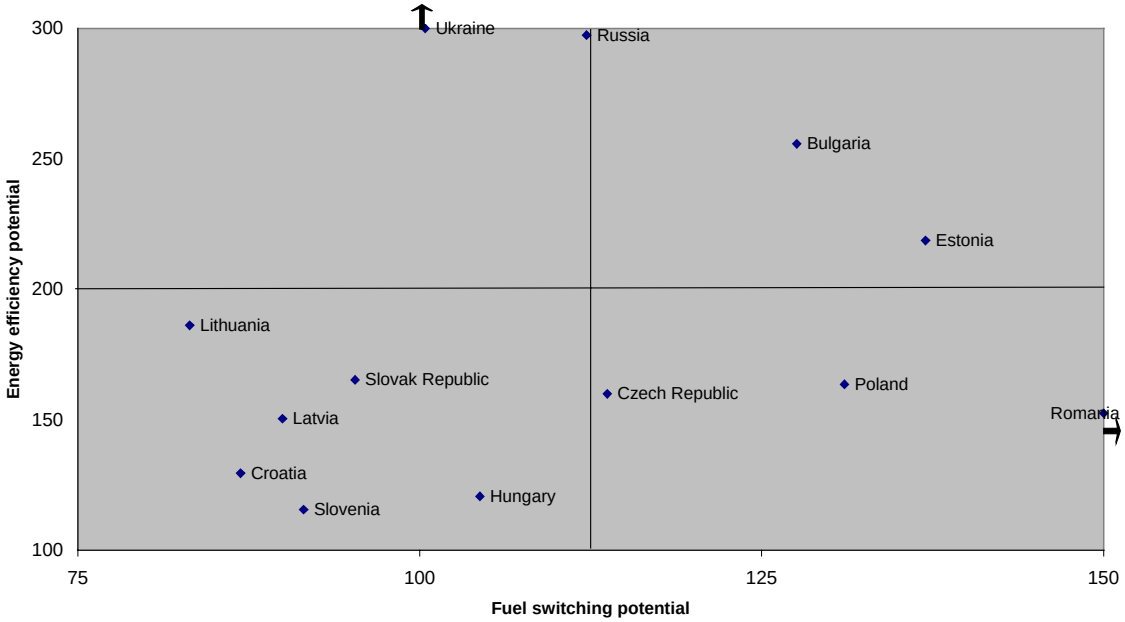
Carbon intensity is defined as the amount of carbon a country emits per unit of energy consumed. Carbon intensity can be interpreted as a rough measure of a country's fuel switching potential. Fuel switching involves the replacement of high carbon fuels (such as coal) with low carbon fuels (such as gas or renewable energy). Carbon intensity is, however, an imperfect indicator of fuel switching potential as it neglects other important factors, such as the availability of substitute fuels, their cost, the age of generating units and the structure of demand. Nevertheless, carbon intensity can be positively correlated to a country's fuel switching potential and negatively to its abatement costs.

Similarly, energy intensity can be seen as an indicator of an economy's potential to improve energy efficiency. Defined as the ratio of energy use per GDP, energy intensity is again an imperfect indicator of a country's energy conservation potential. This is because it neglects exogenous factors like settlement patterns, comparative advantages, climate and the availability of cheap indigenous energy resources, all of which may explain differences in energy consumption. A country like Russia, for example, with its cold climate and dispersed population, will always use extra energy for transport and heating, even if the economy is efficiently run. Nevertheless, the high energy intensity of transition countries is often used as evidence of their inefficient use of energy resources.

[8] For a critique of using country-level marginal abatement costs in a JI context see Zapfel and Vainio (2002).

Chart 1 shows the carbon and energy intensity of the JI countries in transition. Studies of these indicators have found that the energy intensity of transition countries is consistently higher than that of their European Union peers. The best performing countries are Croatia, Hungary and Slovenia, with energy intensities within 30 per cent of the EU average. In the worst performing countries, Russia and Ukraine, the ratio is three to four times higher if GDP is corrected for purchasing power parity (Chart 1). It is more than ten times higher if this correction is not made (Cornellie and Fankhauser 2002; EBRD 2001). In terms of carbon intensity, the leading countries are those that rely heavily on hydro or nuclear energy, as their carbon intensities can compete with many EU countries. In contrast, the coal-based energy systems of the Czech Republic, Poland and Romania lag behind both EU and other transition countries. In Bulgaria and Ukraine, a high share of nuclear energy is off-set by a similarly high share of coal-based electricity production, while Estonia's carbon intensity is probably a reflection of its heavy reliance on oil-shale.

Chart 1: Energy and carbon intensity (1998)



Note: The energy efficiency potential is calculated as energy intensity (energy use over purchasing power parity corrected GDP) relative to the European Union average (EU = 100). The fuel switching potential is calculated as carbon intensity (greenhouse gas emissions over energy use) relative to the EU average (EU = 100). The totals for Romania and Ukraine lie outside the graphed area in one of the two categories. The Ukrainian energy efficiency score is 440 and the Romanian fuel switching score is 206.
Source: World Development Indicators and UNFCCC.

There is a degree of correlation between carbon and energy intensity. Most countries with a low energy use per GDP also score well with respect to carbon intensity. The high correlation may be explained by the fact that energy efficiency investments often go hand in hand with a change in fuel, for example when inefficient coal boilers are replaced with more efficient gas-fired units. Countries where both intensities are high, suggesting a high JI potential, include Bulgaria, Estonia, and Russia.

Stringency of the baseline

Emission reductions are measured against a baseline, that is, a scenario of what would have happened in the absence of a JI project. It is likely that some of the emission reduction potential implicit in high *current* carbon and energy intensities will be realised as part of this baseline and, therefore, not available for JI.

Most countries have active energy efficiency and renewable energy programmes. They are also moving ahead with the restructuring and technological modernisation of their industrial base. For more accurate information about the JI potential of a country (as opposed to its emission reduction potential), we need to gain an understanding about the extent of these baseline activities.

Particularly relevant, in this respect, are the requirements imposed on transition countries by EU accession. Ten of the 13 JI countries in transition are expected to join the European Union by 2004 or (in the case of Bulgaria and Romania) around 2007-8. Only Russia, Ukraine and Croatia are currently not formal candidates for EU membership. Several of the directives which EU accession candidates will have to adopt have implications on their greenhouse gas emissions. These include, among others, the Integrated Pollution Prevention and Control Directive (IPPC), the Landfill Directive, the Large Combustion Plants Directive and various energy efficiency directives (see European Commission 2001).

Despite transition periods in the implementation of these programmes, most of them will be in force well before the start of JI trading in 2008. However, the interpretation and enforcement of these new rules may differ, which makes the extent of baseline emission reductions uncertain. This is particularly the case for the IPPC, which stipulates the use of Best Available Technology (BAT) in large power plants and a number of industrial sectors. The term "available" is relatively vague and open to interpretation. It is usually understood as economic availability, therefore making the stringency of the BAT requirement related to a country's economic strength. Assuming that higher national income will mean higher standards imposed by the BAT requirements, the most stringent BAT requirements would apply to richer countries like Slovenia, the Czech Republic and Poland, and more lax standards in Romania and Bulgaria. But even these two countries would probably be ahead of the non-accession trio of Croatia, Russia and Ukraine.

In most cases, EU accession implies more stringent baselines and, hence, a lower JI potential, as candidate countries adopt the emission reducing policies of the *acquis communautaire*. There is one important exception, however, which has to do with the decommissioning of unsafe nuclear power plants in Bulgaria, Lithuania and the Slovak Republic. Bulgaria has agreed to close units 1 and 2 of its Kozloduy nuclear power station in 2003 and the remaining two units around 2008-10. The agreed decommissioning dates for Bohunice (Slovak Republic) are 2006-08, while the first unit of Lithuania's Ignalina power station is to be shut down before 2005. The closure of the remaining reactor will be determined in 2004. In all three cases, the old, Soviet-style nuclear reactors will probably be replaced by thermal energy sources. As a result, the carbon intensity and baseline carbon emissions in these three countries are likely to go up, compared to the status quo. The same may be true for Russia and Ukraine, which also still run a number of Soviet-style reactors, but international pressure for their decommissioning is lower.

Summary indicator

For ease of comparison, the data relating to fuel switching and energy efficiency potential, as well as information about likely baseline developments, are aggregated into a single indicator. In the absence of consistent abatement cost data, we put forward *expected carbon emissions per GDP in 2010* as a rough measure of countries' JI potential. The indicator combines the fuel switching and energy efficiency potential since carbon emissions per GDP (C/Y) equals the product of carbon intensity (C/E) and energy intensity (E/Y). In addition, by looking at forecasts for 2010, we incorporate baseline policies to the extent that forecasters and national authorities anticipate their adoption over the next seven years.

Table 1: Indicator of JI scope and production cost

	Carbon emissions per GDP, 2010 (tonnes of carbon / million US$)	**Scope for low cost JI (ranking)**
Bulgaria	1,328	2
Croatia	176	12
Czech Republic	380	7
Estonia	360	8
Hungary	205	11
Latvia	296	10
Lithuania	393	6
Poland	402	5
Romania	683	4
Russia	1,164	3
Slovak Republic	337	9
Slovenia	120	13
Ukraine	2,530	1

Source: EBRD.

Emissions data used in Table 1 are primarily based on the countries' national communications to the UNFCCC, complemented by market forecasts such as Ecosecurities (2002). Where several forecasts are available, a median scenario has been used. GDP data are based on the EBRD's internal macroeconomic forecasts. While the EBRD numbers may not necessarily be consistent with the growth assumptions used in the national communications, they constitute a complete and internally consistent data panel. The GDP information in the national communications, in contrast, is incomplete and based on varying assumptions about global macroeconomic developments. As with all long-term predictions, emission and GDP forecasts for 2010 vary greatly depending on the underlying assumptions. However, for the present purpose the relative ranking of countries is more important than absolute values. This tends to be relatively robust across all scenarios.

The table also shows an indicative ranking of countries in terms of their potential for low cost JI. Ukraine, Bulgaria, Russia and Romania are identified as the countries with probably the highest scope for cheap emission reductions. In the case of Bulgaria, this partly reflects the need to phase out nuclear energy in the baseline, but also its high emissions in the non-nuclear sector. Slovenia, Croatia and Hungary are the countries with the lowest JI potential, according to this indicative measure.

While some of the results are surprising and details of the ranking would undoubtedly change with the use of a more sophisticated indicator, the overall picture appears to be intuitive. Unfortunately, it was not possible to carry out a more systematic statistical test. It would be interesting to see whether, for a broader set of countries, the C/Y indicator is indeed correlated with the marginal abatement cost estimates of energy models. However, this was not feasible. Regionally disaggregated models are too diverse in their underlying assumptions to provide consistent and comparable results. Model comparisons based on standard assumptions tend to focus on globally aggregated models, rendering a cross-sectional comparison impossible.

2. JI CAPACITY AND EXPERIENCE

For the Kyoto mechanisms to work smoothly, host and sponsor countries alike will need to develop their institutional capacity for the review, approval and registration of emission reduction projects. Foreign investors, already wary of the onerous administrative procedures they face in many transition countries, will look for host countries where JI responsibilities and policies have been clarified. In particular, they will be interested in countries where effective, transparent procedures for the processing of proposals have been established. Yet, despite several years of experience with JI and AIJ, the institutional framework is still mostly under preparation, both in transition countries and elsewhere (see, for example, OECD/IEA/IETA 2002).

JI policy and responsibilities

The procedures imposed by Kyoto to ensure the transparency and credibility of the mechanisms are clarified in the Marrakesh Accords, agreed at the 7th Conference of the parties of the UNFCCC in 2001.[9] The Accords provide two tracks, or options, for the administration of JI projects, depending on the institutional capacity of the host country.

Track one makes higher institutional demands in terms of emission monitoring and reporting. In return, it allows more streamlined processing of individual JI projects. To qualify for track one, countries need to establish a national system for estimating greenhouse gas emission. They also need to develop a registry for recording and monitoring the transfer of emission reductions and must report back to the Convention about supplementary action taken to reduce greenhouse gases. With such systems in place, compliance with the Kyoto targets can easily be established at the national level. The review of individual JI deals can, therefore, be left to the host country. If a project sells more emission reductions than it produces, the host country would cover the shortfall to remain in overall compliance. Track two presupposes that the national emission monitoring and tracking system is insufficient to accurately measure national greenhouse gas emissions and, hence, Kyoto compliance. Additional steps are, therefore, needed at the JI transaction level to ensure that projects do not sell more emission reductions than they generate.

Before track one eligibility is confirmed, JI investors will prefer to process projects under track two. This is because track two is less onerous for host countries and poses fewer non-compliance risks. Once compliance is established, however, JI investors will switch to track one countries to benefit from speedier and cheaper project implementation. It seems unlikely that any of the JI countries in transition will qualify for track one in the short or medium-term. Most of them are still in the process of developing their JI policy, have not yet clarified the government-internal responsibilities for JI, and employ only a handful of staff with JI experience.

[9] see www.unfccc.int; document FCCC/CP/2001/13/Add.2.

The main concern for JI investors in the short-term will be about the progress of these fundamental issues, rather than the choice between track one and two. Particularly needed is a clarification of JI policy and responsibilities within governments. Sponsors in early JI projects have often been frustrated by the uncertain mandate of their counterparts and a lack of clarity in the government's position. Table 2 summarises the current state of play in terms of JI policies, responsibilities and staff capacity.

Table 2: JI responsibilities and capacity

	JI policy	National registry	Provisional procedures	Dedicated JI office	JI staff	Institutions involved
Bulgaria	yes	no	yes	yes	1.5	Ministry of Environment and Water
Croatia	draft	no	no	no	5	Ministry of Environment (MZOPU) Ministry of Economy (MG)
Czech Republic	na	under preparation	yes	yes	na	Ministry of Environment
Estonia	draft	no	no	no	1	Ministry of Environment, Environmental Management: Technology department
Hungary	draft	under preparation	under preparation	na	2	Ministry of Environment, Atmosphere Protection: Energy office
Latvia	draft	no	being drafted	no	5 (in 2003)	Ministry of Environmental Protection and Regional Development Ministry of Finance
Lithuania	under discussion	no	no	no	1	Ministry of Environment: Environmental Quality department
Poland	na	no	yes	yes	na	National Fund for Environmental Protection and Water Management
Romania	draft	no	yes	yes	4	Ministry of Environment Ministry of Industry and Trade Ministry of Agriculture
Russia	no	no	no	being reformed	2	Ministry of Economic Development and Trade Ministry of Energy Roshydromet
Slovak Republic	yes	no	yes	no	2	Ministry of Environment
Slovenia	proposal	proposal	no	no	7	Proposal to nominate working group
Ukraine	no	no	no	no	0	Ministry of Ecology and Natural Resources

Source: Survey of environment ministries and various JI organisations in the region. Information on the Czech Republic and Poland comes from Nondek et al. (2001) and Sobelewski and Karaczun (2002), respectively. See also Missfeldt and Villavicenco (2002).

Prior experience and technical assistance

The speed with which institutional capacity can be built depends not least on the amount of technical assistance provided by the donor community. Donor organisations, such as the Global Environment Facility, have supported the development of emission inventories and the drafting of national communications to the UNFCCC for many years. As a result, substantial capacity has been developed in these areas. Assistance for JI-specific capacity building, however, has been more recent and coverage more patchy. One of the first JI-specific programmes was the National Strategy Studies of the World Bank, which commissioned JI studies in the Czech Republic, Russia and the Slovak Republic, among other countries (World Bank 1998a, b; 1999). Other agencies have also stepped up their efforts, including the Baltic Sea Region Energy Co-operation (BASREC).[10] However, many programmes have apparently suffered from high turnover among newly trained staff and ill-defined or shifting responsibilities for JI. Both factors have made it difficult to target support at the right agencies.

Equally important is the amount of experience countries have gained through pilot projects. Most of this experience has come from AIJ, the JI pilot phase, in which transition countries actively participated. A total of 74 AIJ projects were completed in transition countries for an emission reduction volume of close to 70 million tonnes of CO_2-equivalent.[11] Table 3 provides a summary of AIJ activities and suggests that while the largest deals were signed in Russia, the three Baltic states may have gained the most experience given the large number of deals they have processed. However, the experience gained from AIJ was mostly confined to baseline analysis and served to raise awareness among host authorities.[12] Experience with the commercial, economic and financial assessment of a transaction was limited as no actual emission reduction credits were awarded under AIJ.

Table 3: Project experience from AIJ

Host country	Emission reductions		Number of projects	
	CO_2 (tonnes '000)	Per cent	Number	Per cent
Bulgaria	0	0	0	0
Croatia	50	0.1	1	1.3
Czech Republic	16,049	23.5	4	5.2
Estonia	1,004	1.5	21	27.3
Hungary	459	0.7	3	3.9
Latvia	1,001	1.5	25	32.5
Lithuania	755	1.1	9	11.7
Poland	2,609	3.8	2	2.6
Romania	1,232	1.8	2	2.6
Russia	44,992	65.8	7	9.1
Slovak Republic	207	0.3	3	3.9
Slovenia	0	0	0	0
Ukraine	0	0	0	0
Total	68,358	100	74	100

Source: UNFCCC.

[10] For an overview of capacity building initiatives see OECD/IEA/IETA (2002).
[11] For a number of projects, the reporting has been incomplete. These are not included in this statistic.
[12] For a review of AIJ in transition countries, see Baumert and Petkova (2000), SEVEn/JIN (1997) and UNFCCC (2002).

Table 4: Indicator of JI capacity

Country	JI capacity indicator	JI capacity ranking
Bulgaria	3-	6
Croatia	2-	11
Czech Republic	4-	1
Estonia	3-	6
Hungary	4-	1
Latvia	3-	6
Lithuania	2+	9
Poland	3+	3
Romania	3	5
Russia	2	10
Slovak Republic	3+	3
Slovenia	2-	11
Ukraine	1	13

Note: Assessment based on Tables 2 and 3 and the sources given there.
The indicator is based on the following classification system:

1 Initial national communication, proposals for policies and institutional structures, little training and experience

2 Regular national communications, provisional authorities appointed, procedures and responsibilities unclear, some training and experience

3 Regular national communications, Kyoto ratified, JI policy adopted, provisional authorities appointed, national registry and inventory in place, procedures and responsibilities cleared, good capacity and prior experience

4 Kyoto ratified, good inventory, registry established, designated authority, national system under preparation, supplementary information being provided, on course for track two, several JI projects hosted, but no transfer of emission reductions yet.

4+ Eligible for track one, several JI projects hosted and emission reduction units successfully transferred.

Source: EBRD.

Summary score

To summarise the organisational arrangements and experience of the JI transition countries, we have developed an indicator depicting JI capacity. This takes into account the various factors relevant to the effective handling of JI projects. The indicator is modelled on the EBRD transition assessments (see, for example, EBRD 2002) and uses the same scale. A score of 1 signifies basic JI capacity only, while 4+ describes countries with a sound record of processing JI transactions under track one. Evidently this is a state that no country will achieve for some time, but it constitutes the ultimate objective. Like the other EBRD transition indicators, the JI capacity indicator can only provide an ordinal measure of relative progress. It is based to a considerable extent on value judgement. JI is also a fast evolving field, hence, the indicator only provides a snapshot of country capacity at one particular point in time.

With these caveats in mind, we can look at the results in Table 4. The most advanced countries of the region are Hungary and the Czech Republic, which have comparatively efficient public sectors, followed by Poland and the Slovak Republic. Bulgaria is relatively well placed despite its lack of AIJ experience. This is because the country has already adopted a JI policy and provisional procedures. Romania and the Baltic states have benefited from substantial technical assistance and pilot activities, but have not yet clarified their policies and procedures. Croatia and Slovenia have paid little attention to JI and fare badly, as does Ukraine, where deeper concerns about public sector performance also extend to JI.

3. INDICATORS OF THE BUSINESS ENVIRONMENT

Like overall foreign investment, the location of JI projects is influenced by differences in the business environment. The literature on the determinants of foreign direct investment (FDI) in transition countries alludes to the importance of a sound business environment. This is in addition to such factors as the level of privatisation, the size of the local economy and political and economic ties between investor and host country (see, for example, Bevan and Estrin, 2000; Bevan et al., 2000 and Holland and Pain, 1998). In the case of JI investments, additional factors likely to be important include the state of the energy sector, as most projects will be energy related, and the degree of country risk. The delivery of emission reductions hinges crucially on certain actions taken by the local authorities and JI investors will be exposed to considerable host government risk.

The general business environment

Governments and development organisations have begun to pay increasing attention to the quality of the business environment as a condition for private sector-led growth (see, for example, EBRD 1999; WEF 2003). A good business climate has many dimensions and is difficult to characterise. However, it is clearly linked to the quality of institutions, government policies and the legal and regulatory framework. A sound business environment depends on the integrity of public and private agents and the absence of crime and corruption. It requires political and economic stability, a level playing field between market participants and a tax system which is universally applied but not unduly distortionary. Effective infrastructure and a well-functioning financial sector are other important considerations.

The quality of the business environment can be assessed through surveys that either evaluate objective measures (such as company time spent dealing with bureaucrats) or the perceptions of the business community. One such survey that provides a good insight into the investment climate in transition countries is the Business Environment and Enterprise Performance Survey (BEEPS). Jointly commissioned by the World Bank and the EBRD, the BEEPS was first undertaken in 1999 in 20 transition countries, covering over 3,000 enterprises. A second survey of around 6,000 firms in 26 countries, including the 13 JI countries in transition, was undertaken in 2002.

Chart 2 shows the results of the two surveys. [13] It distinguishes seven dimensions of the investment climate and rates performance on a scale from 1 (no obstacles to business operation) to 4 (major obstacles). A fuller circle, thus, signifies a more difficult business environment. The chart suggests that the quality of infrastructure and crime are of least concern to enterprises, while access to finance and taxation top the list of complaints. Taxation – which is an issue for business people everywhere – seems to be particularly problematic in Lithuania and Russia, while Bulgaria and Romania have the lowest score in the finance indicator. Overall, the investment climate appears to be best in Slovenia, Hungary, Estonia and the Czech Republic and worst, by some distance, in Romania and Ukraine. Corruption and lack of trust in the judiciary stand out as key problems in these two countries. Romania and Ukraine are the only countries where the business climate has deteriorated since 1999.

[13] See EBRD (2002) for more detailed results of the 2002 BEEPS. The 1999 results are discussed in EBRD (1999) and Hellman et al. (2000).

Chart 2: Qualitative assessment of the investment climate

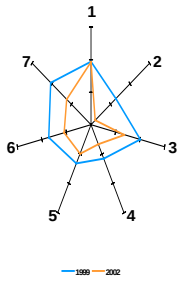
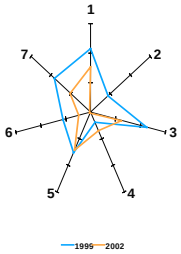
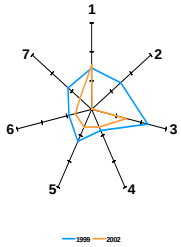
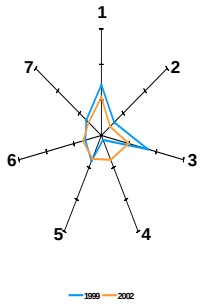
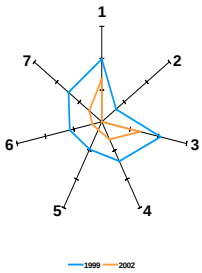
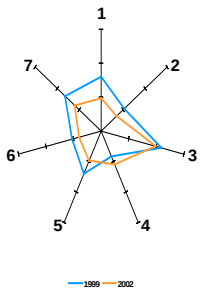
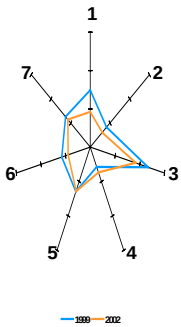
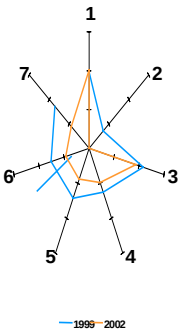
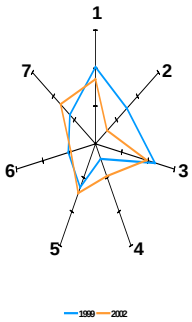
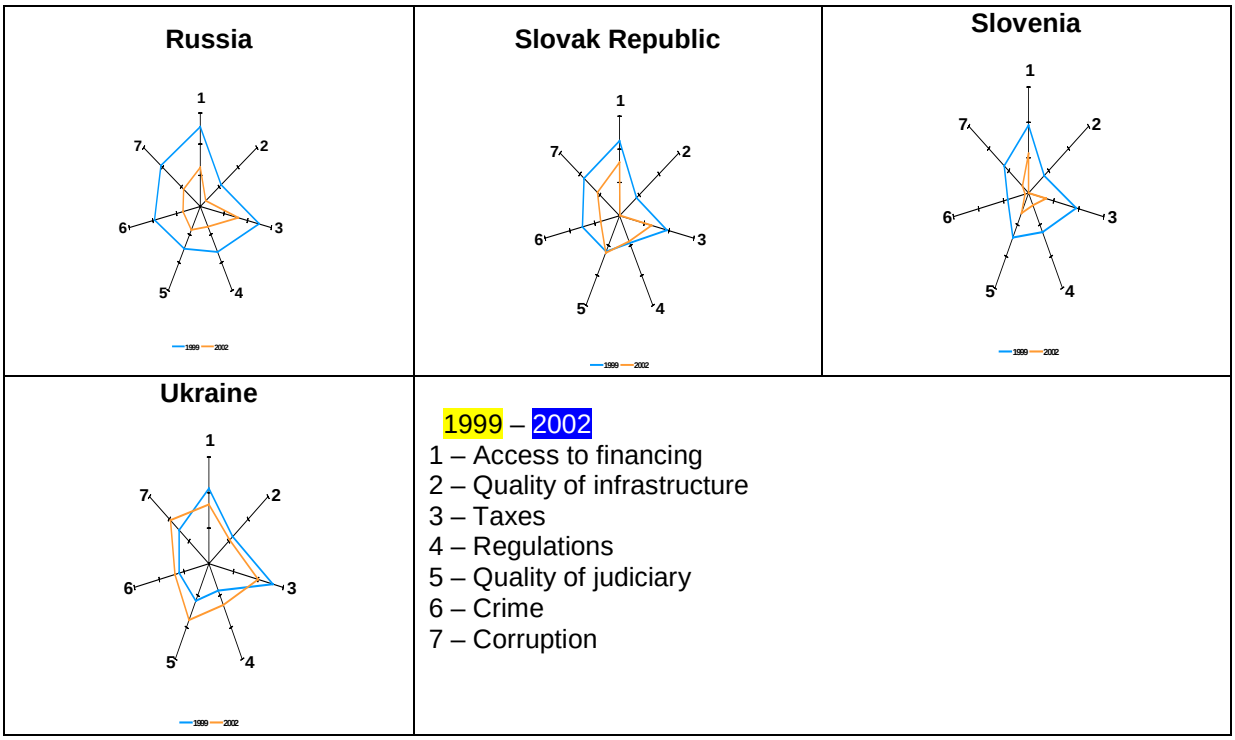
Bulgaria	**Croatia**	**Czech Republic**
		
Estonia	**Hungary**	**Latvia**
		
Lithuania	**Poland**	**Romania**
		

Chart 2 cont.



Note: Ratings reflect enterprise perceptions. A larger surface area indicates a more problematic business environment.
Source: EBRD (2002).

Widespread corruption and state capture remain central problems in many transition countries. These factors could become significant obstacles to JI. Experience has shown that corruption thrives in an environment where rules and procedures are ill-defined and officials have a fair amount of regulatory discretion. As we have seen above, this is exactly the situation in which the nascent JI market finds itself. Fortunately, the BEEPS indicates that since 1999 much progress has been made in the fight against corruption. Transparency International (2002) now ranks the leading transition countries (Slovenia, Estonia, Hungary and Lithuania) on a par with, or slightly above, the worst performing EU countries.

However, a caveat is necessary when interpreting the BEEPS results. The survey measures the experience of firms already active in a country and, hence, familiar with its business culture. They may differ from the perceptions of foreign firms which consider entering a country. The focus on local firms also means that results are difficult to compare across countries. Enterprises working in a more difficult environment, with lower expectations, may express satisfaction with a level of service that firms in more advanced countries would consider inadequate. The BEEPS only provides a qualitative assessment of the relative business environment.

Country risk

Host country governments play a crucial part in JI projects. They have to approve individual transactions and, upon their verification, transfer emission reductions to the buyer and register the transaction in the national registry. They also have to remain compliant with Kyoto Protocol requirements, maintain conducive economic policies and refrain from undue government and regulatory interference in the project

company. Project sponsors and their lenders are, therefore, concerned about host country risk.

The level of country risk faced by JI investors can be readily derived from the country risk assessments produced by rating agencies such as Standard & Poor's (S&P), Moody's and Fitch. Their ratings are based on overall economic indicators, as well as the credit ratings of the governments. They are widely used, including by the Prototype Carbon Fund, for their risk assessment (PCF, 2002).

Table 5 shows the country risk ratings of the three agencies as of November 2002. The assessments are broadly consistent across agencies, but for ease of comparison, an average rating was produced and transformed into the 1 to 4+ scale used by the EBRD for its transition indicators. According to the ratings, Estonia, Hungary and Slovenia are the least risky countries, while Romania, Ukraine and Russia pose the highest country risk.

Table 5: Country risk ratings (November 2002)

Country	S&P	Moody's	Fitch	Average
Bulgaria	BB-	B1	BB	3-
Croatia	BBB-	Baa3	BBB-	3+
Czech Republic	A-	A1	BBB+	4 -
Estonia	A-	A1	A-	4
Hungary	A-	A1	A-	4
Latvia	BBB+	A2	BBB	3+
Lithuania	BBB	Baa1	BBB-	3+
Poland	BBB+	A2	BBB+	3+
Romania	B+	B2	BB-	2+
Russia	BB-	Ba3	BB-	3-
Slovak Republic	BBB-	A3	BBB-	3+
Slovenia	A	Aa3	A	4
Ukraine	B	B2	B	2+

Note: The average rating uses the same scale as the EBRD transition indicators. That is, a lower score represents a less favourable risk rating. A score of 4+ would correspond to an AA rating or better.
Source: EBRD country database.

The state of the energy sector

The overwhelming majority of JI projects in transition countries are expected to be energy-related, as energy consumption is by far the largest source of greenhouse gas emissions. Although there is clear potential for energy-related mitigation and projects in the land use and forestry sectors, these are usually held back by monitoring and accounting difficulties. Therefore, the structure and business environment of the energy sector – particularly relating to heat and power supply – are key to JI investments.

Transition countries have made varying degrees of progress in reforming their energy sectors. Historically, the sector was dominated by vertically integrated, state-owned energy utilities. However, increasingly the sector has been unbundled into separate generation, transmission and distribution companies. Regulatory agencies have been created and the private sector invited to acquire or manage the newly corporatised utilities.

JI investors can be expected to look for energy sectors where reform is well advanced, where transparent and predictable regulation provides comfort to investors and where the institutional framework welcomes private sector participation. The EBRD assesses developments in the power sector in its annual *Transition Report*. One of the transition indicators published in the *Report* specifically concerns the power sector and measures progress in commercialisation, unbundling, regulation, private sector participation and tariff reform. The ratings of the 2002 *Transition Report* are reproduced in Table 6 (EBRD 2002; see also EBRD 2001 for a more detailed discussion).

One of the main problems which has long plagued the energy sectors of transition countries is the low level of energy tariffs and insufficient collection rates. Inadequate pricing and revenue collection has weakened the financial health of the sector and has prevented much-needed rehabilitation investment. Progress in tariff reform is reflected in the EBRD's electricity transition indicator. Tariff and collection indicators are also listed separately in Table 6, as they directly affect the scope for JI investment. The commercial attraction of energy efficiency measures is severely undermined by low energy prices, even in the presence of additional JI revenues. Investments in modern, cleaner and more efficient generation capacity will be unattractive unless the initial capital costs can be recouped through adequate sales revenues.

Table 6: The state of the power sector

	Industrial tariffs (US cents per kWh)	**Cash collection rate** (in per cent)	**EBRD power sector transition indicator**
Bulgaria	3.9	85	3+
Croatia	6.7	100	3
Czech Republic	4.3	na	3
Estonia	4.1	97	3
Hungary	5.7	90	4
Latvia	5.2	100	3
Lithuania	3.8	91	3
Poland	4.5	97	3
Romania	4.8	62	3
Russia	1.6	97	2+
Slovak Republic	4.2	100	4
Slovenia	7.0	99	3
Ukraine	2.2	78	3+

Note: For comparison, the long-run marginal cost of Western power systems is around US cents 8 per kWh. The EBRD transition indicators are based on the following rating:

1 The power sector operates as a government department. There is political interference in the running of the industry, with few commercial freedoms or pressures. Average prices are below costs, with external and implicit subsidy and cross-subsidy. Very little institutional reform has been achieved. There is a monolithic structure, with no separation of different parts of the business.

2 The power company is distanced from the government. It may operate as a joint-stock company, but there is still political interference. There has been some attempt to harden budget constraints, but management incentives for efficient performance are weak. Some degree of subsidy and cross-subsidy exists. Little institutional reform has been achieved. There is a monolithic structure, with no separation of different parts of the business. Minimal, if any, private sector involvement has occurred.

3	A law has been passed providing for full-scale restructuring of the industry, including vertical unbundling through account separation and setting-up of a regulator. Some tariff reform and improvements in revenue collection have been achieved and there is some private sector involvement.
4	A law for industry restructuring has been passed and implemented, with separation of the industry into generation, transmission and distribution. A regulator has been set up. Rules for cost-reflective tariff –setting have been formulated and implemented. Arrangements for network access (negotiated access, single buyer model) have been developed. There is substantial private sector involvement in distribution and/or generation.
4+	Business has been separated vertically into generation, transmission and distribution. An independent regulator has been set up, with full power to set cost-reflective effective tariffs. There is large-scale private sector involvement. Institutional development has taken place, covering arrangements for network access and full competition in generation.

Source: EBRD.

Table 6 shows that Hungary, the Slovak Republic, Bulgaria and Ukraine have advanced furthest in power sector reform. However, in Ukraine, and to a lesser extent Bulgaria, the financial viability of JI projects is likely to be affected by low energy tariffs and poor collection rates. Low effective tariffs (that is, tariffs corrected for collection rates) are also a problem in Romania and in Russia, where sector reform has started only recently with the adoption of a comprehensive reform plan.

Summary score and ranking

Combining the many facets of a good investment climate into a single indicator is not easy. One way to approach the problem is to reverse the causality in the "determinants of FDI" literature (see, for example, Bevan et al. 2000). Given that current FDI flows are determined not least by differences in the investment climate, data on FDI per capita can serve as an indicator of relative investor satisfaction with the investment climate in different countries. The argument is that investors reveal their preferences by directing capital to those countries where the business environment is most to their liking.

Table 7 provides data on FDI per capita over the period 1997-2001. It shows total FDI rather than energy-related FDI, even though most investments are expected in the energy sector. This is primarily for data reasons, as information about energy sector-specific FDI is available only for a few countries. Fortunately that small data set shows a strong correlation between total FDI and foreign investment in the energy sector. In other words, total FDI is a reasonable proxy for energy sector FDI. Total FDI also has the advantage of being a broader measure and being more closely linked with the general state of the investment climate in a country.

Table 7: Indicators of the general investment climate

	FDI per capita (5-year average, US$)	**WEF** (global ranking)	**EBRD**	**Investment climate ranking**
Bulgaria	86.9	62	4 -	10
Croatia	244.4	58	3+	9
Czech Republic	412.2	40	4	3
Estonia	287.9	26	4	1
Hungary	202.8	29	4	2
Latvia	152.6	44	4 -	8
Lithuania	140.2	36	4 -	5
Poland	189.9	51	4 -	7
Romania	57.5	66	3+	11
Russia	24.6	64	3	12
Slovak Republic	175.8	49	4	4
Slovenia	128.6	28	4 -	6
Ukraine	13.0	79	3	13

Note: The WEF index shows the ranking of countries in their global competitiveness table. For comparison, the US is ranked first, Germany 14th, France 30th and Italy 39th. The EBRD transition indicators range from 1 (no progress) to 4+ (fully functioning market economy). The table shows the aggregate score over all reform dimensions assessed by the EBRD. The ranking in the final column was obtained by taking the unweighted average over the three indicators.
Source: EBRD and WEF (2003).

The FDI indicator is complemented by two other measures of the business environment. The first is the growth competitiveness index compiled by the World Economic Forum (WEF 2003). The second is the aggregate score of the EBRD's transition indicators, which measure progress in privatisation, liberalisation, enterprise performance and financial sector reform (EBRD 2002). The three indicators paint a surprisingly consistent picture and the ordinal ranking in the business environment they imply is also shown in Table 7. It suggests that the most conducive business environment can be found in Estonia, Hungary and the Czech Republic while Romania, Russia and Ukraine create the most severe problems for foreign investors.

4. SYNTHESIS AND COMPARISON

In this paper we have developed indicators of the JI investment climate in three respects: the scope for low cost JI, the host country's capacity to process JI and its general business environment. The indicative rankings we produced in each of these categories are reproduced in Table 8 for ease of comparison.

The table shows that JI investors will face real trade-offs. No country scores well in all three dimensions and none consistently lags behind. Generally, there is a good correspondence between JI capacity and the investment climate. The countries with the most conducive business environment also tend to be furthest ahead in the development of JI institutions. Chart 3 shows this link graphically.

Table 8: Summary ranking – scope for JI, JI capacity and business environment

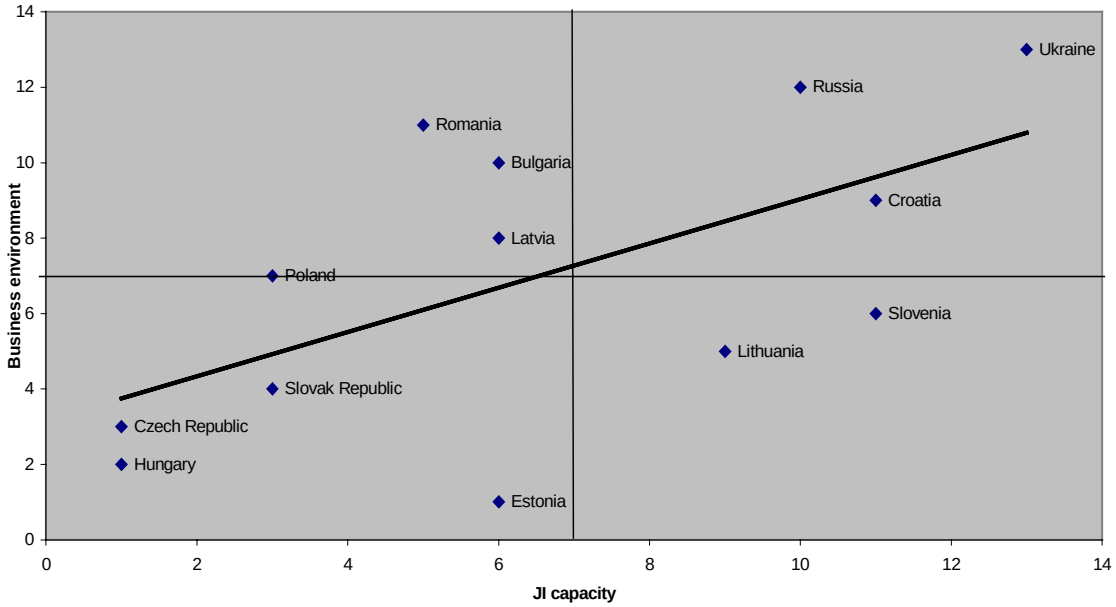
Rank	Scope for JI	JI capacity	Business environment
1	Ukraine	Czech Republic	Estonia
2	Bulgaria	Hungary	Hungary
3	Russia	Slovak Republic	Czech Republic
4	Romania	Poland	Slovak Republic
5	Poland	Romania	Lithuania
6	Lithuania	Estonia	Slovenia
7	Czech Republic	Bulgaria	Poland
8	Estonia	Latvia	Latvia
9	Slovak Republic	Lithuania	Croatia
10	Latvia	Russia	Bulgaria
11	Hungary	Croatia	Romania
12	Croatia	Slovenia	Russia
13	Slovenia	Ukraine	Ukraine

Source: EBRD.

However, there is a clear negative relationship between the scope for JI and the general business environment (Chart 4). This makes intuitive sense, as the countries with the worst investment climate will have attracted the lowest amount of (foreign or domestic) investment. Such investments generally increase resource efficiency and upgrade the capital stock: actions that usually lead to a reduction in greenhouse gas emissions. However, some of these stalled investments may look more attractive once the added benefit of emission reduction sales is factored in.

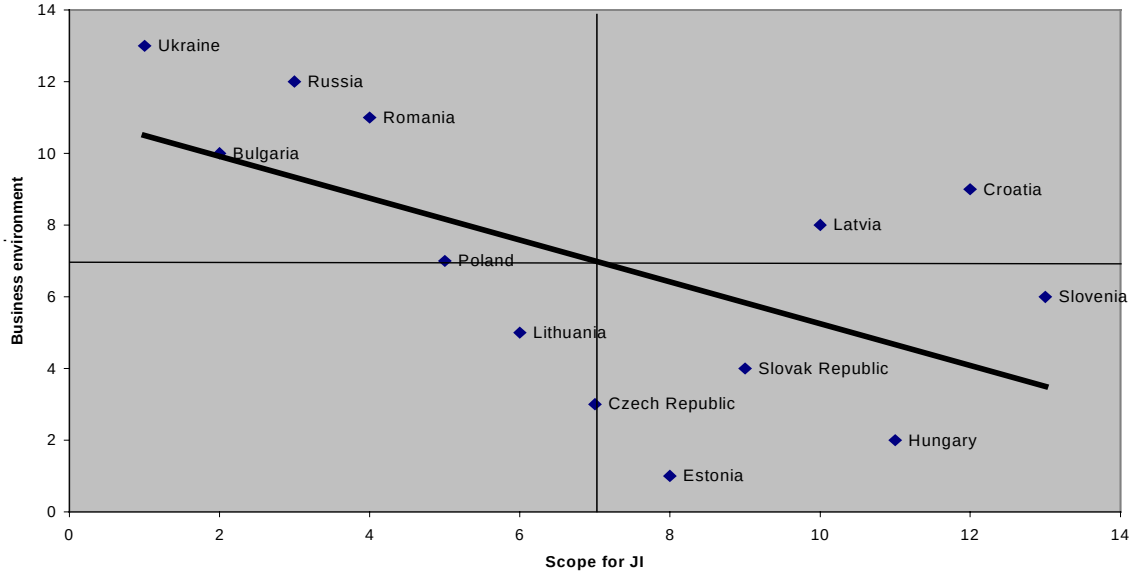
The relationship between JI capacity and the scope for JI is u-shaped, reflecting two counteracting trends (Chart 5). At one end of the spectrum, the countries with a limited JI potential have, quite rationally, refrained from building expensive JI capacity. This is because they do not expect to participate much in the market. At the other end of the spectrum, the countries with a good JI potential have every interest in developing JI capacity and take advantage of this new opportunity. However, these are also the countries with the most difficult business climates. It appears that the institutional and political constraints, which slow down improvements in the business environment, also hold back the development of JI capacity.

Chart 3: Country rankings – JI capacity and business environment



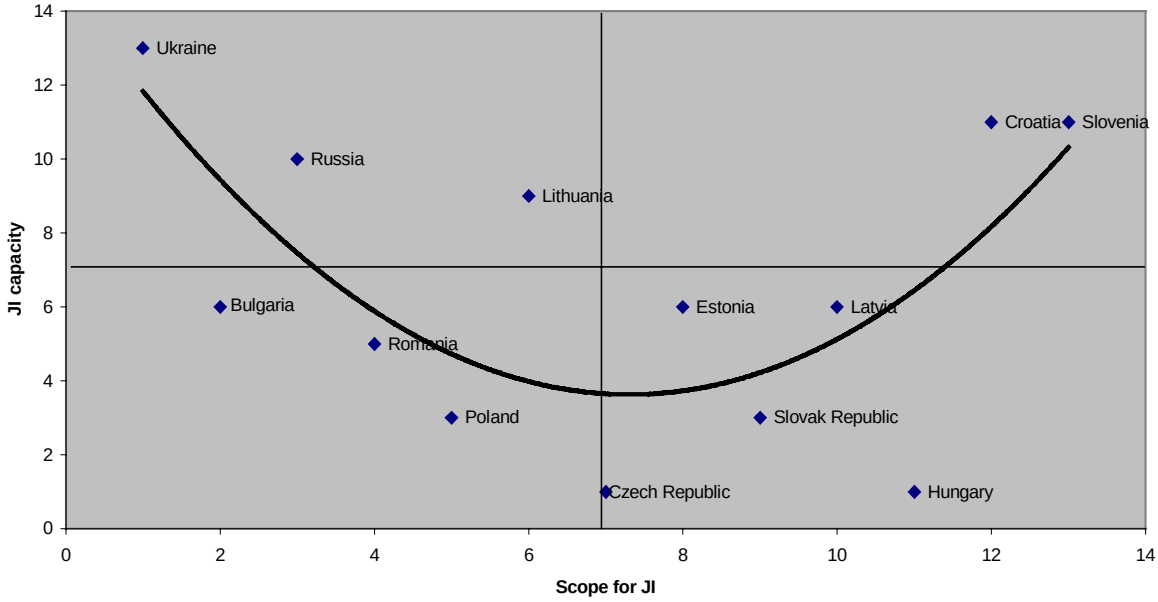
Source: EBRD.

Chart 4: Country rankings – Scope for JI and business environment



Source: EBRD.

Chart 5: Country rankings – Scope for JI and JI capacity



Source: EBRD.

At the country level, the results of Table 8 may be synthesised by distinguishing the following five groups of countries:

- *Croatia* and *Slovenia* have a relatively conducive business environment, but few other features that would make them attractive for JI. The scope for low cost emission reduction appears to be limited and, probably because they recognise this, the authorities of these two countries have made little attempt, so far, to build JI capacity.
- *Russia* and *Ukraine* are long-term prospects. They have tremendous JI potential, but their business environment is notoriously difficult and they have been slow in developing JI capacity. JI investors may shy away from these countries until the situation improves, unless they can obtain risk coverage from international financial institutions like the EBRD.
- *Latvia, Lithuania* and *Poland* can be characterised as median countries, which currently stand out as neither particularly attractive nor particularly unattractive for JI. Latvia has participated in one of the first JI projects in the region but its JI potential will probably be limited. Given its size, Poland, in contrast, may develop into an attractive JI country over the medium-term. Lithuania's long-term potential depends not least on the future of the Ignalina nuclear power station, which currently provides most of the country's electricity.
- The *Czech Republic, Estonia* and *Hungary* are perhaps the most successful reformers of the region and, at least in the short-term, have much to offer JI investors. They have the least risky business environments, with Hungary and the Czech Republic well advanced in developing JI capacity. However, their JI potential may be limited. Hungary already scores low on JI potential and the scope for JI in the Czech Republic and Estonia may be limited given the fast growth of their relatively small economies. There are still opportunities, but once these have been realised these countries may become less attractive. Over time, they may turn from carbon sellers into buyers.

- *Bulgaria, Romania* and the *Slovak Republic* probably have the best short to medium-term prospects for JI. They have a good JI potential and are in the process of building the necessary institutional capacity. In the case of Romania, this could be enough to offset concerns about the difficult investment climate. Concerns about the Bulgarian and Slovak business climate have receded since the election of reform-minded governments and, although problems remain, they have become more attractive to foreign investors.

The indicators we develop in this paper provide a pointer about the likely direction of JI investment flows. It is not possible to test how significant they are in determining future JI activity. With barely a handful of JI deals completed, there is not yet enough data for statistical analysis. The only data available so far concern AIJ, the JI pilot phase.

However, we argue that the AIJ pilot phase, under which no emission reduction credits were awarded, was too heavily dominated by government agencies to be a meaningful indicator of the direction of future (private) JI investment. Most AIJ programmes were either administered by, or closely associated with, the international development agencies of the sponsoring countries. This also influenced the location of the projects. Table 9 shows the direction of AIJ flows between sponsor and host countries. The correlation between the political priorities of sponsor countries and the flow of investment is apparent (for example, Sweden's investments in the Baltic States, or US and German projects in Russia). This is confirmed by regression analysis, which shows that the flow of official aid between two countries is a far better predictor of AIJ investment than the flow of FDI.[14]

Table 9: The distribution of AIJ projects
(emission reductions financed, in '000 tCO_2)

Investor Host	US	Sweden	Germany	Nether-lands	Belgium	Norway	France	Switzer-land	*Total*
Croatia	-	-	-	-	50	-	-	-	*50*
Czech Republic	607	-	5,440	9,834	-	-	168	-	*16,049*
Estonia	-	1,004	-	-	-	-	-	-	*1,004*
Hungary	-	-	-	388	-	-	71	-	*459*
Latvia	-	925	14	63	-	-	-	-	*1,001*
Lithuania	-	755	-	-	-	-	-	-	*755*
Poland	-	-	-	77	-	2,532	-	-	*2,609*
Romania	-	-	-	1,093	-	-	-	138	*1,232*
Russia	33,682	-	11,025	286	-	-	-	-	*44,992*
Slovak Republic	-	-	-	7	-	51	-	148	*207*
Total	*34,289*	*2,683*	*16,479*	*11,747*	*50*	*2,583*	*239*	*287*	***68,358***

Note: Table excludes countries without documented AIJ projects.
Source: UNFCCC.

[14] In a regression of the form $AIJ_{ij} = f(ODA_{ij}, FDI_{ij}, \ldots)$, ODAij was found to be significant, but FDI_{ij} was not. AIJ_{ij} denotes the volume of emission reductions financed by sponsor country i in host country j through AIJ. ODA_{ij} is the percentage of the aid budget of country i directed to country j during the AIJ pilot phase, and FDI_{ij} denotes the flow of foreign direct investment from country i to country j. The regression also included proxi variables for the investment climate (total FDI_j) and emission abatement costs (C/Y_j).

5. CONCLUSION

In this paper we have looked at the factors that may determine the magnitude and location of Joint Implementation investments in transition countries. We argue that JI investors will be concerned not only about the cost of emission reductions, which has been the main focus of the literature so far, but also the capacity of countries to process JI transactions and the business environment they offer. We found that JI investors will face a clear trade-off between the scope for cheap JI on the one hand and the quality of JI institutions and the business environment on the other. Transition countries can increase their attractiveness to JI investors by pushing ahead with reforms to improve the business environment – a win-win option that will benefit foreign investment more generally – and by clarifying their JI policies and building the necessary JI capacity.

Greenhouse gas mitigation models often treat transition countries as a homogeneous region. However, it would be wrong to assume that all JI countries in transition are tarred with the same brush. There are significant differences, both in terms of JI policies and potential. Some countries have shown little interest in the Kyoto mechanisms and are unlikely to host many JI projects. Elsewhere, the scope for JI may be short-lived as countries are reforming rapidly and realising emission reduction opportunities in the course of this process. Another group of countries will only be able to realise their JI potential if they accelerate reform and improve their business environment. These differences, in outlook and circumstances, will determine the flow of JI investments in the region.

Of course, the JI countries in transition will not only, and perhaps not even primarily, compete for Kyoto business among themselves. Investors will look for emission reduction opportunities in all countries that are parties to the Kyoto Protocol. Many of them have huge emission reduction potentials. Transition countries need to be mindful of this competition, but should not fear it. The capacity needed to implement emission reduction projects is not only lacking in transition countries, but virtually everywhere. In terms of their business environment, the JI countries in transition do not score worse than developing countries in global transparency and competitiveness ratings. Indeed, the frontrunners in the group are already rated on a par with, and in some cases above, the weakest OECD performers. While much remains to be done to build up JI capacity and reduce generic barriers to foreign investment, transition countries remain one of the brightest prospects in the emerging emission reduction market.

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